

## ABBREVIATIONS

GENERAL	HVAC
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFC	ABOVE FINISHED GRADE
BHP	BRAKE HORSEPOWER
BOP	BOTTOM OF PIPE
BOT	BOTTOM
CLL	CENTER LINE
CLG	COOLING
CFM	CUBIC FEET PER MINUTE
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
CSR	CURRENT SENSING RELAY
DISCH	DISCHARGE
DN	DOWN
DS	DISCONNECT SWITCH, DOOR SWITCH
(E)	EXISTING
EA	EXHAUST
EC	ELECTRICAL CONTRACTOR, END CAP
EP	EMERGENCY POWER OFF
EOP	EMERGENCY STATIC PRESSURE
IT	FUTURE
FA	FIRE ALARM
FDC	FIRE DEPARTMENT CONNECTION
FOR	FOR POSITION
FLEX	FLEXIBLE
FFF	FOOT PROTECTION
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
HP	HORSEPOWER, HIGH PRESSURE
HTG	HEATING
HTR	HEATER
IAW	IN ACCORDANCE WITH
ID	INCHES DIAMETER/DIMENSION
IN WC	INCHES WATER COLUMN
MC	MANUFACTURAL CONTRACTOR
MFR	MANUFACTURER
MH	MANIFOLD
MTD	MONITOR
N/A	NOT APPLICABLE
NC	NOT NORMALLY CLOSED
NIC	NOT IN CONTRACT
NONM	NOT NORMALLY OPEN, NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OVHD	OVERHEAD
PERF	PERFORATED
POC	POINT OF CONNECTION
QTY	QUANTITY
RI	RELOCATED
RCP	REFLECTED CEILING PLAN
REQD	REQUIRED
SECT	SECTION
SIM	SIMILAR
SPEC	SPECIFICATION
STD	STANDARD
TBD	TO BE DETERMINED
TI	TYPE OF IMPROVEMENTS
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TOP	TOP, TOP, TOP, TOP, TOP
TPY	TOP, TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
VFD	VARIABLE FREQUENCY DRIVE
VSD	VARIABLE SPEED DRIVE
W	WITH
W/O	WITHOUT
WC	WATER COLUMNS
WG	WATER GAUGE
G	NATURAL GAS
2# G	NATURAL GAS - LOW PRESSURE, 2 PSI
5# G	NATURAL GAS - LOW PRESSURE, 5 PSI
GE	GENERATOR EXHAUST
GHW	GEO - FIELD WATER RETURN
GWP	GROUNDED WATER SUPPLY
GWR	GROUNDED WATER RETURN
GWR	GROUNDED WATER SUPPLY
GWR	GROUNDED WATER RETURN
HPC	HIGH PRESSURE CONDENSATE
HPS	HIGH PRESSURE STEAM
HWR	HIGH WATER RETURN
HWS	HEATING WATER SUPPLY
LPC	LOW PRESSURE CONDENSATE
LPG	LIQUEFIED PROPANE GAS
LPS	LOW PRESSURE STEAM
LWT	LOW WATER TEMPERATURE
MPC	MEDIUM PRESSURE CONDENSATE
MPS	MEDIUM PRESSURE STEAM
POW	PROCESS COLD WATER
PCWR	PROCESS COOLING WATER RETURN
PCWS	PROCESS COOLING WATER SUPPLY
PHW	PROCESS HOT WATER
PHWR	PROCESS HOT WATER RETURN
RL	REFRIGERATION LIQUID
RS	REFRIGERATION SUCION
RV	REFRIGERATION VENT
SCW	SOFTENED COLD WATER
SRV	STEAM RELIEF VENT
TOP	TOP OF PIPE

## PIPING IDENTIFICATION

HVAC

PROJECT SPECIFIC

RETURN PIPING

SUPPLY PIPING

PROJECT SPECIFIC

SUPPLY GRILLE

RETURN OR EXHAUST GRILLE

PROJECT SPECIFIC

VOLUME DAMPER

PROJECT SPECIFIC

MOTOR OPERATED DAMPER

PROJECT SPECIFIC

CEILING EXHAUST GRILLE

PROJECT SPECIFIC

LINEAR DIFFUSER (CEILING)

PROJECT SPECIFIC

LINEAR DIFFUSER (WALL)

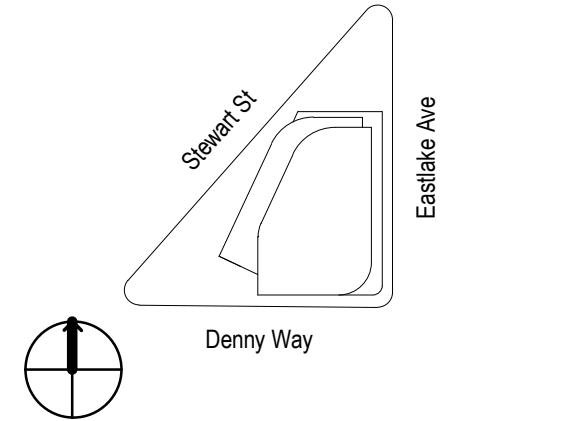
PROJECT SPECIFIC

LOUVER PLAN VIEW

PROJECT SPECIFIC

LOUVER (ELEVATION VIEW)

PROJECT SPECIFIC



NO	ISSUE	DATE
Job Number	207092-001	
Checked	O NNAMDI-EMETAROM, BGM	
Approved	D BUDD	
	TITLE	

**MECHANICAL BASIS OF DESIGN**

## 1305 Stewart BOD Narrative

### MECHANICAL SYSTEMS

The following sections contain design criteria and system descriptions for the heating, ventilation, and air conditioning systems. IESVE software will be used to model the peak HVAC loads during the 100% phase of this project. Any necessary adjustments will be made as the design progresses.

### DESIGN CRITERIA AND ASSUMPTIONS

This project has been designed to comply with the following codes and industry guidelines:

- o ASHRAE Standard 62.1
- o ASHRAE Standard 170
- o 2018 Seattle Mechanical Code
- o 2018 Seattle Plumbing Code
- o 2018 Seattle Gas Code
- o 2018 Seattle Fire Code
- o American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Standards
- o American Society of Plumbing Engineers (ASPE) Data Books

ENERGY CONSERVATION MEASURES (ECM): The project is pursuing the following options to achieve a total of eight (8) credits per 2018 SEC Table C406.1 Efficiency Packages: Credits requirements for Group B occupancy:

- o More Efficient HVAC Performance in accordance with Section C406.2 (3 credits)
- o Reduced lighting power Option 2 in accordance with C406.3.2 (4 credits), to be confirmed
- o Reduced Air Infiltration in accordance with C406.11 (1 credit), to be confirmed

### SUSTAINABILITY GOALS:

- USGBC LEEDv4 Core and Shell Gold certification
- Salmon-Safe Certified (to be confirmed)
- Seattle's Green Building Standard (to be confirmed)

### HVAC DESIGN CRITERIA:

The building HVAC systems are sized based on the following design conditions:

- 1. Outdoor design temperatures:  
A. Summer: 86/67 deg. F DB/WB  
B. Winter: 24 deg. F DB
- 2. Indoor design temperatures:  
A. Laboratory: Occupied cooling 75 +/- 2 deg. F  
B. Laboratory: Occupied heating 70 +/- 2 deg. F  
C. Office: Occupied cooling 75 +/- 3 deg. F  
D. Office: Occupied heating 70 +/- 3 deg. F

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### SUPPLY AND GENERAL EXHAUST AIR DISTRIBUTION:

Except retail spaces on level 1, parking levels spaces, and the core Glasswash/Autoclave space, the entire building will be served by (4) central rooftop, 100% outside air supply air handling units (SAHUs). The resulting (4) 51,000 cfm SAHUs, with a total of 204,000 cfm OA capacity is based on 60% laboratory / 40% office units. On levels 3 through 14, a space for a future mechanical room is reserved for (1) SAHU and (1) EAH. This would provide supplemental ventilation to accommodate an average ventilation rate of up to 8 ACH per future tenant needs.

The SAHUs will be custom-made units. Multiple fans in parallel provide up to approximately 90% of unit capacity. 90% of unit capacity will be provided for the core and non-lab spaces. Unit discharge temperature is 55°F and unit intake temperature is 45°F, giving the capability to reset the discharge temperature during off-peak hours of operation as required by the SECS.

The resulting (4) 51,000 cfm SAHUs, with a total of 204,000 cfm OA capacity is based on 60% laboratory / 40% office units. On levels 3 through 14, a space for a future mechanical room is reserved for (1) SAHU and (1) EAH. This would provide supplemental ventilation to accommodate an average ventilation rate of up to 8 ACH per future tenant needs.

The SAHUs will be custom-made units, and will also have multiple fans in parallel, providing up to approximately 90% of unit capacity with the last one being a fan. Each unit will come with a MERV 8 filter upstream of an energy recovery coil. Alternatively, MERV 14 filters can be provided with embedded activated carbon to mitigate the impacts from annual wildfire smoke; this option is being evaluated and a final decision will be made at the design progresses.

The EAHs are custom-made units, and will also have multiple fans in parallel, providing up to approximately 90% of unit capacity with the last one being a fan. Each unit will come with a MERV 8 filter upstream of an energy recovery coil. The energy recovery coil extracts heat from the warm exhaust air stream and MERV 13 filters media. Alternatively, MERV 14 filters can be provided with embedded activated carbon to mitigate the impacts from annual wildfire smoke; this option is being evaluated and a final decision will be made at the design progresses.

The Autoxlate/Glasswash and Neutralization room will be served by an Energy Recovery Ventilator located in the Level 2 back of house area. These will be served by 4-pipes heating and cooling coil with MERV 8 and MERV 13 filters. The unit will include its own energy recovery heat exchanger to comply with local code.

Medium pressure exhaust ductwork will be stubbed out of the central shafts on each floor for future tenant connection. As part of the tenant build-out, constant volume air terminal units with hydronic reheat coils and/or 4-pipe fan coil units will be used to control airflow for both office and laboratory areas.

### MAINTENANCE MODE CONTROL SEQUENCE

The DDC controls design will allow for maintenance during normal working hours without completely shutting down primary HVAC systems. Control design will include a maintenance mode operating sequence for reduced capacity that postures the systems to maintain key pressure relationships between lab and non-lab areas.

### LAB TENANT PROVISIONS:

- 1. Future FCU: CHW and HW supply and return piping for future 4-pipe fan coil units or fan powered VAV units will be stubbed out and capped on each floor for future tenant connection. FCUs and FPVAVs will be provided as part of the tenant improvement work. Chilled water supply is provided at 44°F-56°F and hot water demand is provided at 100°F-95°F.
- 2. Fan coil units: Fan coil units will be accomplished with (3) rooftop fume exhaust fans in an N+1 configuration. Each exhaust fan is sized for 19,200 cfm, for a combined 38,400 cfm total capacity which could accommodate an average of 3,200 cfm per lab sufficient to accommodate a combination of 4-foot and 6-foot, low-flow fume hoods. The primary fume exhaust shaft located on the south side of the building will include its own energy recovery heat exchanger to comply with local code.

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Standard 132-2008, BACnet. All workstations and controllers, including unitary controllers, shall be native BACnet devices. No gateways shall be used for communication to controllers installed under this section. Gateways may be used for communication to systems installed under other sections if the only communication protocol is something other than BACnet.

### NETWORK

- 1. All IP controllers shall have their drops directly coordinated with Owner and connected via IP (CAT-6E) into Owner's network. Unmanaged Ethernet switches are not allowed.
- 2. BACnet/MSTP throughput speeds for all devices provided by this contractor will be a minimum of 76.8 Kbps.

### FRONT-END

- 1. If the proposed BMS platform is already in-place in the Owner's Seattle market portfolio, the new building will be integrated into Owner's Campus-Wide Building Automation System (BAS) and utilize existing server(s) and software license(s) already in-place. If BMS system does not have a system server and software license(s) already in-place, the BMS system will be provided with a system server and software license(s) which shall have the capacity to host all future project's DDC controllers and user workstations at no additional future cost to the Owner (i.e., it will be provided up-front as part of this project).
- 2. All computer workstations (servers and clients) will be loaded with any/all BAS system tools and licenses necessary for implementing future system changes (programming tools, graphic building tools, etc.). All software tools and passwords required for implementing future system will be left with the Owner.

### DESIGN

- 1. All I/O for critical and/or central systems (including, but not limited to CHW System, HW System, AHUs & associated Relief Fans, Garage Exhaust Systems) will reside on a single DDC Application Controller. This controller will be solely responsible for that system's SOO processing. Each critical and/or central system shall be capable of operating in a stand-alone mode upon loss of network traffic. In no instance should values of remote devices be passed over the network (this includes, but is not limited to, CO/NO2 sensors, bypass valves, hydronic DP sensors, duct & building static pressure sensors, etc.).
- 2. All critical and/or central systems will reside on a DDC controller with on-board HOA capabilities for all outputs (HOA switches for DO's, switches/potentiometers for AO's). This is to allow local override control by the onsite Facility Management Team.
- 3. All non-terminal unit controllers should be designed with 10% spare point capacity for each type of input & output.
- 4. Application controllers for every terminal unit (VAV, HP, UV, etc.) air handler, central plant equipment, and any other piece of controlled equipment shall be fully programmable to support any custom sequence of operations provided by the Engineer or Owner.
- 5. Room sensors shall be intelligent room sensors provided with digital readout that allow the user to view

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
### ME


**HVAC DUCT SPECIFICATION; LATEST REVISION: 5/10/23**

DUCT SYSTEM	PRESSURE CLASS	DUCT MATERIALS SPECIFICATION SPECIFICATION 23313 & 235100	FITTINGS SPECIFICATION 23313 & 235100	FLEX CONNECTION FLEX DUCT	SEAL CLASS 2018 SEC C403.10.2	CLEANLINESS DURING CONSTRUCTION	INSULATION (INDOOR, OUTDOOR) 2018 INT'L ENERGY CODE C403.11.1 *DETERMINED BY CLIMATE ZONE & ASHRAE 90.1 TABLES 6.8.2 & B-1	LINING MATERIALS	SEISMIC CRITERIA	SEISMIC IMPORTANCE FACTOR, IP	NOTES
HVAC SUPPLY MEDIUM PRESSURE FOR VAV SYSTEMS	SMACNA +4"	ALL DUCT TO BE UNLINED GALVANIZED DUCT. GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR DUCT TO HAVE TDF CONNECTIONS ROUND MAY BE SPIRAL.	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S 3-FOOT MAX. LENGTH WITH NO OFFSETS; USE JPL OR EQUAL; CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" DIA TAPS: CONICAL OR BOOT-STYLE	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS A	FOLLOW ADVANCED "LEVEL C" SMACNA	WITHIN CONDITIONED SPACE: R-3.3 (<55F OR >105F) WHEN NOT IN A CONDITIONED SPACE: R-4 WITH APPROVED VAPOR BARRIER WHEN OUTSIDE: R-8 EXTERIOR INSULATION WITH APPROVED VAPORMWEATHER BARRIER IN CONCRETE OR GROUND: R-3.3 (HEATING ONLY)	N/A	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0 IP = 1.5 (LAB PRESSURIZATION)	1, 2, 3, 4, 5
HVAC SUPPLY LOW PRESSURE TERMINALS TO DIFFUSERS FAN COIL UNITS TO DIFFUSERS HEAT PUMPS TO DIFFUSERS	SMACNA +1/2" OR +1" PRESSURE NOTE: MCKINSTRY BUILDS ALL LOW PRESSURE DUCTWORK IN ACCORDANCE WITH +1" SMACNA GUIDELINES TO MAXIMIZE PRODUCTION EFFICIENCY NO PRESSURE TEST REQUIRED PER 2018 SEC C403.10.2.1	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR MAY BE S+D NO PRESSURE TEST REQUIRED PER IEC C403.2.7	ELBOWS: PURCHASED ADJUSTABLE ELBOWS IN ACCORDANCE WITH SMACNA +1" STANDARDS RECTANGULAR TO HAVE TDF CONNECTIONS ROUND MAY BE SNAPLOCK.	12-FOOT MAX. LENGTH WITH NO OFFSETS; USE JPL OR EQUAL; CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" SPIN-IN / ATTO BRANCHES OK	SMACNA SEAL CLASS A	FOLLOW ADVANCED "LEVEL C" SMACNA	WITHIN CONDITIONED SPACE: R-3.3 (<55F OR >105F) WHEN NOT IN A CONDITIONED SPACE: R-4 WITH APPROVED VAPOR BARRIER WHEN OUTSIDE: R-8 EXTERIOR INSULATION WITH APPROVED VAPORMWEATHER BARRIER IN CONCRETE OR GROUND: R-3.3 (HEATING ONLY)	LINING WHERE INDICATED ON THE PLANS	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0 IP = 1.5 (LAB PRESSURIZATION)	1, 2, 3, 4, 5
HVAC OA INTAKE LOUVER CAN / PLENUMS UPSTREAM OF MOTORIZED DAMPER	SMACNA ±2"	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF CONNECTIONS ROUND MAY BE SNAPLOCK	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S WITH VANES OR PURCHASED ADJUSTABLE ELBOWS IN ACCORDANCE WITH SMACNA +1" CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" DIA TAPS: CONICAL OR BOOT-STYLE	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS LEVEL C	FOLLOW ADVANCED "LEVEL C" SMACNA	WITHIN CONDITIONED SPACE: R-7 (LESS THAN 2800 CFM) WITHIN CONDITIONED SPACE AND DOWNSTREAM OF AUTOMATIC SHUTOFF DAMPER TO HVAC UNIT: R-8 (LESS THAN 2800 CFM) OSA DUCT W/ GREATER THAN 2800 CFM UPSTREAM OF MOTORIZED DAMPER: R-16	LINING WHERE INDICATED ON THE PLANS R4.4 per inch	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0 IP = 1.5 (LAB PRESSURIZATION)	1, 2, 3, 4, 5
HVAC RETURN LOW PRESSURE	SMACNA -1/2" OR -1" PRESSURE NOTE: MCKINSTRY BUILDS ALL LOW PRESSURE DUCTWORK IN ACCORDANCE WITH -1" SMACNA GUIDELINES TO MAXIMIZE PRODUCTION EFFICIENCY NO PRESSURE TEST REQUIRED PER 2018 SEC C403.10.2.1	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE S+D CONNECTIONS, ROUND MAY BE SPIRAL NO PRESSURE TEST REQUIRED PER IEC C403.2.7	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S WITH VANES OR PURCHASED ADJUSTABLE ELBOWS IN ACCORDANCE WITH SMACNA -1" STANDARDS RECTANGULAR MAY BE S+D, ROUND MAY BE SNAPLOCK.	3-FOOT MAX. LENGTH WITH NO OFFSETS; USE JPL OR EQUAL; CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" TAPS: CONICAL OR BOOT-STYLE SPIN-IN / ATTO BRANCHES OK	SMACNA SEAL CLASS LEVEL C	FOLLOW ADVANCED "LEVEL C" SMACNA	WITHIN CONDITIONED SPACE: R-3.3 WHEN NOT IN A CONDITIONED SPACE: R-6 WITH APPROVED VAPOR BARRIER WHEN OUTSIDE: R-8 EXTERIOR INSULATION WITH APPROVED VAPORMWEATHER BARRIER	1" LINING ONLY WHERE INDICATED ON PLANS R4.4 per inch	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0 IP = 1.5 (LAB PRESSURIZATION)	1, 2, 3, 4, 5
HVAC EXHAUST LOW PRESSURE	SMACNA -1/2" OR -1" PRESSURE NOTE: MCKINSTRY BUILDS ALL LOW PRESSURE DUCTWORK IN ACCORDANCE WITH -1" SMACNA GUIDELINES TO MAXIMIZE PRODUCTION EFFICIENCY NO PRESSURE TEST REQUIRED PER 2018 SEC C403.10.2.1	GALVANIZED DUCT: SEE SUBMITTAL FOR GAUGE AND REINFORCEMENT. RECTANGULAR MAY BE S+D, ROUND MAY BE SNAPLOCK.	ELBOWS: PURCHASED ADJUSTABLE ELBOWS IN ACCORDANCE WITH SMACNA -1" STANDARDS RECTANGULAR MAY BE S+D, ROUND MAY BE SNAPLOCK.	12-FOOT MAX. LENGTH WITH NO OFFSETS; USE JPL OR EQUAL; CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" SPIN-IN / ATTO BRANCHES OK	SMACNA SEAL CLASS LEVEL C	FOLLOW INTERMEDIATE "LEVEL B" SMACNA	NOT REQUIRED UNLESS HEAT RECOVERY APPLIES, THEN NEED TO INSULATE IN UNCONDITIONED SPACE	1" LINING ONLY WHERE INDICATED ON PLANS R4.4 per inch	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0 IP = 1.5 (LAB PRESSURIZATION, CHEM STORAGE, BATTERY & REFRIGERATION EXHAUST)	1, 2, 3, 4, 5
HVAC EXHAUST MEDIUM PRESSURE	SMACNA -4" PRESSURE	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF CONNECTIONS, ROUND MAY BE SPIRAL	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S WITH VANES CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" DIA TAPS: CONICAL OR BOOT-STYLE	3-FOOT MAX. LENGTH WITH NO OFFSETS; USE JPL OR EQUAL; FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS LEVEL C	FOLLOW INTERMEDIATE "LEVEL B" SMACNA	NOT REQUIRED UNLESS HEAT RECOVERY APPLIES, THEN NEED TO INSULATE IN UNCONDITIONED SPACE ENGINEER TO SPECIFY	1" LINING ONLY WHERE INDICATED ON PLANS WHERE NOTED ON PLANS, LINING TO BE JM SUPERDUCT AIR DUCTBOARD 2" DUCT BOARD WITH FOIL-SCRIM-KRAFT FACING (2" SLSM/FSK)	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0 IP = 1.5 (LAB PRESSURIZATION, CHEM STORAGE, BATTERY & REFRIGERATION EXHAUST)	1, 2, 3, 4, 5
PUBLIC UTILITY VAULT TRANSFORMER EXHAUST	DOWNSTREAM OF VAULT TO EXTERIOR OF BUILDING SMACNA ±2" PRESSURE NO PRESSURE TEST REQUIRED PER 2018 SEC C403.10.2.1	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF CONNECTIONS, ROUND MAY BE SPIRAL VERIFY DUCT CONSTRUCTION IS ADEQUATE FOR EXPECTED WEIGHT OF DUCT AND DUCT WRAP	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S WITH VANES CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" DIA TAPS: CONICAL OR BOOT-STYLE	NONE ALLOWED	SMACNA SEAL CLASS LEVEL C	FOLLOW ADVANCED "LEVEL C" SMACNA	FIRE WRAP UTILITY VAULT EXHAUST TO 3-HR RATED ASSEMBLY PER FIRE WRAP PRODUCT. FIRE WRAP TO BE UL LISTED. THERMAL CERAMIC. FIRE MASTER "FAST WRAP" OR ALTERNATE APPROVED BY AHJ.	NONE ALLOWED	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.5	1, 2, 3, 5
GENERATOR / RADIATOR INTAKE EXHAUST	SMACNA ±2"	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF CONNECTIONS ROUND MAY BE SPIRAL	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S WITH VANES OR PURCHASED ADJUSTABLE ELBOWS IN ACCORDANCE WITH SMACNA ±1" CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" DIA	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL LEVEL C	FOLLOW ADVANCED "LEVEL C" SMACNA	INTAKE & EXHAUST MAY BE SAME AS OUTSIDE AIR DEPENDING ON ROUTING THROUGH BUILDING.	LINING WHERE INDICATED ON THE PLANS ENGINEER TO CONSIDER LINING WHEN VELOCITY IS 1,400 FPM OR GREATER R4.4 per inch	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.5	1, 2, 3, 4, 5
FUME HOOD EXHAUST - STAINLESS LABORATORY APPLICATION	SMACNA -4" PRESSURE NO PRESSURE TEST REQUIRED UP TO 3" WG PER 2018 SEC C403.10.2.2 >3.0"WG, TEST PER 2018 SEC C403.10.3 (25% OF DUCT)	STAINLESS STEEL TYPE 304, 16 GA OR TYPE 316 16 GA; JOGGLE-WELDED JOINTS; GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER ROUND MAY BE SPIRAL REMOVABLE JOINTS MAY BE VANESTONE FLANGES WITH GASKET, ANGLE RINGS, AND BOLTS ENGR TO SPECIFY MATERIAL AND WELDING TYPE TYPE 304, 304L, 316, 316L; JOGGLE-WELDED OR BUTT-WELDED	ELBOWS: CENTERLINE RADIUS OF 1.5 DIA OR MITERED 90S WITH VANES CL RADIUS OF 1.0 DIA ON DUCTS LARGER THAN 24" DIA TAPS: CONICAL OR BOOT-STYLE	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS LEVEL A	FOLLOW BASIC "LEVEL A" NOT REQUIRED UNLESS HEAT RECOVERY APPLIES, THEN NEED TO INSULATE IN UNCONDITIONED SPACE	N/A	N/A	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.5	1, 2, 3, 4, 5
OFFICE TRANSFER DUCTS DIFFUSERS TO PLENUM	NONRATED, UNSEALED	1" DUCTBOARD OR GALVANIZED DUCT; GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER	NOT APPLICABLE	N/A	N/A	FOLLOW BASIC "LEVEL A" NOT REQUIRED SMACNA	1" DUCTBOARD, BLACK IN COLOR WHERE VISIBLE TO BE INSTALLED WHERE SHOWN ON PLANS 1" LINING FOR SHEETMETAL PERMISSABLE IF ADDITIONAL COST IS ACCEPTED	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0	1, 2, 3, 4, 5	
GARAGE EXHAUST	SMACNA +4" PRESSURE NO PRESSURE TEST REQUIRED UP TO 3" WG PER 2018 SEC C403.10.2.2 >3.0"WG, TEST PER 2018 SEC C403.10.3 (25% OF DUCT)	GALVANIZED DUCT: GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF OR S+D CONNECTIONS; ROUND DUCT MAY BE SPIRAL DUCT MAY INCORPORATE FACE OF SLAB AND WALL.	10 CENTERLINE RADIUS OR MITERED 90S WITH VANES. SPIN-IN / ATTO BRANCHES OK.	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS LEVEL A	FOLLOW ADVANCED "LEVEL C" SMACNA	NOT REQUIRED	1" LINING ONLY WHERE INDICATED ON PLANS	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0	1, 2, 3, 4, 5
STAIRWELL AND ELEVATOR PRESSURIZATION	SMACNA +4" PRESSURE PRESSURE TEST SHALL BE 1.5 X MAXIMUM DESIGN PRESSURE PER IMC 513 DESIGN PRESSURE DUCTS SHALL BE LEAK TESTED TO MAX. LEAKAGE OF 5% OF DESIGN FLOW. DUCTS (INCLUDING FLEXIBLE JOINTS) SHALL BE CAPABLE OF WITHSTANDING PROBABLE TEMPS.	UNLINED GALVANIZED DUCT. GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF CONNECTIONS, ROUND MAY BE SPIRAL	10 CENTERLINE RADIUS OR MITERED 90S WITH VANES. SPIN-IN / ATTO BRANCHES OK.	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA FOR THE APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS LEVEL A	FOLLOW INTERMEDIATE "LEVEL B" SMACNA	NOT REQUIRED	N/A	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.5	1, 2, 3, 4, 5
STAIRWELL RELIEF	SMACNA +1" PRESSURE	UNLINED GALVANIZED DUCT. GAUGE AND REINFORCEMENT SHALL BE SMACNA OR BETTER RECTANGULAR TO HAVE TDF CONNECTIONS, ROUND MAY BE SPIRAL	10 CENTERLINE RADIUS OR MITERED 90S WITH VANES. SPIN-IN / ATTO BRANCHES OK.	FLEX AT EQUIP CONNECTIONS TO COMPLY WITH SMACNA APPLICABLE PRESSURE CLASS	SMACNA SEAL CLASS LEVEL C	FOLLOW ADVANCED "LEVEL C" SMACNA	NOT REQUIRED	N/A	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.5	1, 2, 3, 4, 5
SHOWER ROOM EXHAUST DUCTWORK	SMACNA -2" PRESSURE NO PRESSURE TEST REQUIRED PER 2018 SEC C403.10.2.1	MIN. 18 GAUGE 304 STAINLESS STEEL HORIZONTAL DUCT - CONTINUOUSLY WELDED VERTICAL DUCT - WELDED OR CAULKED SLIP JOINT	10 CENTERLINE RADIUS OR MITERED 90S WITH VANES	NO FLEX AT EXHAUST GRILLE, CONNECT TO GRILLE VIA PLenum WITH HARD Duct. PROVIDE A MINIMUM OF 10 FEET OF STAINLESS STEEL Duct BEFORE TRAVERS TO GALVANIZED Duct.	SMACNA SEAL CLASS LEVEL C	FOLLOW ADVANCED "LEVEL C" SMACNA	NOT REQUIRED	N/A	SEISMIC SUPPORT PER APPLICABLE CODE / LOCAL JURISDICTION. SEE MECHANICAL SEISMIC SHEET WHEN APPLICABLE.	IP = 1.0	1, 2, 3, 4, 5
BACKDRAFT DAMPERS LOW PRESSURE	N/A	N/A	N/A	N/A	PER APPLICABLE DUCT SYSTEM	PER APPLICABLE DUCT SYSTEM	N/A	HORIZONTAL MOUNT, VERTICAL AIRFLOW - GREENHECK BR-10 OR APPROVED VERTICAL MOUNT, HORIZONTAL AIRFLOW - GREENHECK ES-10 OR APPROVED	N/A	N/A	1, 2, 3
BAROMETRIC DAMPERS < 2000 FPM	N/A	N/A	N/A	N/A	PER APPLICABLE DUCT SYSTEM	PER APPLICABLE DUCT SYSTEM	N/A	HORIZONTAL MOUNT, VERTICAL AIRFLOW - GREENHECK ES-10 OR APPROVED VERTICAL MOUNT, HORIZONTAL AIRFLOW - GREENHECK ES-30 OR APPROVED	N/A	N/A	1, 2, 3
BAROMETRIC DAMPERS >= 2000 FPM	N/A	N/A	N/A	N/A	PER APPLICABLE DUCT SYSTEM	PER APPLICABLE DUCT SYSTEM	N/A	HORIZONTAL MOUNT, VERTICAL AIRFLOW - GREENHECK EM-30 OR APPROVED VERTICAL MOUNT, HORIZONTAL AIRFLOW - GREENHECK EM-30 OR APPROVED	N/A	N/A	1, 2, 3
FIRE DAMPERS (1-1/2 HR)	N/A	N/A	N/A	N/A	CLASS 2	PER APPLICABLE DUCT SYSTEM	N/A	UL 555, NFPA 90A, PROVIDE DUCT ACCESS TO RESET DAMPER, GREENHECK FPD-150 OR APPROVED	N/A	N/A	1, 2, 3
FIRE DAMPERS (3-HR)	N/A	N/A	N/A	N/A	PER APPLICABLE DUCT SYSTEM	PER APPLICABLE DUCT SYSTEM	N/A	UL 555, NFPA 90A, PROVIDE DUCT ACCESS TO RESET DAMPER, GREENHECK FPD-350 OR APPROVED	N/A	N/A	1, 2, 3
FIRE/SMOKE DAMPERS < 2000 FPM	N/A	N/A	N/A	N/A	PER IBC MINIMUM LEAKAGE CLASS II	PER APPLICABLE DUCT SYSTEM	N/A	DYNAMIC, 1-1/2 HR (AIRFOIL), UL 555 & 5555, 120 V, GREENHECK FSD-312 OR APPROVED	N/A	N/A	1, 2, 3
FIRE/SMOKE DAMPERS > 2000 FPM	N/A	N/A	N/A	N/A	PER IBC MINIMUM LEAKAGE CLASS II	PER APPLICABLE DUCT SYSTEM	N/A	DYNAMIC, 1-1/2 HR (AIRFOIL), UL 555 & 5555, 120 V, GREENHECK FSD-312 OR APPROVED	N/A	N/A	1, 2, 3
FIRE/SMOKE DAMPERS FOR 3 HOUR WALLS.	N/A	N/A	N/A	N/A	PER IBC MINIMUM LEAKAGE CLASS II	PER APPLICABLE DUCT SYSTEM	N/A	DYNAMIC, 3 HR, UL 555 & 5555, 120 V, GREENHECK FSD-231 OR APPROVED	N/A	N/A	1, 2, 3
VOLUME DAMPERS	N/A	N/A	N/A	N/A	PER APPLICABLE DUCT SYSTEM	PER APPLICABLE DUCT SYSTEM	N/A	SHOP FABRICATED PER SMACNA OR GREENHECK 9V OR APPROVED	N/A	N/A	1, 2, 3
VOLUME DAMPERS (REMOTE)	N/A	N/A	N/A	N/A	PER APPLICABLE DUCT SYSTEM	PER APPLICABLE DUCT SYSTEM	N/A	SHOP FABRICATED PER SMACNA OR GREENHECK 9V OR APPROVED	N/A	N/A	1, 2, 3
SCL VAULT INTAKE LOUVERS	N/A	MIN 12" GAUGE LOUVER W/O LINE OF SIGHT INTO SCL VAULT	N/A	N/A	N/A	N/A	N/A	RBDR-50 OR APPROVED	N/A	N/A	1, 2, 3
SCL VAULT EXHAUST BIRDSCREEN	N/A	MIN 12" GAUGE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1, 2, 3

**Perkins & Will**

 1301 Fifth Avenue  
Suite 2300  
Seattle, WA 98101  
1206.441.4981  
www.perkinswill.com





**Perkins&Will**

1301 Fifth Avenue  
Suite 2300  
Seattle, WA 98101  
t 206.381.6000  
f 206.441.4981  
[www.perkinswill.com](http://www.perkinswill.com)

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## **CONSULTANTS**

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**CPL**  
900 - 801 2nd Ave  
Seattle, WA 98104  
t 206.343.0460

**Landscape**  
**Site Workshop**  
300 Woodland Park Ave N

t 206.285.3026

5005 3rd Ave S  
Seattle, WA 98134  
t 206.762.3311

**Electrical**  
**man Engineers**  
400 - 1101 2nd Ave  
Seattle, WA 98108  
t 206.623.0717

**M Construction**  
General Contractor  
110 - 5900 Airport Way S  
Seattle, WA 98108  
t 206.587.4000



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# LIFE SCIENCES TOWER

1305 Stewart St  
Seattle WA 98109

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**SDCI Use Only**

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A map showing the intersection of Stewart St and Eastlake Ave. The map includes a north arrow pointing upwards and a "TRUE NORTH" label.

**100% DD**  
2023/11/03

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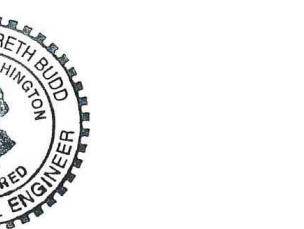
**ISSUE CHART**

ISSUE	DATE
umber	207092-001
I O. NNAMDI-EMETAROM, BGM	
d	D. BUDD
<b>TITLE</b>	

# CHILLED WATER PIPING DIAGRAM

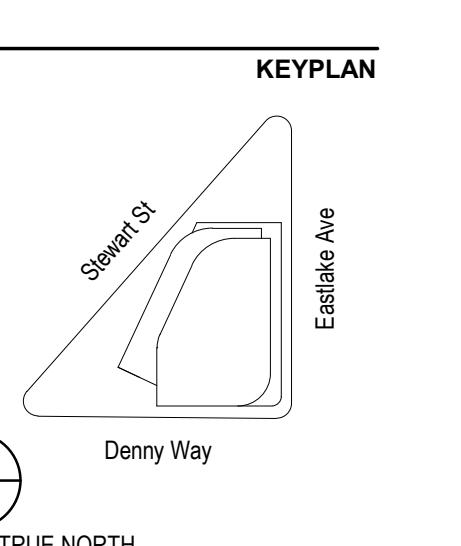
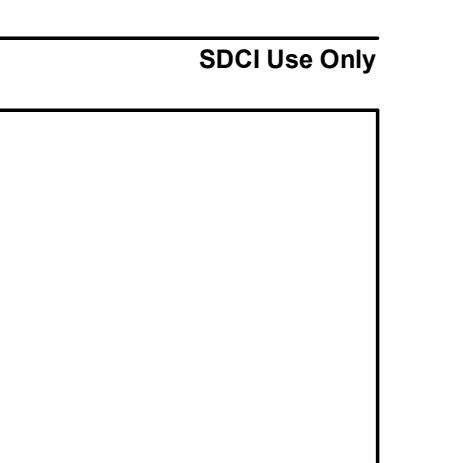
**SHEET NUMBER**

**M-021**



**LIFE SCIENCES TOWER**  
1305 Stewart St  
Seattle, WA 98109

**PMB**  
ADVANCED HEALTHCARE REAL ESTATE  
200 - 3394 Carmel Mountain Rd  
San Diego, CA 92121  
858.794.1900



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2023/11/03

ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
Checked	O NNAMDI-EMETAROM, BGM	


Approved

D. BUDD

TITLE

**HOT WATER PIPING DIAGRAM**

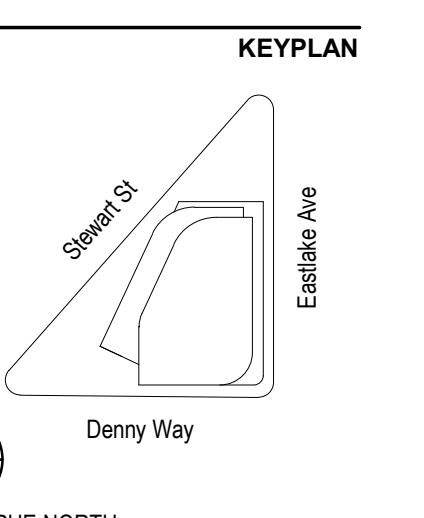
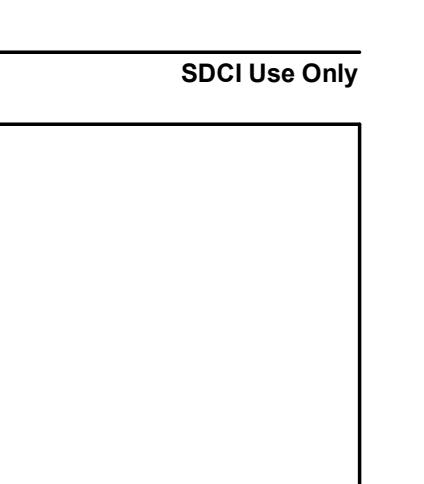
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**M-022**



**LIFE SCIENCES TOWER**  
1305 Stewart St  
Seattle, WA 98109

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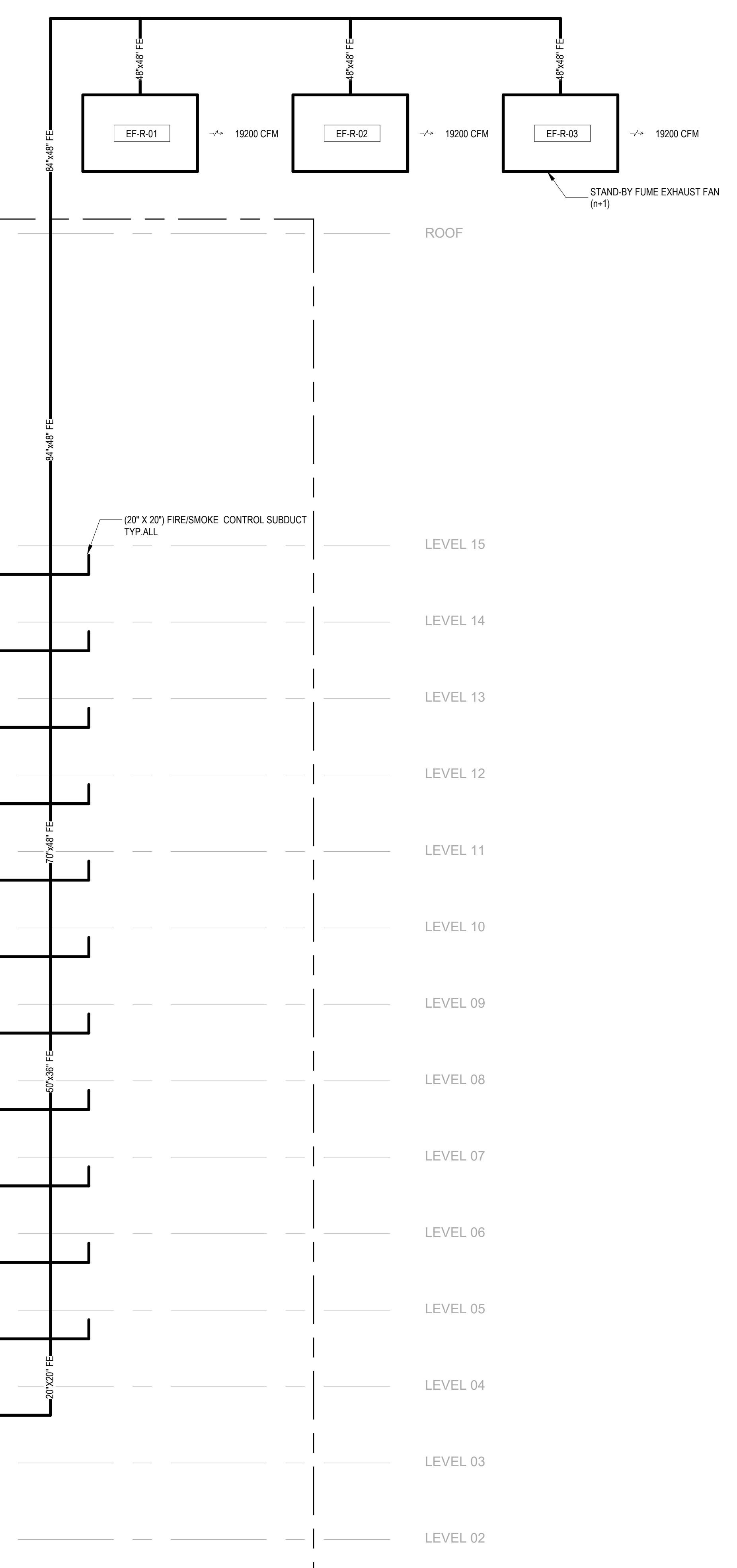
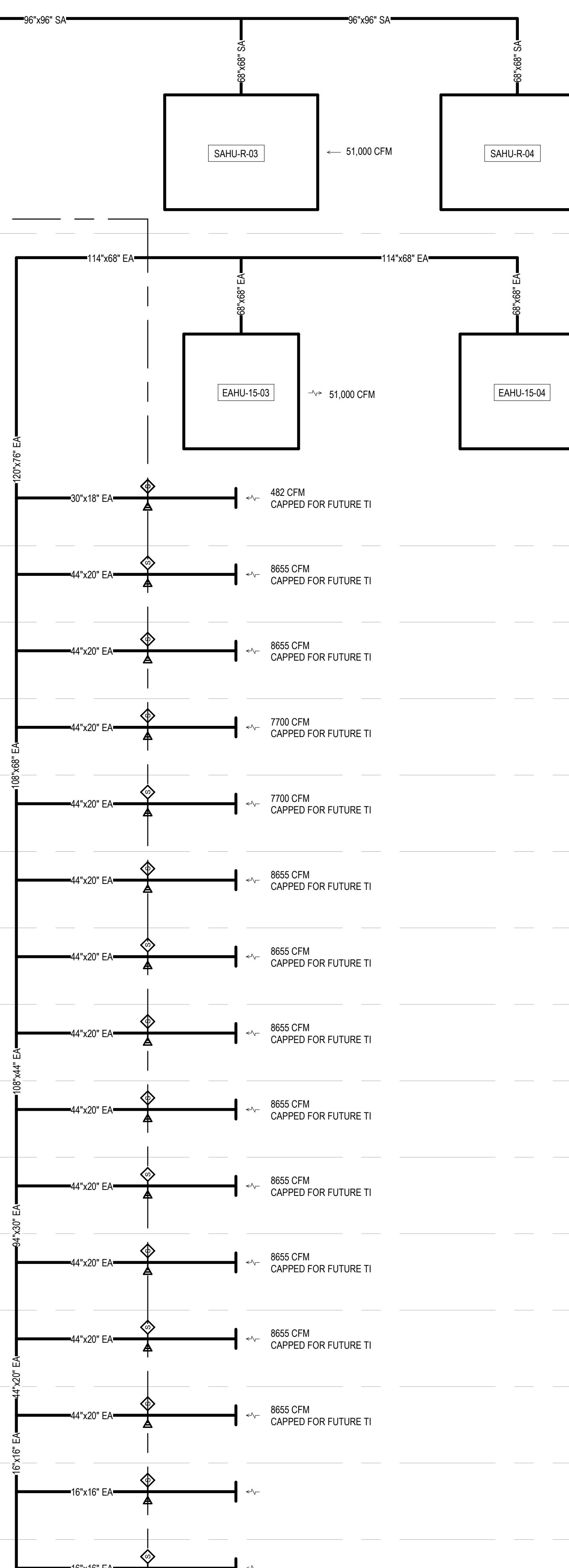
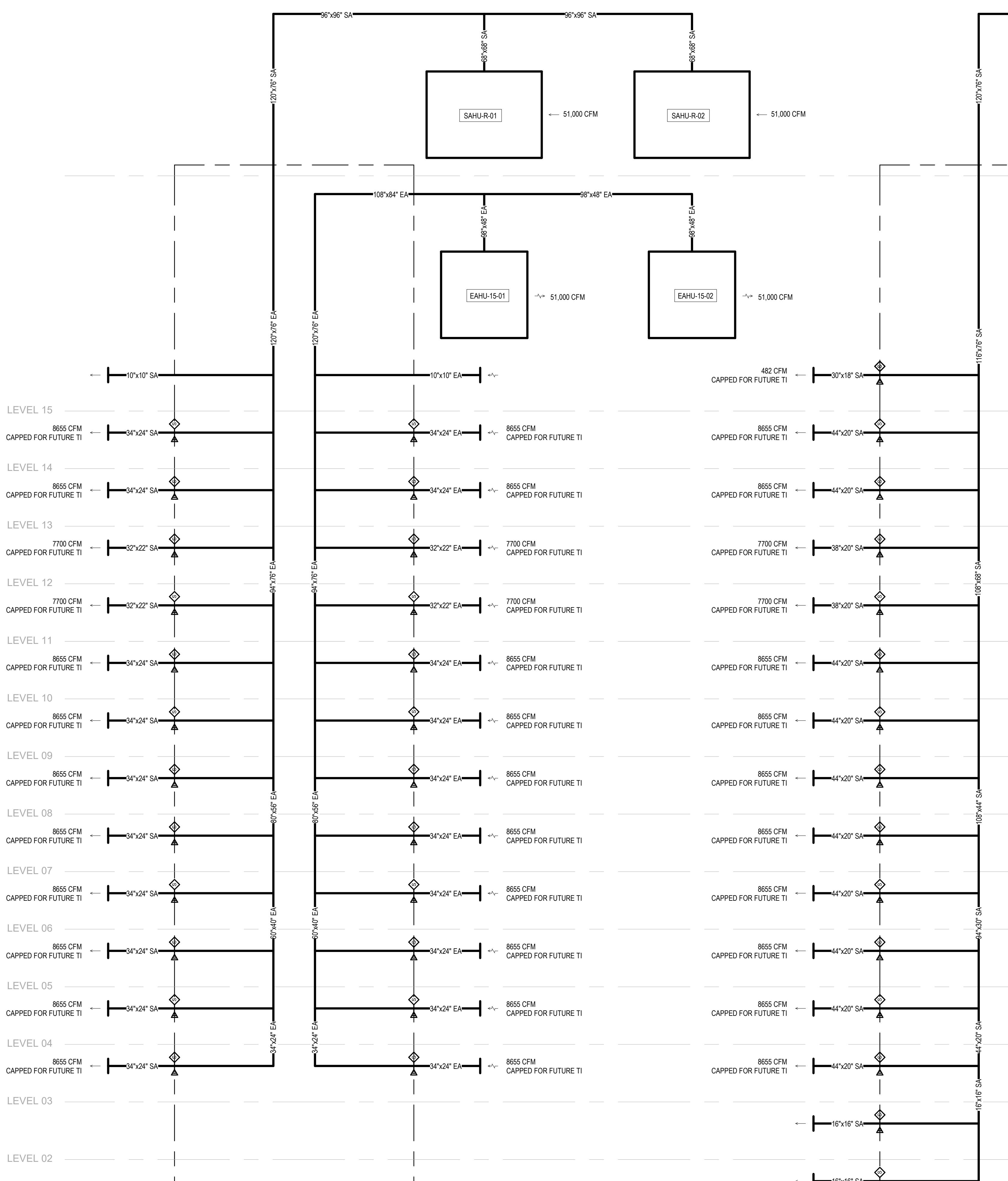
ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved	<input type="checkbox"/>	D. BUDD
TITLE		

AIRFLOW  
DIAGRAM

SHEET NUMBER

M-023

**NORTH SUPPLY/GENERAL EXHAUST SHAFT****SOUTH SUPPLY/GENERAL EXHAUST SHAFT****FUME EXHAUST SHAFT (GRID-XX)**

P-01

P-02

P-03

P-04

P-01

P-02

P-03

P-04

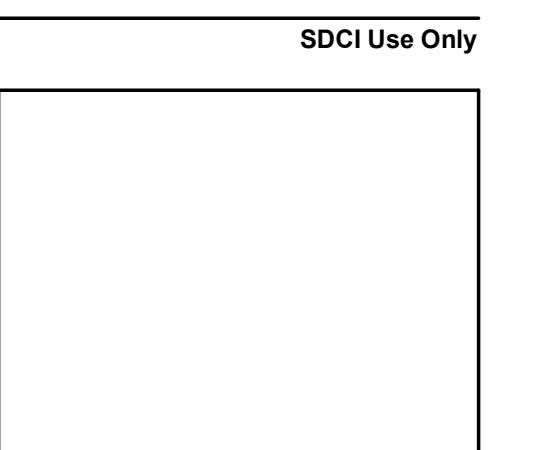


# LIFE SCIENCES TOWER



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858.734.1000

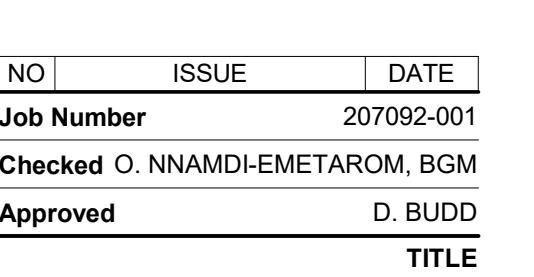
200 - 3394 Carmel Mountain Rd  
San Diego, CA 92121  
858.734.1000



A map showing the intersection of Stewart St and Eastlake Ave. The map includes a compass rose indicating True North.

**100% DD**  
2023/11/03

## **LINE CHART**




# PRESSURIZATION DIAGRAMS

# PRESSURIZATION DIAGRAMS

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# NUMBER



3	ELEVC 5,6,7 PRESSURIZATION	
M-025	SCALE:	3/32" = 1'-0"

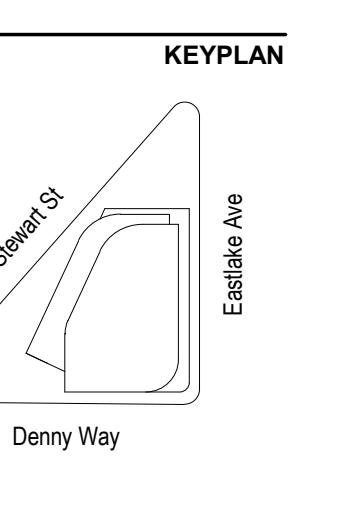
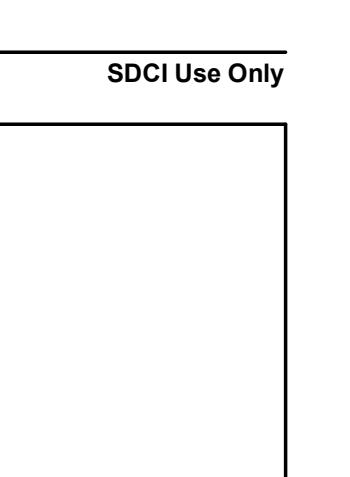
4	ELEV 2,3,4 PRESSURIZATION
M-025	SCALE: 3/32" = 1'-0"

5	ELEV 1/FS1 STRETCHER PRESSURIZATION
M-025	SCALE: 3/32" = 1'-0"

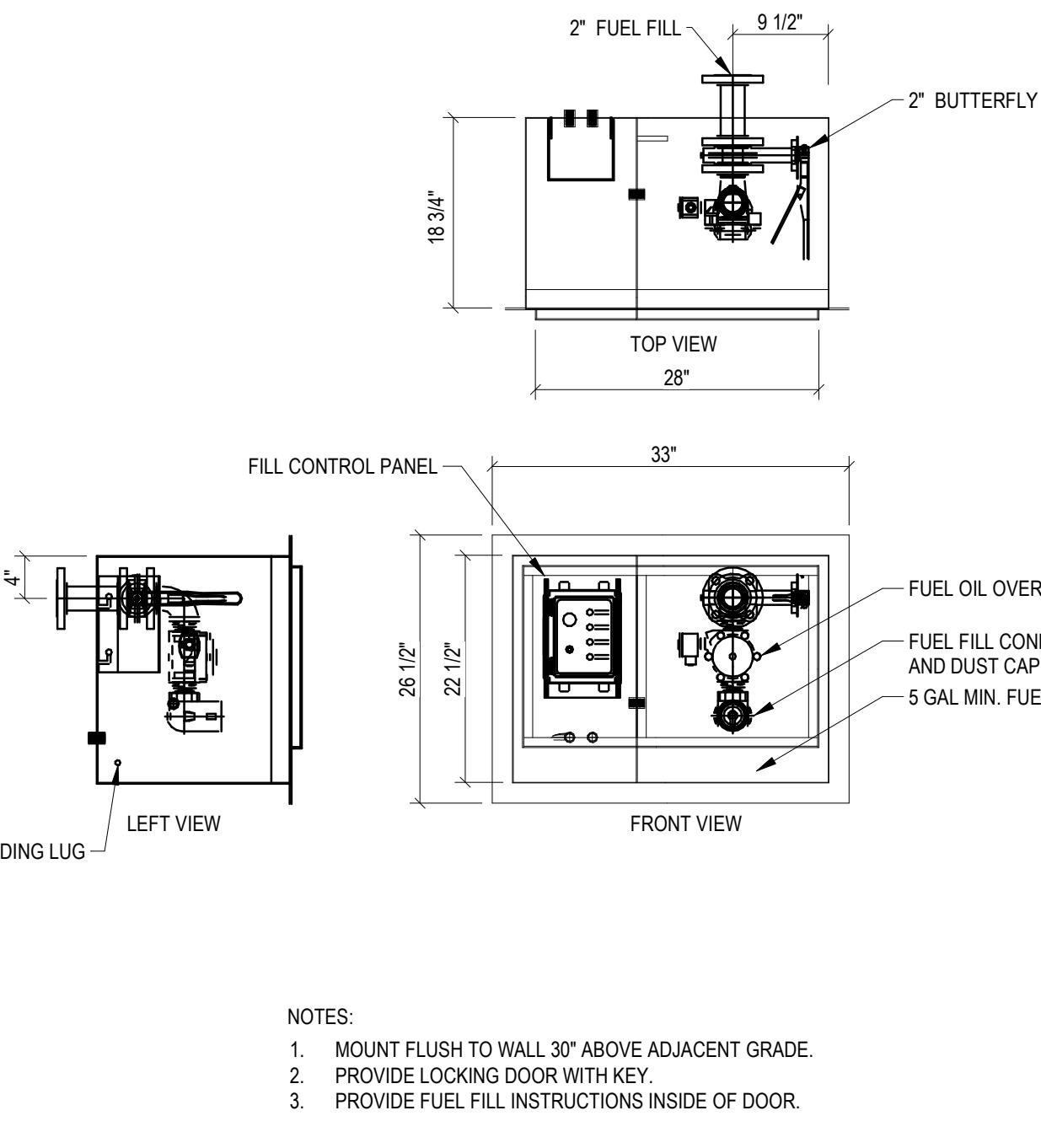
# 2 NORTH STAIR PRESSURIZATION

M-025      SCALE: 3/32" = 1'-0"

1	SOUTH STAIR PRESSURIZATION
M-025	SCALE: 3/32" = 1'-0"



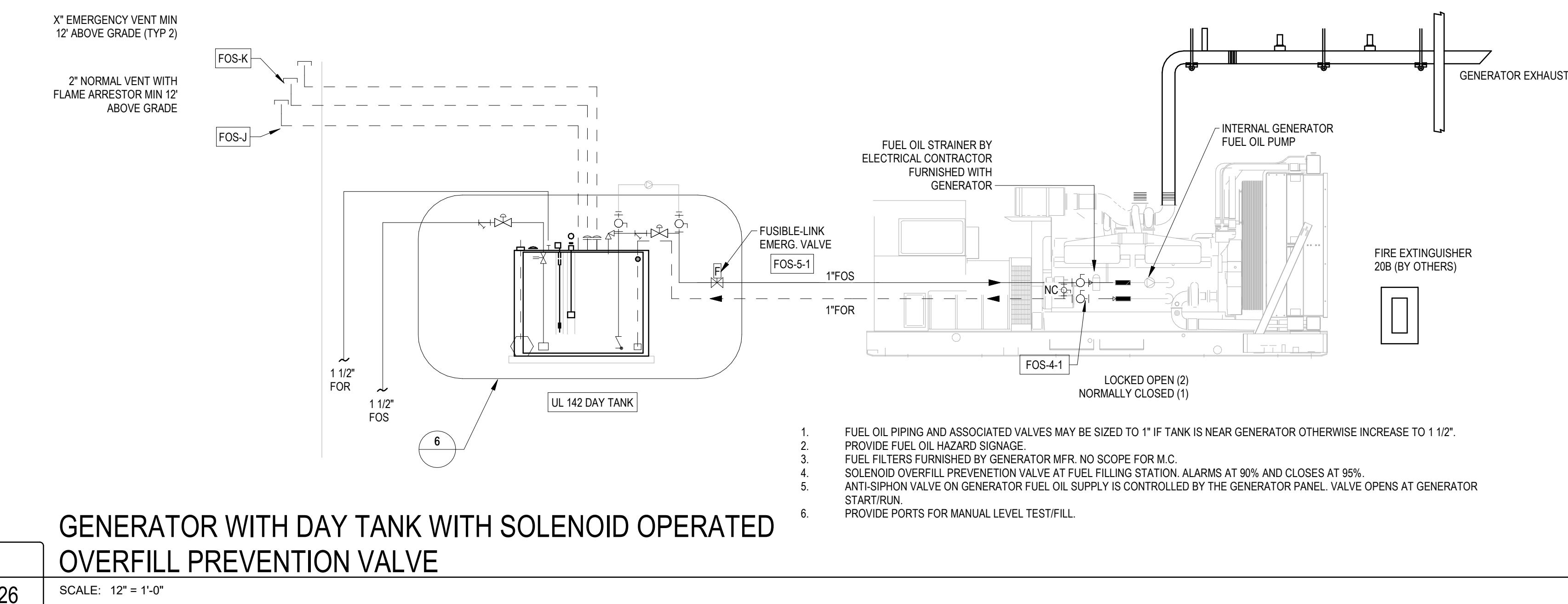
NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved	<input type="checkbox"/>	D. BUDD



1 REMOTE FUEL FILL STATION - SINGLE TANK  
M-026 SCALE: 12" = 1'-0"

4 FUEL OIL BASIS OF DESIGN  
M-026 SCALE: 12" = 1'-0"

2 FUEL CODES  
M-026 SCALE: 12" = 1'-0"



FUEL OIL SPECIALTIES - GENERATOR BELLY TANK

F.O. EQUIPMENT - SEE INDIVIDUAL SCHEDULES

TAG#	(TAG-LOCATION#)	QTY	DESCRIPTION	MODEL SCHEDULED
FFS		1	REMOTE FUEL FILLING STATION WITH MIN 15 GAL SPILL CONTAINMENT	ACE TANK - BAKER INDUSTRIES 7401C-2P
TLM-1		1	TANK LEVEL MONITOR	OMNITEC OEL 8000U
RAS		1	TANK LEVEL REMOTE ANNUNCIATOR	PNUMERCTOR RA000
RAS-TR		1	TANK LEVEL REMOTE ANNUNCIATOR TEST & RESET	PNUMERCTOR RS-2
RAS-PM		1	REMOTE ANNUNCIATOR POWER MODULE	PNUMERCTOR RA200-PM
FCP		1	FUEL CONTROL PANEL	MORRISON BROS. FIG. 918 AC (4 CHANNEL)
FUEL FILL STATION APPURTENANCES				
TAG#	(TAG-LOCATION#)	QTY	DESCRIPTION	MODEL SCHEDULED
FOS-A		1	DUST CAP	PT COUPLING 20W
FOS-B		1	2" CAMLOCK/FILL 90 DEGREE WITH CHECK VALVE	PT COUPLING 20G
FOS-C		1	BUTTERFLY VALVE	JOMAR 900-0205VB
FOPV		1	FUEL OVERFLOW PREVENTION VALVE	2" MORRISON BROTHERS 905A-
RAS		2	REMOTE ANNUNCIATOR - TEST AND RESET. SEE ABOVE SCHEDULE	
ABOVE GROUND TANK APPURTENANCES				
TAG#	(FOS #/SIZE)	QTY	DESCRIPTION	MODEL SCHEDULED
FOS-E-2		1	2" OVERFILL PREVENTION VALVE - PRESSURIZED	2" MORRISON BROTHERS 905A-
FOS-G-2		1	2" ALUM DROP TUBE (WITH FOS-H)	2" MORRISON BROTHERS 419-0100T
FOS-H-2		1	2" DROP TUBE DIFFUSER	4" MORRISON BROTHERS 538AS-040AD
FOS-I-2		1	2" SINGLE POPPET FOOT VALVE	EBW 200-20-01 / MORRISON BROTHERS 334
FOS-J-2		1	2" TANK NORMAL VENT FLAME ARRESTOR	2" PROTECTOSEAL 61Z
FOS-K-3		2	3" TANK EMERGENCY VENT (43,000SCFH EACH)	3" MORRISON BROTHERS 2440M-050AV or CLAY & BAILEY 0366-03-3040/60/80F
FOS-K-6		1	6" TANK EMERGENCY VENT	NA FOR UNDERGROUND
FOS-Q		1	LEAK DETECTOR SENSOR CAP (WITH LD AT TANKS)	MORRISON 305KPA-220AK
PIPE SPECIALTIES				
TAG#	(TAG-SIZE)	QTY	DESCRIPTION	MODEL SCHEDULED
FOS-4-2		1	2" FULL PORT CARBON STEEL SOCKET WELD BALL VALVE WITH LOCKING HANDLE	53034SW
FOS-5-2		1	2" FUSIBLE LINK GATE VALVE	346DI-0400AV
FOS-5-5		1	1/2" 100 MESH INLINE STRAINER	285-250QAS
FOS-6-2		1	2" 100 MESH INLINE STRAINER	285-250QAS
FOS-11-2		1	2" FUEL RATED METAL BRAIDED FLEX HOSE	FLEX-ING
FOS-12		3	1" PRIMING PORT CAMLOCK & CAP	07F & 07V or 10F & 10V PT coupling
PIPE SPECIALTIES - CONTROLS				
TAG#	(TAG-LOCATION#)	QTY	DESCRIPTION	MODEL SCHEDULED
LD-1		1	LIQUID LEAK DETECTOR	PNEUMERCTOR L5600-LDBH / GEMS
LSW-3		1	LEVEL SWITCH - MERCURY LEVEL SWITCHES, 95% 90% 30%	PNEUMERCTOR L5600 / GEMS L5800
FOPV-5		1	1/2" OVERFLOW PREVENTION VALVE (SOLENOID) N.C. - FILL STATION/HOUSE GEN	ASCO 82100394
FOPV-2		1	2" OVERFLOW PREVENTION VALVE (120V-SOLENOID OPERATED) N.O.	ASCO 821003103

GENERATOR BELLY-DAY TANK SCHEDULES FUEL OIL  
SPECIALTIES

5  
M-026  
SCALE: 12" = 1'-0"

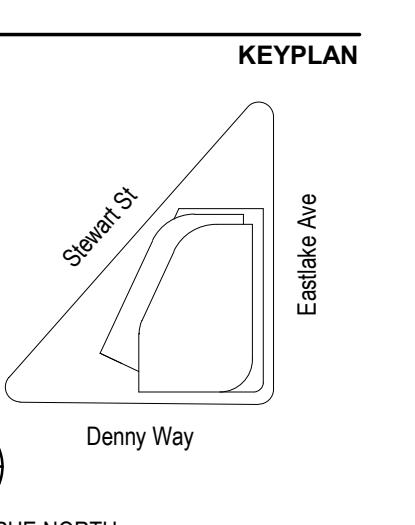
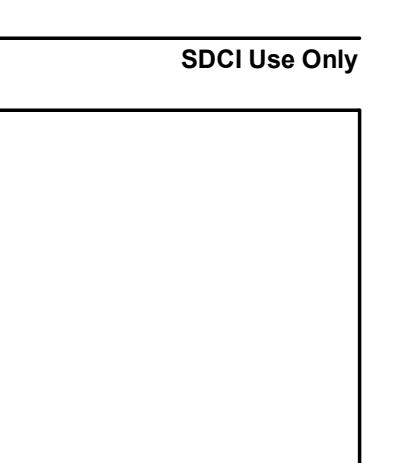
3 GENERATOR WITH BELLY TANK DIAGRAM  
M-026  
SCALE: 12" = 1'-0"



## LIFE SCIENCES TOWER

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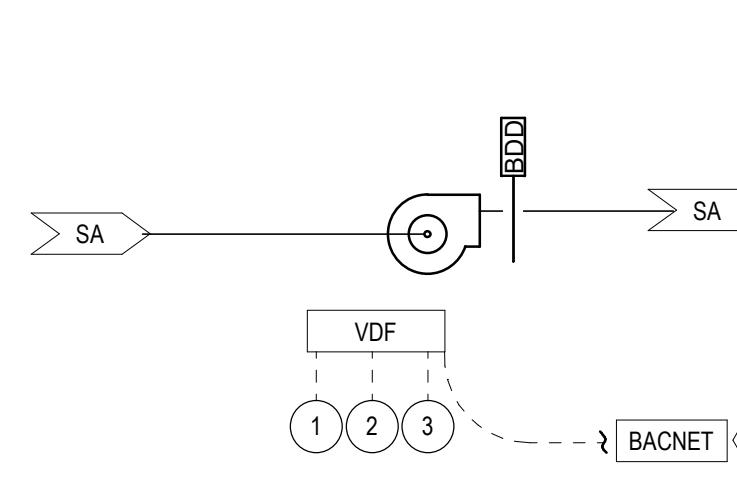
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Job Number 207092-001  
Checked O NNAMDI-EMETAROM, BGM  
Approved D. BUDD  
Title

## CONTROL DIAGRAMS

SHEET NUMBER

**M-030**

12'  
8'  
0'

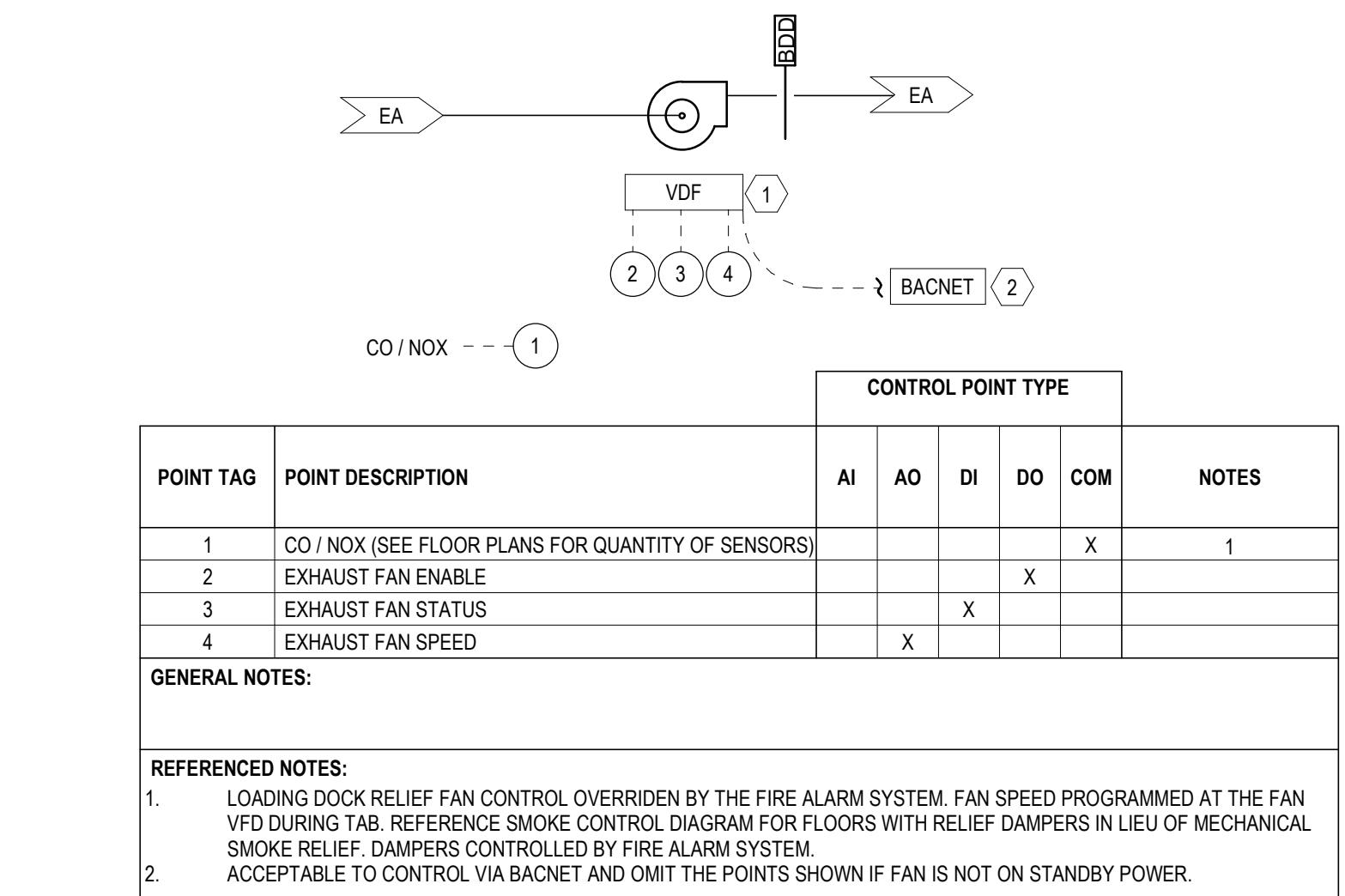


POINT TAG		CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO	COM	NOTES
1	SUPPLY FAN ENABLE			X			
2	SUPPLY FAN STATUS		X				
3	SUPPLY FAN SPEED			X			

GENERAL NOTES:  
1. ACCEPTABLE TO CONTROL VIA BACNET AND OMIT THE POINTS SHOWN IF FAN IS NOT ON STANDBY POWER.

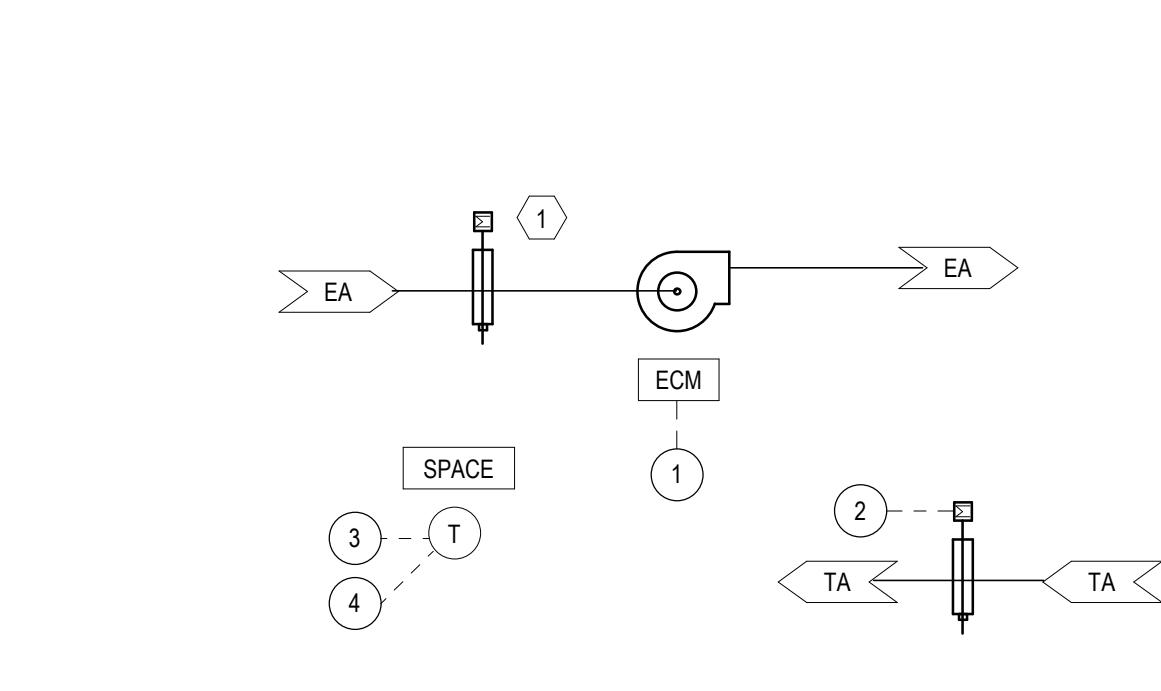
1 GARAGE SUPPLY FAN CONTROL DIAGRAM  
M-030

SCALE: 1/8" = 1'-0"



2 GARAGE EXHAUST FAN CONTROL DIAGRAM  
M-030

SCALE: 1/8" = 1'-0"



CONTROL POINT TYPE	
POINT TAG	POINT DESCRIPTION
1	EXHAUST FAN START / STOP
2	MAKE UP AIR DAMPER COMMAND
3	ROOM TEMPERATURE
4	ROOM TEMP SETPOINT

GENERAL NOTES:  
1. ELECTRICAL CONTRACTOR TO INTERLOCK DAMPER WITH FAN OPERATION. DAMPER AND ACTUATOR PROVIDED BY MECHANICAL. REFERENCE EXHAUST FAN SCHEDULE FOR APPLICABILITY.  
2. EXHAUST FAN SPEED SHALL BE ADJUSTED AND BALANCED VIA MANUAL DIAL AT THE ECM MOTOR.  
3. MAKE UP AIR DAMPER (IF APPLICABLE)  
4. REFERENCE UTILITY SPACE MATRIX FOR LOCALLY TEMPERATURE CONTROLLED SPACES.

3 EXHAUST FAN - TEMPERATURE CONTROLLED  
M-030

SCALE: 1/8" = 1'-0"

CONTROLS ABBREVIATIONS  
NOTE TO ENGINEER - THE ABBREVIATIONS AND SYMBOLS LIST IS BASED ON THE ANSI/AI INDUSTRIAL CONTROLS STANDARD. THESE DEFINITIONS ARE INTENDED FOR USE IN DRAWINGS, SEQUENCES OF OPERATIONS, AND OTHER CONTROLS SCOPE. ALSO INDICATED ARE DEFINITIONS FOR THE ABBREVIATIONS AND SYMBOLS. THESE DEFINITIONS ARE INTENDED FOR THE ABBREVIATIONS AND SYMBOLS.

### DEFINITIONS

ANALOG - A MODULATING CONTROL SIGNAL (IE 0-10 VOLTS, 4-20 MILLIAMPS)

BUILDING AUTOMATION SYSTEM - A CONTROL SYSTEM CONSISTING OF HARDWARE AND SOFTWARE TO CONTROL BUILDING HVAC SYSTEMS

DIGITAL - A BINARY CONTROL SIGNAL

ENABLE/DISABLE - A BINARY SIGNAL TO GIVE PERMISSION FOR A SYSTEM TO OPERATE (IE BOILER ENABLE/DISABLE).

FLOW CONTROL VALVE - A HYDROSTATIC VALVE THAT MODULATES FLOW BASED ON A CONTROL SIGNAL.

OPENCLOSE - A TWO POSITION DEVICE THAT IS EITHER 100% OPEN OR 100% CLOSED (IE TWO POSITION DAMPER)

ONOFF - A BINARY SIGNAL THAT ACTIVATES OR DEACTIVATES A DEVICE

START/STOP - A BINARY SIGNAL THAT STARTS OR STOPS A PIECE OF EQUIPMENT (IE EXHAUST FAN)

TEMPERATURE CONTROL PANEL - A PANEL THAT CONTAINS CONTROLLERS TO CONTROL HVAC SYSTEMS.

TEMPERATURE CONTROL VALVE - A HYDROSTATIC VALVE THAT MODULATES TO CONTROL TO A DESIRED TEMPERATURE SETPOINT

TEMPERATURE TRANSMITTER - A DEVICE THAT MEASURES TEMPERATURE AND TRANSMITS AN ANALOG SIGNAL

THERMOSTAT - A GAS SPACE MOUNTED TEMPERATURE SENSING DEVICE. DEVICE COULD INCLUDE DISPLAY, OCCUPANCY OVERRIDE, OR MANUAL TEMPERATURE ADJUSTMENT OPTIONS.

120V THERMOSTAT - A LINE VOLTAGE THERMOSTAT THAT CONTROLS ASSOCIATED HVAC EQUIPMENT. TYPICALLY LINE VOLTAGE THERMOSTAT IS HARDWIRED DIRECTLY TO THE HVAC EQUIPMENT, NOT THROUGH THE BAS

DUCT SMOKE DETECTOR - A DEVICE WHICH DETECTS SMOKE IN A DUCT. TYPICALLY THE DEVICE IS 120V HARDWIRED SO DEVICE TRANSMITS AN ANALOG SIGNAL TO THE BAS.

EMERGENCY POWER OFF - A DEVICE THAT WILL SHUT OFF POWER TO THE ASSOCIATED HVAC SYSTEM

FLOW TRANSMITTER - A MEASURING DEVICE SUCH AS AN AIRFLOW MEASURING STATION OR HYDROSTATIC FLOW METER. THE DEVICE TRANSMITS AN ANALOG SIGNAL TO THE BAS.

FLOW PROOF - A DEVICE THAT INDICATES FLOW AS A BINARY SIGNAL. TYPICALLY USED AS A FLOW PROOF DEVICE.

FLOW TRANSMITTER - A DEVICE THAT INDICATES FLOW AS A BINARY SIGNAL. TYPICALLY USED AS A FLOW PROOF DEVICE.

CURRENT SWITCH - A DEVICE THAT GENERATES A BINARY SIGNAL WHEN CURRENT IS SENSED. TYPICALLY USED FOR EQUIPMENT STATUS.

CURRENT TRANSMITTER - A DEVICE THAT MEASURES CURRENT AND TRANSMITS AN ANALOG SIGNAL

CARBON MONOXIDE SENSOR - A SENSOR THAT MEASURES CARBON MONOXIDE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

DIFFERENTIAL PRESSURE TRANSMITTER - A DEVICE THAT MEASURES THE DIFFERENCE IN PRESSURE BETWEEN TWO SENSING POINTS AND SENDS AN ANALOG SIGNAL TO THE BAS.

DUCT TEMPERATURE TRANSMITTER - A DEVICE WHICH DETECTS TEMPERATURE IN A DUCT. TYPICALLY THE DEVICE IS 120V HARDWIRED SO ACTIVATION OF THE TEMPERATURE DETECTOR WILL AUTOMATICALLY SHUT OFF POWER TO THE ASSOCIATED HVAC SYSTEM

EMERGENCY POWER OFF - A DEVICE THAT WILL SHUT OFF POWER TO ASSOCIATED SYSTEM. TYPICALLY 120V HARDWIRED AND USED FOR BOILER SYSTEMS.

HIGH PRESSURE SWITCH - A DEVICE THAT INDICATES PRESSURE AS A BINARY SIGNAL. TYPICALLY USED AS A 120V HARDWIRED SAFETY SWITCH THAT WILL SHUT OFF POWER TO THE FAN IF THE PRESSURE IN THE SYSTEM IS TOO POSITIVE OR TOO NEGATIVE.

RELATIVE HUMIDITY SENSOR - A SENSOR THAT MEASURES RELATIVE HUMIDITY LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

TEMPERATURE ELEMENT - A SENSOR THAT MEASURE TEMPERATURE AND TRANSMITS A SIGNAL TO THE BAS. THE USE OF "TEMPERATURE ELEMENT" IS APPROPRIATE UNLESS THE TRANSMITTED VALUE TO THE CONTROLLER IS DONE VIA A DIGITAL SIGNAL, NOT A 4-20 MA OR 0-10VDC.

TEMPERATURE SWITCH - A DEVICE THAT INDICATES TEMPERATURE AS A BINARY SIGNAL. TYPICALLY USED AS A 120V HARDWIRED SAFETY THAT WILL SHUT OFF POWER TO THE FAN IF THE TEMPERATURE IN THE SYSTEM IS TOO LOW. (IE. FREEZEESTAT)

CARBON MONOXIDE SENSOR - A SENSOR THAT MEASURES CARBON MONOXIDE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

NITROGEN DIOXIDE SENSOR - A SENSOR THAT MEASURES NITROGEN DIOXIDE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

METHANE SENSOR - A SENSOR THAT MEASURES METHANE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

METHANE DETECTOR - A DEVICE THAT SENSES MOISTURE AND TRANSMITS A BINARY SIGNAL TO THE BAS. IE: CONDENSATE DRIP PAN MOISTURE DETECTOR.

POSITION SWITCH - A DEVICE THAT SENSES POSITION AND TRANSMITS A BINARY SIGNAL TO THE BAS. IE: DAMPER END SWITCH.

ANALOG INPUT - A GENERIC FORM FOR A TRANSMITTER WITH A LOCAL DISPLAY USED TO MEASURE A GAS OR FLUID NOT MENTIONED ABOVE.

ANALOG INPUT - A MODULATING SIGNAL THAT COMES FROM THE FIELD DEVICE TO THE BAS SYSTEM. IE: THERMOSTAT.

ANALOG OUTPUT - A MODULATING SIGNAL SENT OUT FROM THE BAS TO THE FIELD DEVICE. IE: FLOW CONTROL VALVE.

DIGITAL INPUT - A BINARY SIGNAL THAT COMES FROM THE FIELD DEVICE TO THE BAS SYSTEM. IE: FLOW SWITCH.

DIGITAL OUTPUT - A BINARY SIGNAL SENT OUT FROM THE BAS TO THE FIELD DEVICE. IE: FAN START/STOP

COMMUNICATION WIRING - WIRING BETWEEN CONTROLLERS IN A BAS SYSTEM. ALLOWS NUMEROUS POINTS OF INFORMATION TO COMMUNICATE THROUGH THE NETWORK CABLE. BAS NETWORK SPEED AND TRAFFIC CAN EFFECT CONTROLLABILITY.

BACNET - MOST COMMON COMMUNICATION WIRING, REQUIRING 22 GAUGE TWISTED PAIR WIRING BETWEEN THE CONTROLLERS. BACNET IS AN INTERNET BASED COMMUNICATION PROTOCOL THAT PLUGS INTO A NETWORK JACK THROUGH A CAT 5 CABLE.

\*SEE PIPING AND DUCT SYMBOL LEGENDS FOR ADDITIONAL SYMBOL TYPES.

\*\*THERMOSTAT - A DEVICE THAT ACTIVATES A HEATING OR COOLING SYSTEM BASED ON A TEMPERATURE SETPOINT.

\*\*TEMPERATURE ELEMENT - A SENSOR THAT MEASURES TEMPERATURE AND TRANSMITS A SIGNAL TO THE BAS. THE USE OF "TEMPERATURE ELEMENT" IS APPROPRIATE UNLESS THE TRANSMITTED VALUE TO THE CONTROLLER IS DONE VIA A DIGITAL SIGNAL, NOT A 4-20 MA OR 0-10VDC.

\*\*TEMPERATURE SWITCH - A DEVICE THAT INDICATES TEMPERATURE AS A BINARY SIGNAL. TYPICALLY USED AS A 120V HARDWIRED SAFETY THAT WILL SHUT OFF POWER TO THE FAN IF THE TEMPERATURE IN THE SYSTEM IS TOO LOW. (IE. FREEZEESTAT)

\*\*CARBON MONOXIDE SENSOR - A SENSOR THAT MEASURES CARBON MONOXIDE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

\*\*NITROGEN DIOXIDE SENSOR - A SENSOR THAT MEASURES NITROGEN DIOXIDE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

\*\*METHANE SENSOR - A SENSOR THAT MEASURES METHANE PARTS PER MILLION LEVELS AND TRANSMITS AN ANALOG SIGNAL TO THE BAS.

\*\*METHANE DETECTOR - A DEVICE THAT SENSES MOISTURE AND TRANSMITS A BINARY SIGNAL TO THE BAS. IE: CONDENSATE DRIP PAN MOISTURE DETECTOR.

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\*\*DIGITAL INPUT - A BINARY SIGNAL THAT COMES FROM THE FIELD DEVICE TO THE BAS SYSTEM. IE: FLOW SWITCH.

\*\*DIGITAL OUTPUT - A BINARY SIGNAL SENT OUT FROM THE BAS TO THE FIELD DEVICE. IE: FAN START/STOP

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\*\*SDCI Use Only

\*\*KEYPLAN

\*\*TRUE NORTH

\*\*100% DD

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\*\*NO ISSUE DATE

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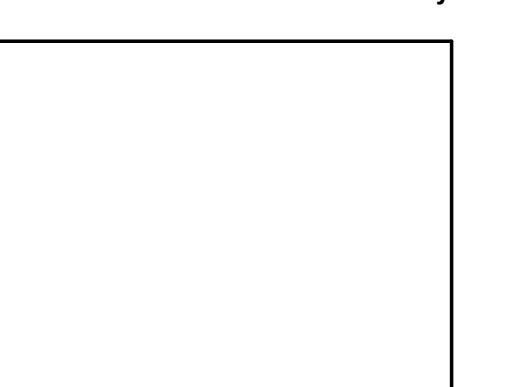
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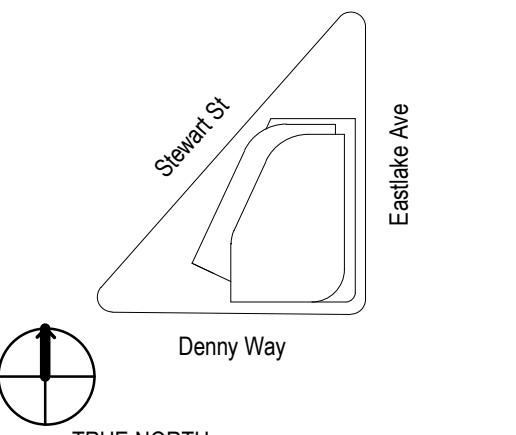

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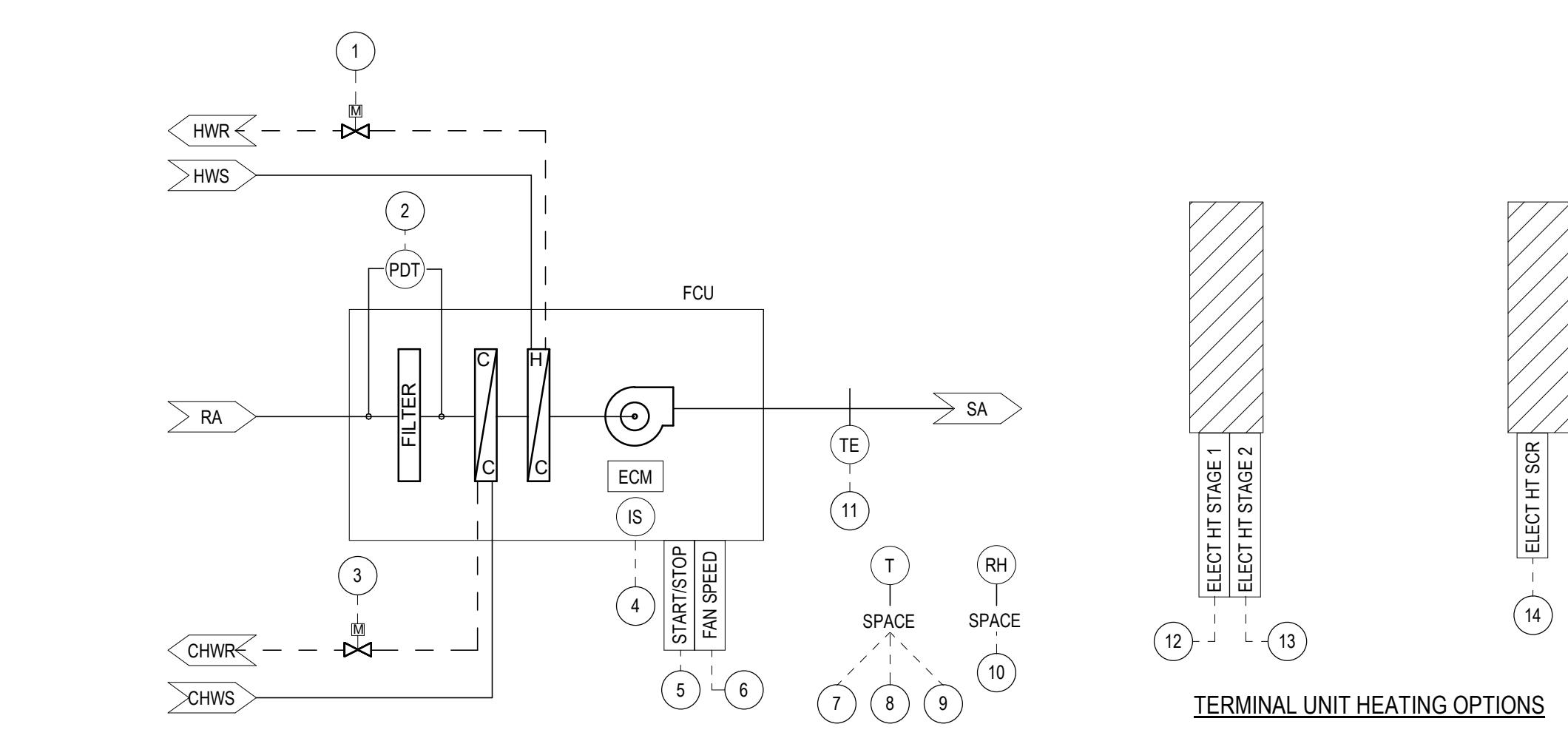
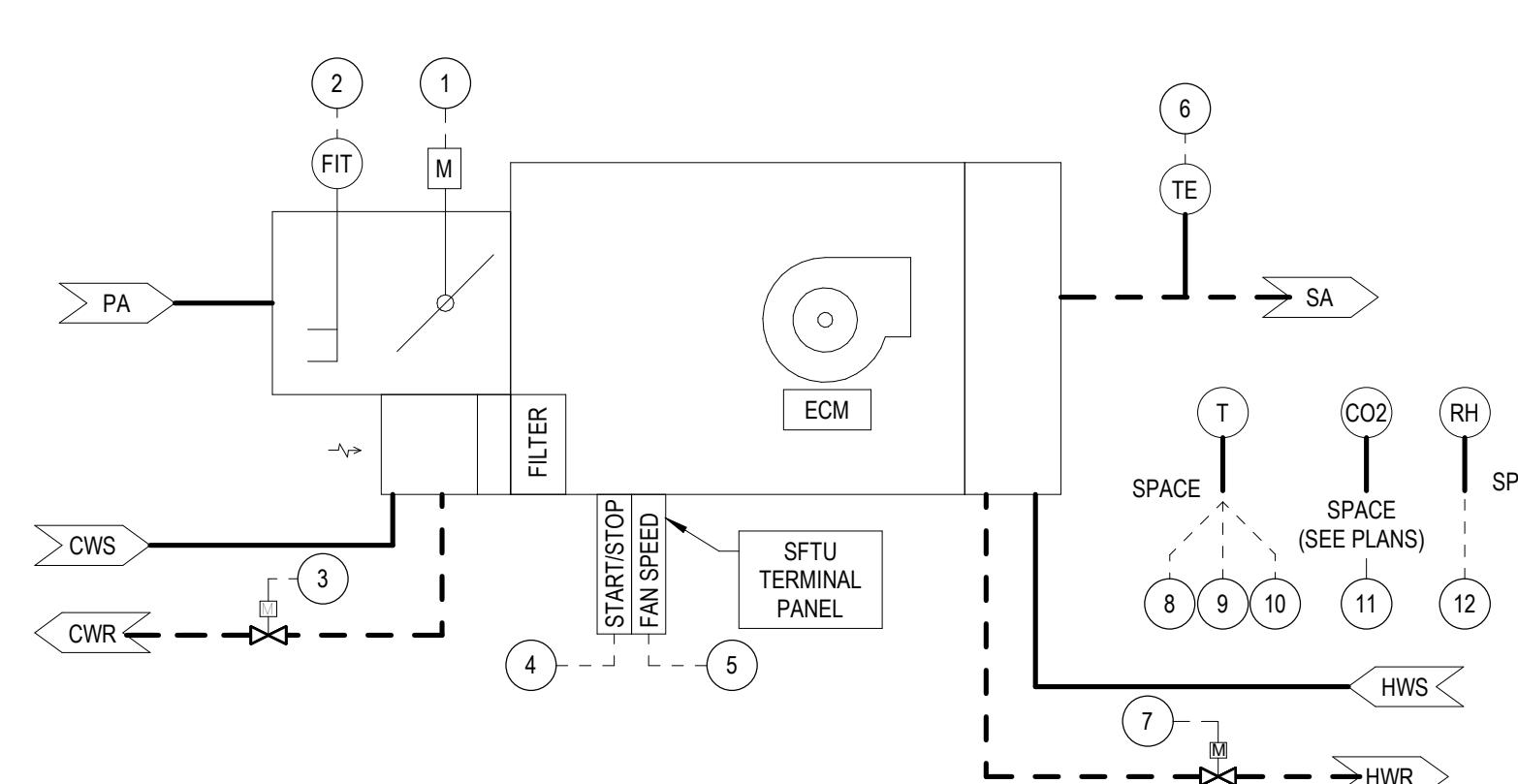
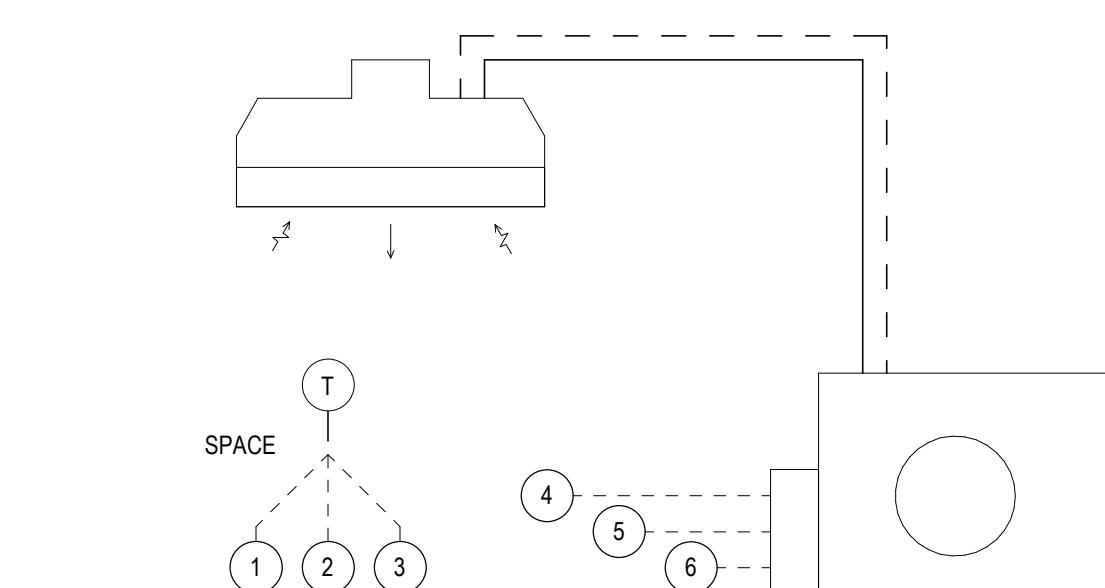
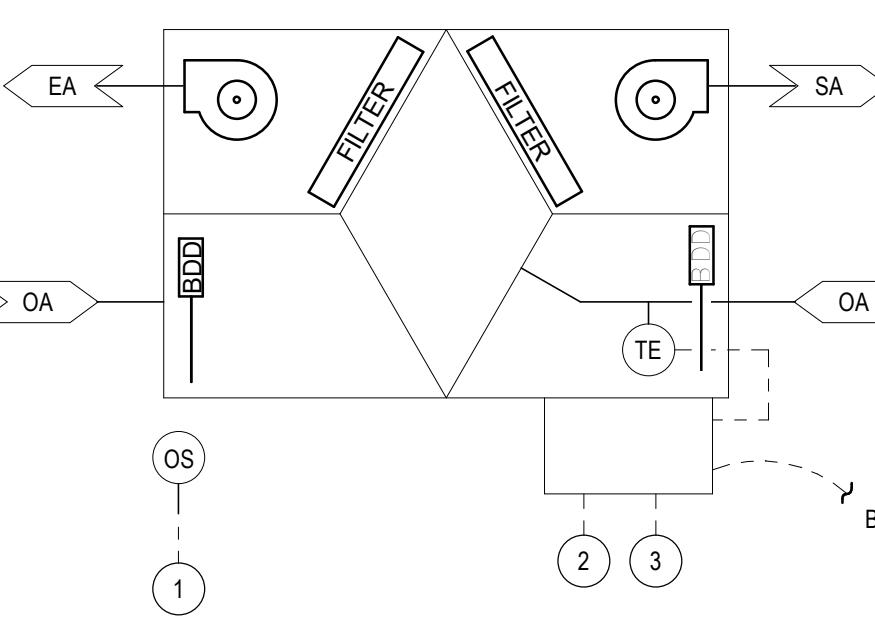


KEYPLAN

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 Job Number 207092-001  
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**CONTROL DIAGRAMS**  
 SHEET NUMBER
**M-031**

1 PACKAGE ERV SYSTEM DIAGRAM

M-031

SCALE: 1/8" = 1'-0"

2 SPLIT SYSTEM CONTROL DIAGRAM

M-031

SCALE: 1/8" = 1'-0"

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	ROOM TEMPERATURE		X		
2	ROOM TEMP SETPOINT		X		
3	OCCUPANCY OVERRIDE			X	
4	SPACE TEMPERATURE	X			
5	ENABLE / DISABLE		X		
6	STATUS			X	

GENERAL NOTES:

1.

XXX

2.

XXX

3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	PRIMARY DAMPER		X		
2	PRIMARY AIRFLOW		X		
3	CROSSING COMMAND		X		
4	FAN START/STOP			X	
5	FAN SPEED	X			
6	DISCHARGE AIR TEMPERATURE		X		
7	HEATING COMMAND	X			
8	SPACE TEMPERATURE			X	
9	SPACE TEMPERATURE SETPOINT			X	
10	OCCUPANCY OVERRIDE			X	
11	SPACE CO2 OVERRIDE			X	
12	ELECT HEAT STAGE ON/OFF (IF APPLICABLE)				X
13	ELECT HEAT STAGE ON/OFF (IF APPLICABLE)				X
14	ELECT HEAT STAGE SCR %				X

GENERAL NOTES:

1.

XXX

2.

XXX

3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	PRIMARY DAMPER		X		
2	PRIMARY AIRFLOW	X			
3	DISCHARGE AIR TEMPERATURE	X			
4	HEATING COMMAND			X	
5	SPACE TEMPERATURE			X	
6	ROOM TEMPERATURE SETPOINT			X	
7	OCCUPANCY OVERRIDE			X	

GENERAL NOTES:

1.

XXX

2.

XXX

3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	ELECT HEAT STAGE ON/OFF		X		
2	ELECT HEAT STAGE ON/OFF (IF APPLICABLE)		X		
3	ELECT HEAT STAGE SCR %	X			

GENERAL NOTES:

1.

XXX

2.

XXX

3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	PRIMARY DAMPER COMMAND		X		
2	PRIMARY AIRFLOW	X			
3	SPACE CO2 SENSOR		X		
4	SPACE TEMPERATURE			X	
5	TEMPERATURE ADJUSTMENT			X	
6	OVERRIDE			X	

GENERAL NOTES:

1.

XXX

2.

XXX

3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	CO2 (IF APPLICABLE)				
2	T (IF APPLICABLE)				

GENERAL NOTES:

1.

XXX

2.

XXX

3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	SA				
2	EA				
3	CO2 (IF APPLICABLE)				
4	T (IF APPLICABLE)				

GENERAL NOTES:

1.

XXX

2.

XXX

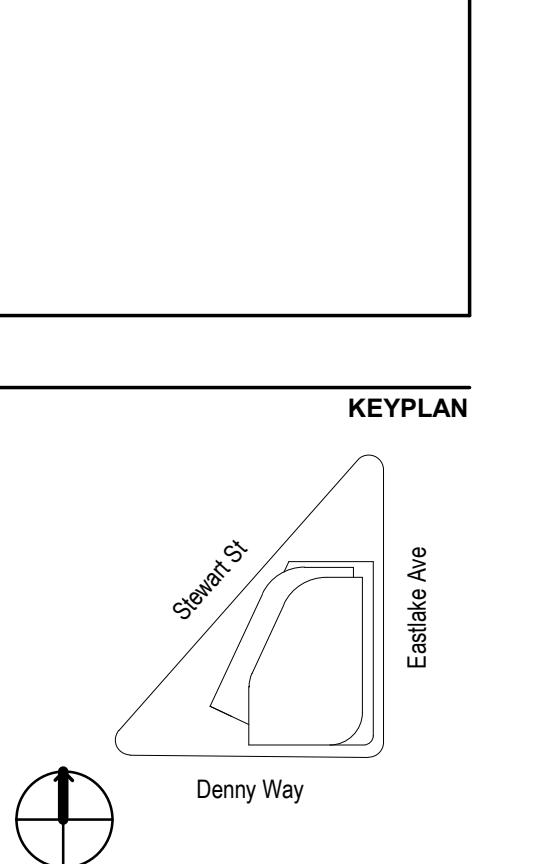
3.

XXX

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	



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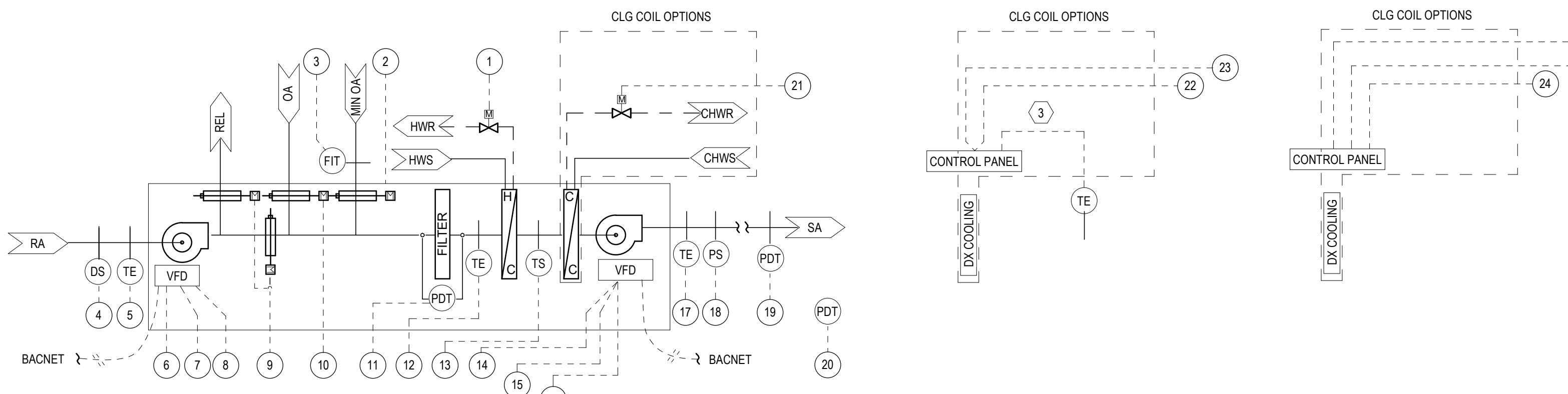
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NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
		TITLE

**CONTROL DIAGRAMS**

SHEET NUMBER

**M-032**Z  
1'-0"  
12'-0"  
0'

AIR HANDLING UNIT CONTROL DIAGRAM

AIR HANDLING UNIT COOLING OPTIONS

POINT TAG	POINT DESCRIPTION	CONTROL POINT TYPE					NOTES
		AI	AO	DI	DO	COM	
1	HEATING WATER VALVE COMMAND		X				
2	MIN OA DAMPER COMMAND		X				
3	OUTSIDE AIRFLOW	X					
4	DUCT SMOKE STATUS		X				1
5	RETURN AIR TEMPERATURE	X					
6	RETURN FAN ENABLE			X			
7	RETURN FAN STATUS		X				
8	RETURN FAN SPEED	X					
9	RETURN / RELIEF DAMPER COMMAND	X					
10	ECONOMIZER DAMPER COMMAND	X					
11	FILTER DIFFERENTIAL PRESSURE	X					
12	MIXED AIR TEMPERATURE	X					
13	FROZEN		X				1
14	SUPPLY FAN ENABLE		X				
15	SUPPLY FAN STATUS		X				
16	SUPPLY FAN SPEED	X					
17	SUPPLY AIR TEMPERATURE	X					1
18	HIGH STATIC ALARM		X				
19	SUPPLY DIFFERENTIAL PRESSURE	X					2
20	BUDGET DIFFERENTIAL PRESSURE	X					2
21	CHILLED WATER VALVE COMMAND	X					
22	ENABLE / DISABLE	X					
23	SUPPLY AIR SETPOINT	X					
24	COOLING STAGE 1 START/STOP		X				
25	COOLING STAGE 2 START/STOP		X				
26	COOLING STAGE 3 START/STOP		X				

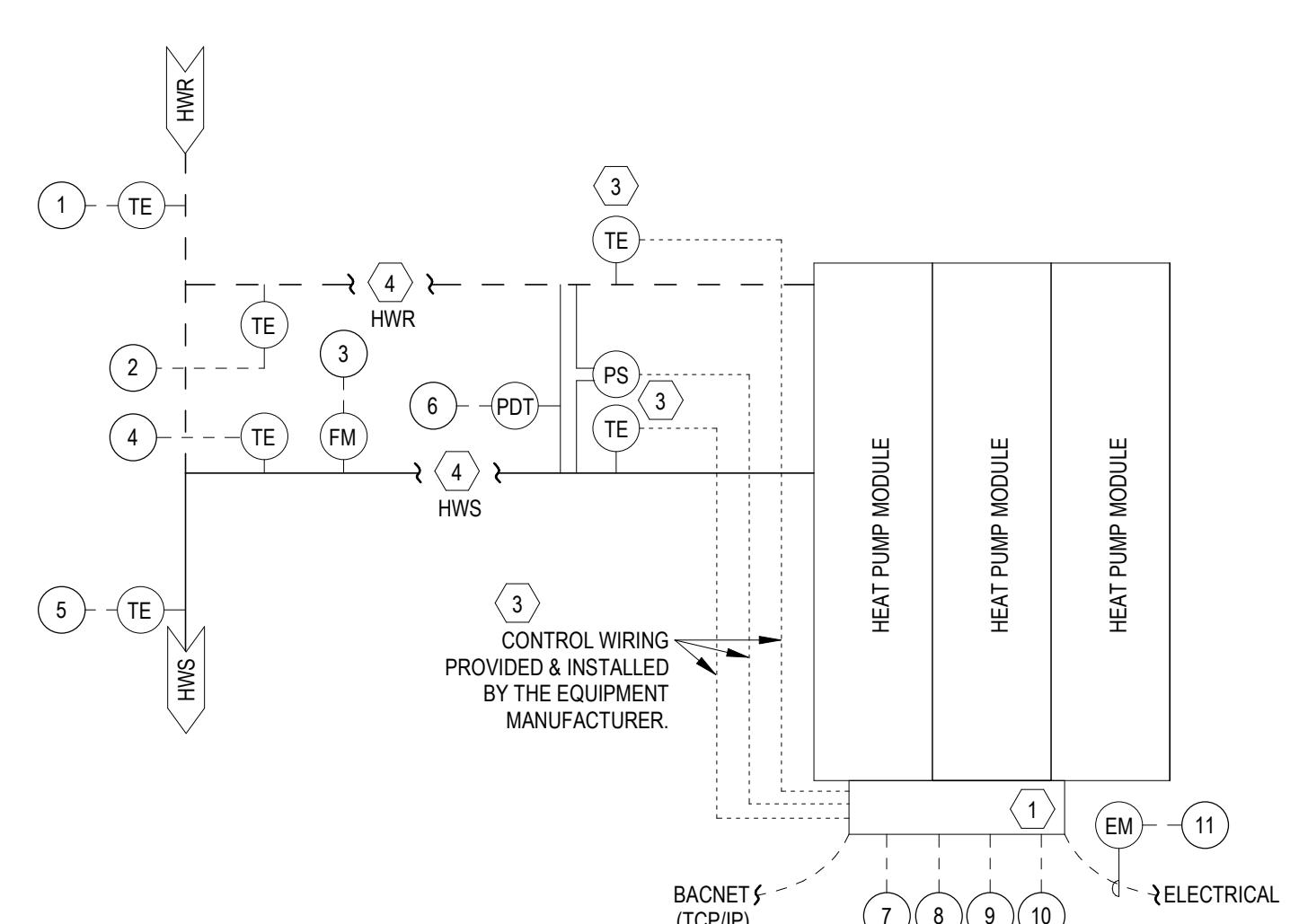
## GENERAL NOTES:

- 1. HARDWIRED TO SUPPLY AND RETURN FAN VFDS TO SHUT DOWN FANS UPON ALARM.
- 2. REFER TO AIR HANDLING UNIT SYSTEM DIAGRAM FOR LOCATION.
- 3. SUPPLY AIR SENSOR FURNISHED BY MANUFACTURER. BAS CONTRACTOR SHALL INSTALL SENSOR AND WIRE TO MANUFACTURER CONTROL PANEL.

1 AIR HANDLING UNIT CONTROL DIAGRAM W/ COOLING OPTIONS

SCALE: 1/8" = 1'-0"

M-032



POINT TAG	POINT DESCRIPTION	CONTROL POINT TYPE					NOTES
		AI	AO	DI	DO	COM	
1	HEATING WATER RETURN TEMPERATURE	X					
2	HEATING WATER RETURN TEMPERATURE	X					
3	HEATING WATER FLOW	X					
4	HEATING WATER SUPPLY TEMPERATURE	X					
5	HEATING WATER SUPPLY TEMPERATURE	X					
6	DIFFERENTIAL PRESSURE	X					
7	ENABLE / DISABLE			X			
8	LEAVING CHILLED WATER TEMPERATURE SETPOINT	X					
9	LEAVING HEATING WATER TEMPERATURE SETPOINT	X					
10	GENERAL ALARM		X				
11	HEAT PUMP KW	X					2

## GENERAL NOTES:

- 1. MANUFACTURER CONTROL PANEL
- 2. KW METER PROVIDED BY ELECTRICAL. REFERENCE ELECTRICAL
- 3. FACTORY FURNISHED TEMPERATURE SENSORS AND PRESSURE SWITCHES. INSTALLATION AND WIRING BACK TO CONTROL CONTRACTOR
- 4. REFERENCE PUMP DIAGRAM
- 5. MASTER CONTROLLER BY MANUFACTURER

2 HEAT PUMP OR HEAT RECOVERY CHILLER CONTROL DIAGRAM

M-032

SCALE: 1/8" = 1'-0"

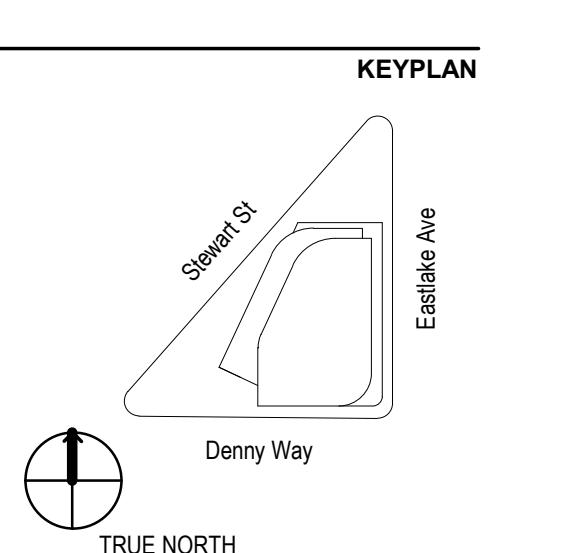
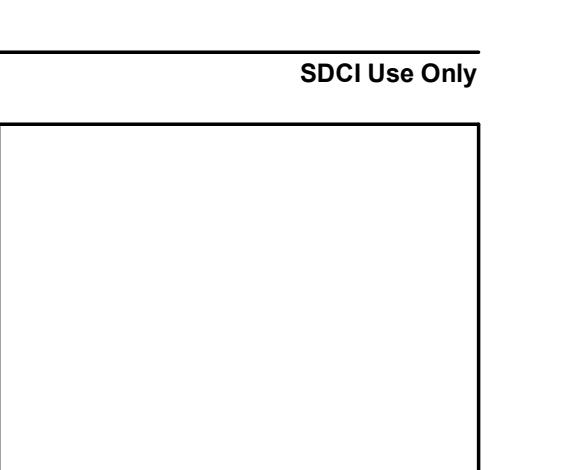
NO	ISSUE	DATE
Job Number		207092-001
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Approved		D. BUDD
		TITLE

**CONTROL DIAGRAMS**

SHEET NUMBER

**M-032**


**LIFE SCIENCES TOWER**  
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 Seattle, WA 98109

 200 - 3394 Carmel Mountain Rd  
 San Diego, CA 92121  
 858-794-1900


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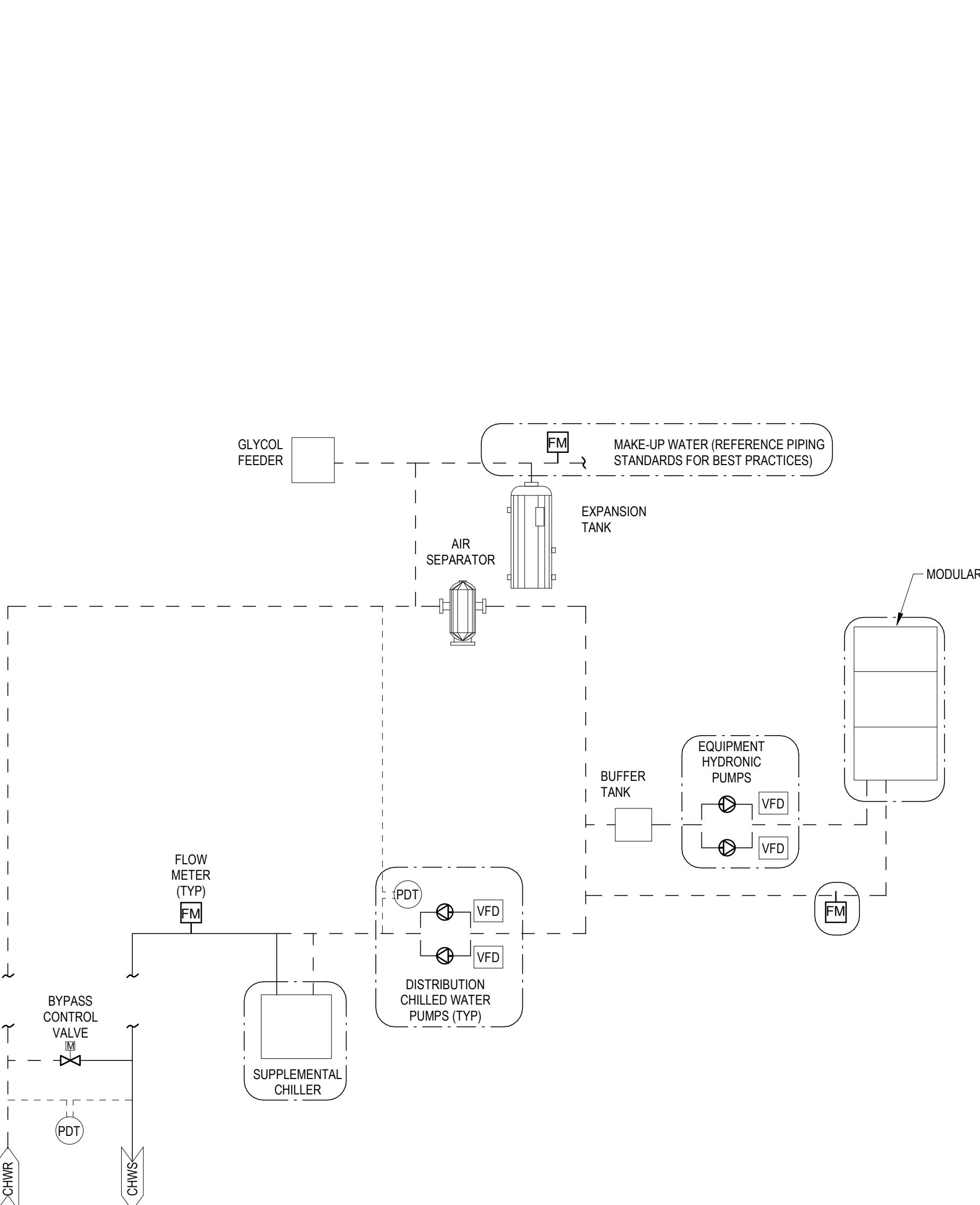
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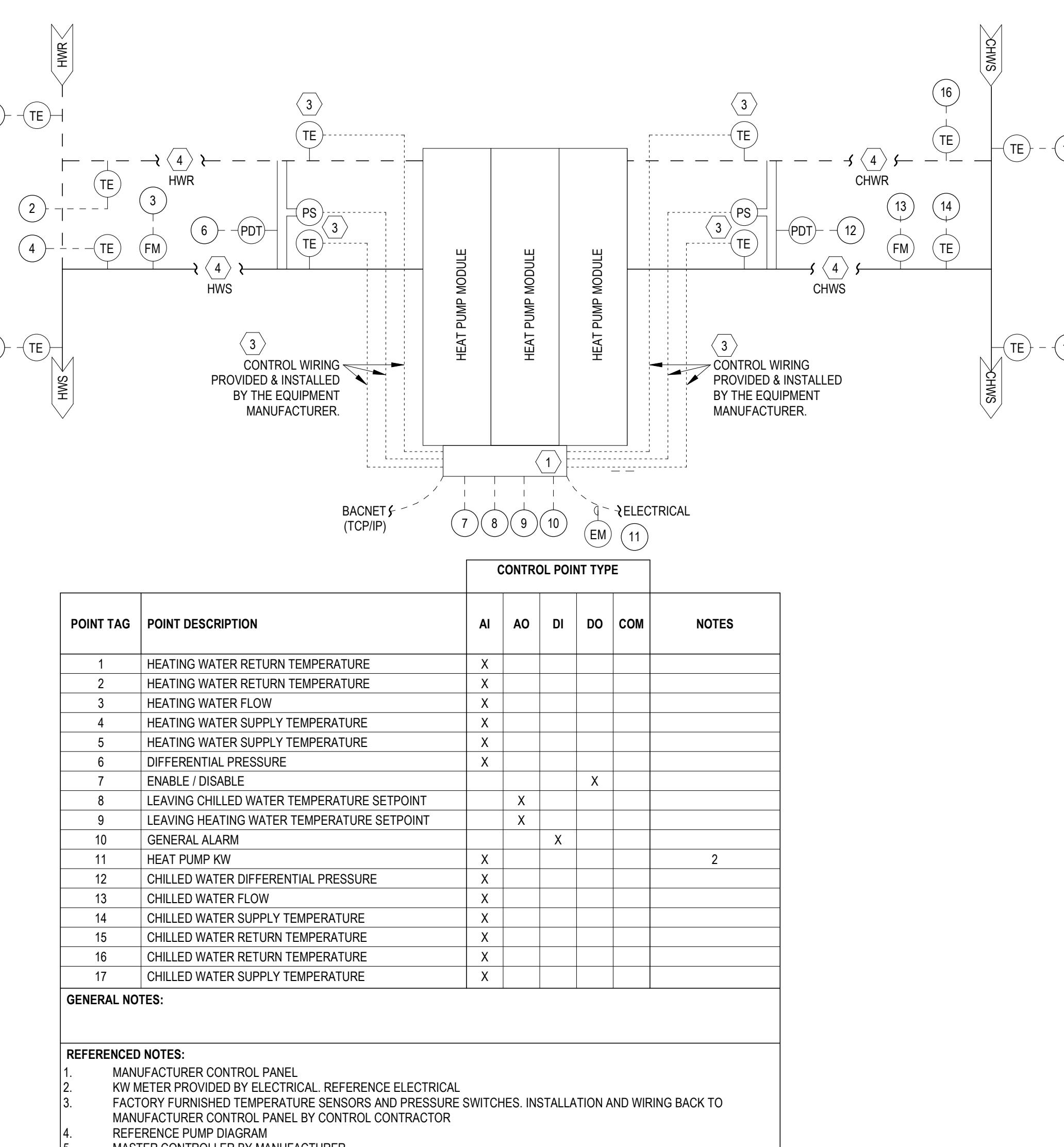
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 Approved D. BUDD  
 TITLE

## CONTROL DIAGRAMS

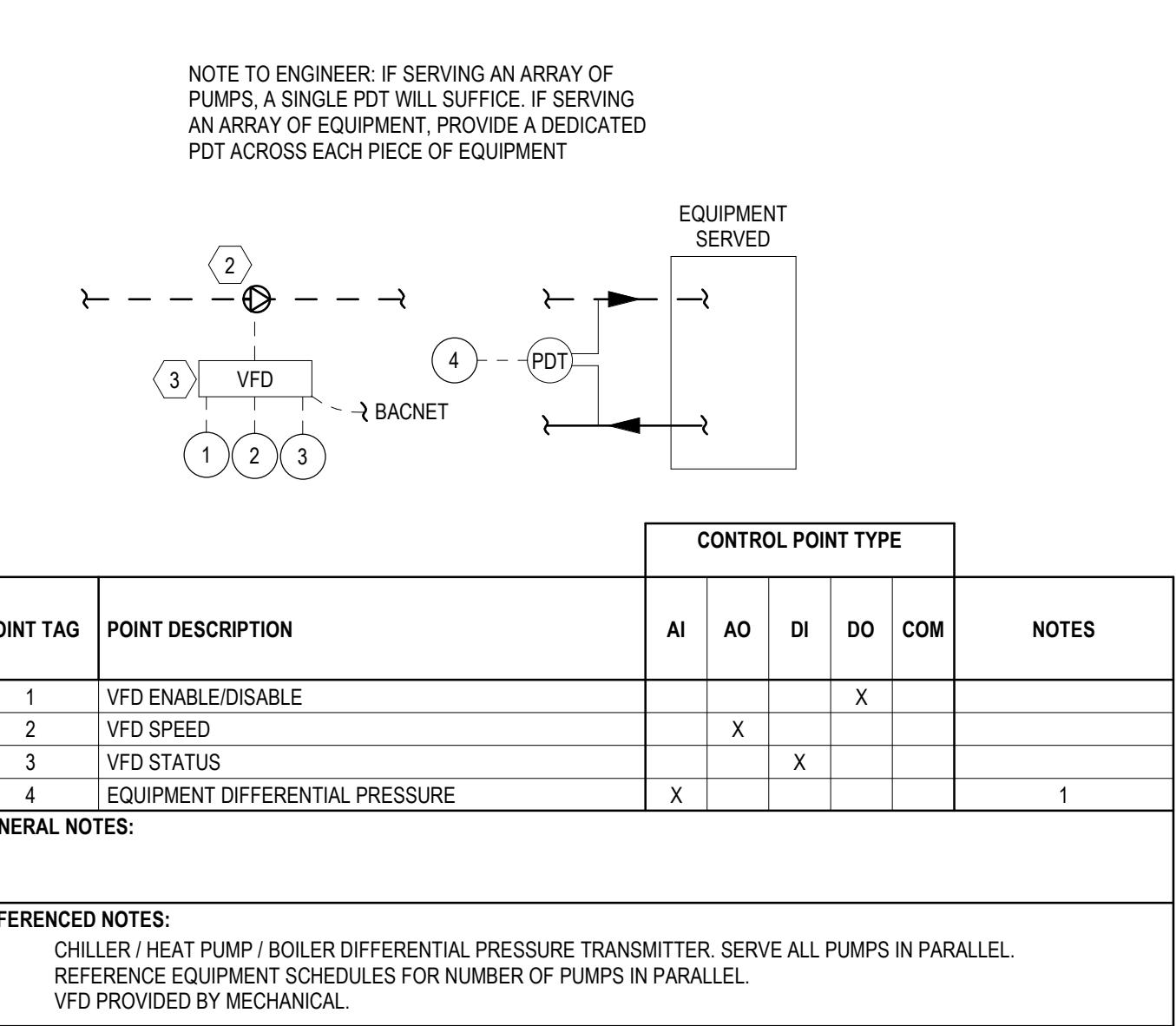
SHEET NUMBER

**M-033**
**1 HYDRONIC COOLING FLOW DIAGRAM**  
 M-033

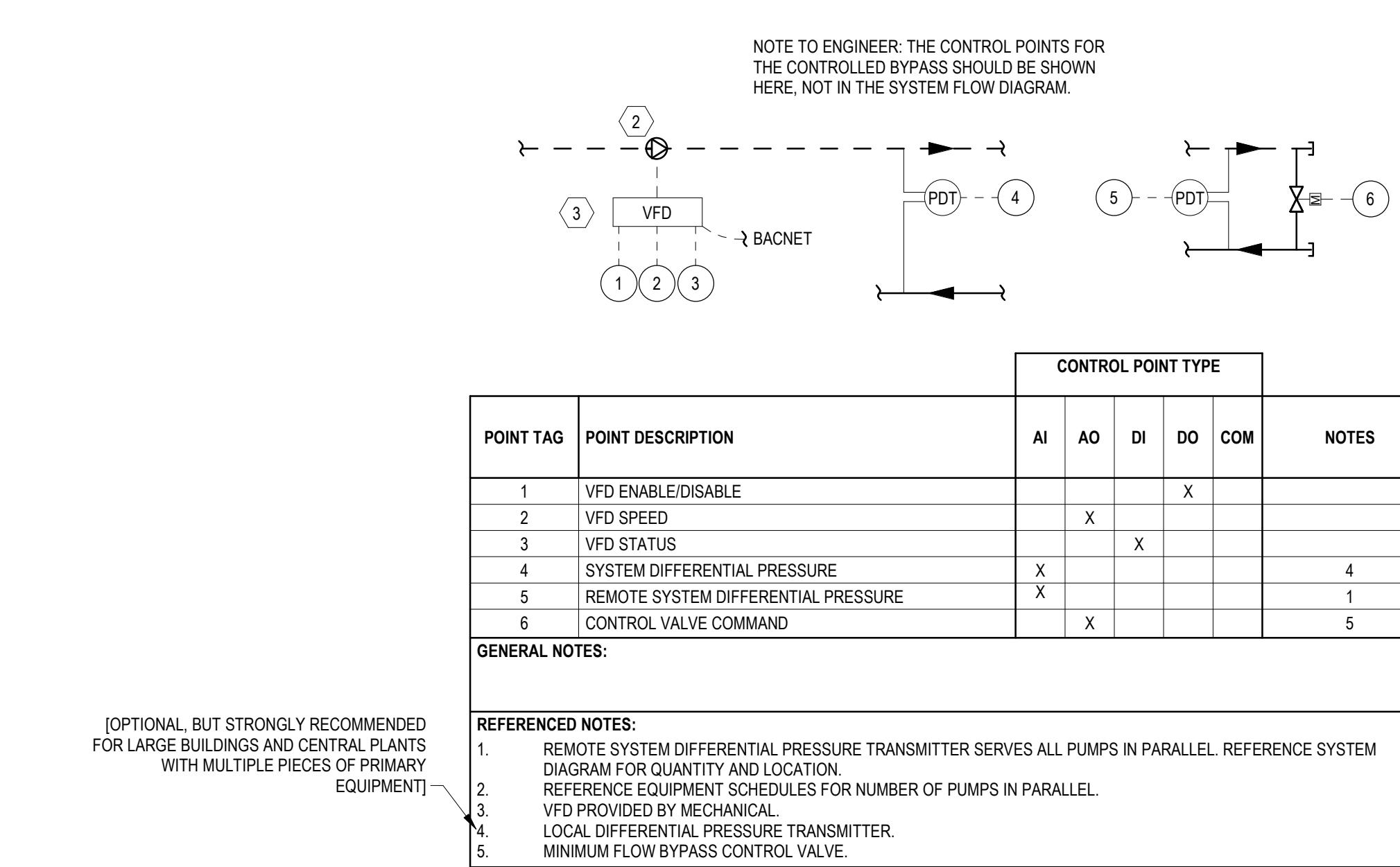
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**2 HEAT RECOVERY CHILLER CONTROL DIAGRAM**  
 M-033

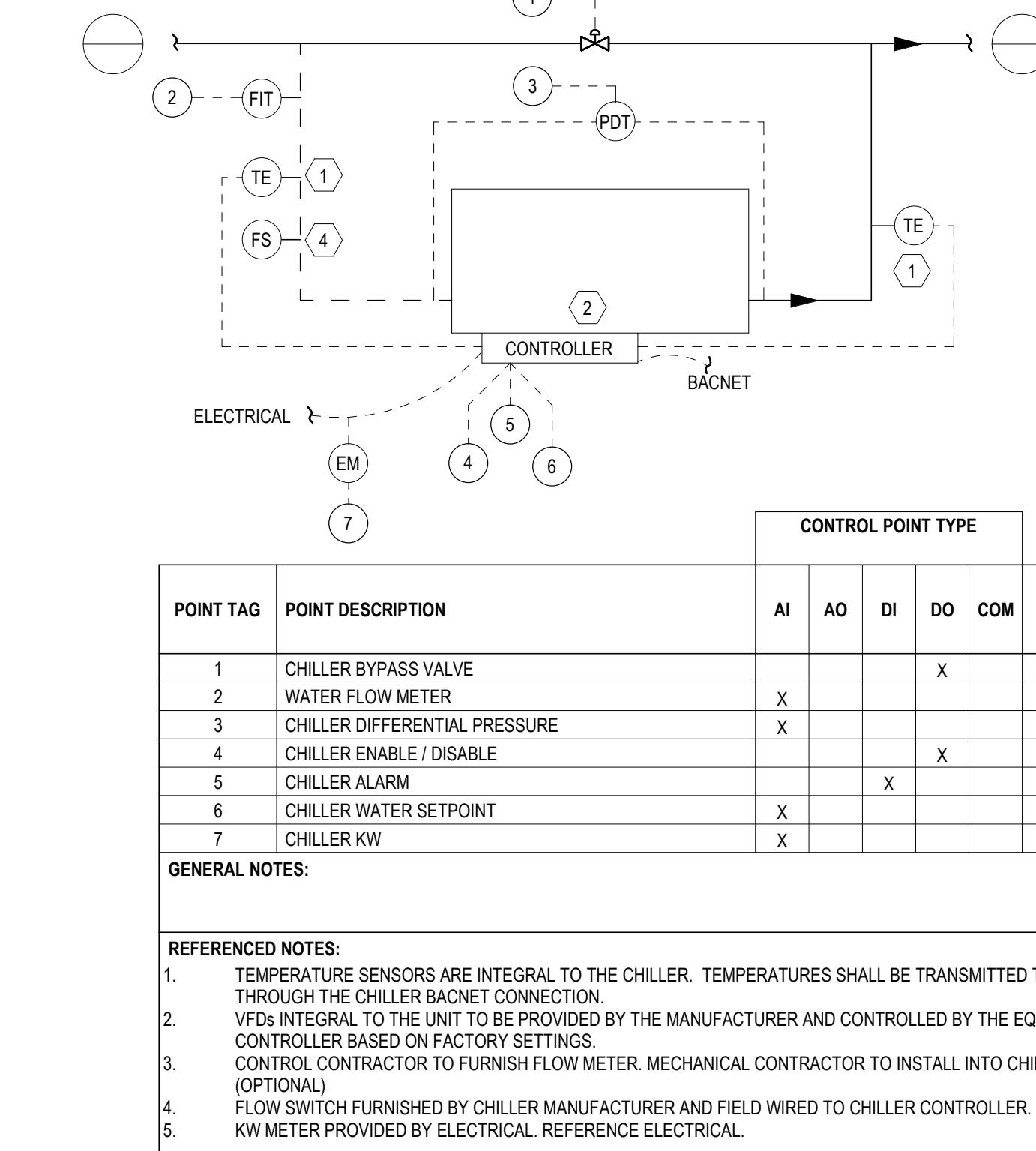
SCALE: 1/8" = 1'-0"


**4 PRIMARY PUMP CONTROL DIAGRAM**  
 M-033

SCALE: 12" = 1'-0"


**5 DISTRIBUTION PUMP CONTROL DIAGRAM**  
 M-033

SCALE: 12" = 1'-0"

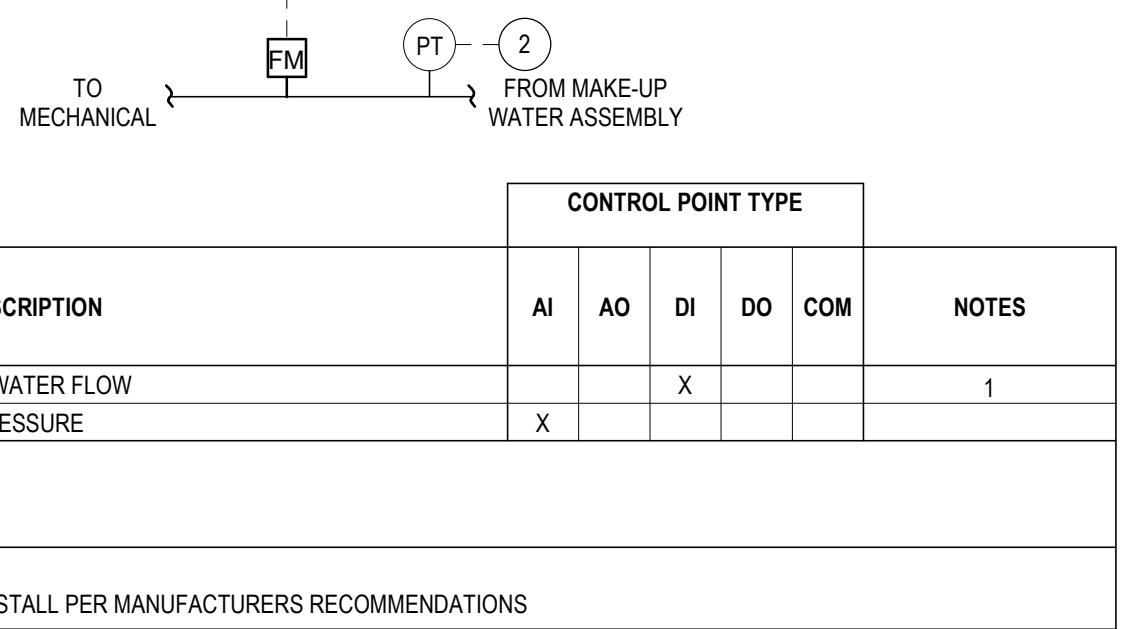

**3 CHILLER EQUIPMENT CONTROL DIAGRAM**  
 M-033

SCALE: 1/8" = 1'-0"

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	HEATING WATER RETURN TEMPERATURE	X			
2	HEATING WATER RETURN PRESSURE	X			
3	HEATING WATER FLOW	X			
4	HEATING WATER SUPPLY TEMPERATURE	X			
5	HEATING WATER SUPPLY PRESSURE	X			
6	DIFFERENTIAL PRESSURE	X			
7	ENABLE / DISABLE				X
8	LEAVING HEAT WATER TEMPERATURE SETPOINT	X			
9	LEAVING HEAT WATER TEMPERATURE SETPOINT	X			
10	GENERAL ALARM				X
11	HEAT PUMP KW	X			
12	CHILLED WATER DIFFERENTIAL PRESSURE	X			
13	CHILLED WATER FLOW	X			
14	CHILLED WATER RETURN TEMPERATURE	X			
15	CHILLED WATER RETURN PRESSURE	X			
16	CHILLED WATER SUPPLY TEMPERATURE	X			
17	CHILLED WATER SUPPLY PRESSURE	X			

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	CHILLER BYPASS VALVE				X
2	WATER FLOW METER	X			
3	CHILLER DIFFERENTIAL PRESSURE	X			
4	CHILLER ENABLE / DISABLE				X
5	CHILLER ALARM				X
6	CHILLER SETPOINT	X			
7	CHILLER KW	X			

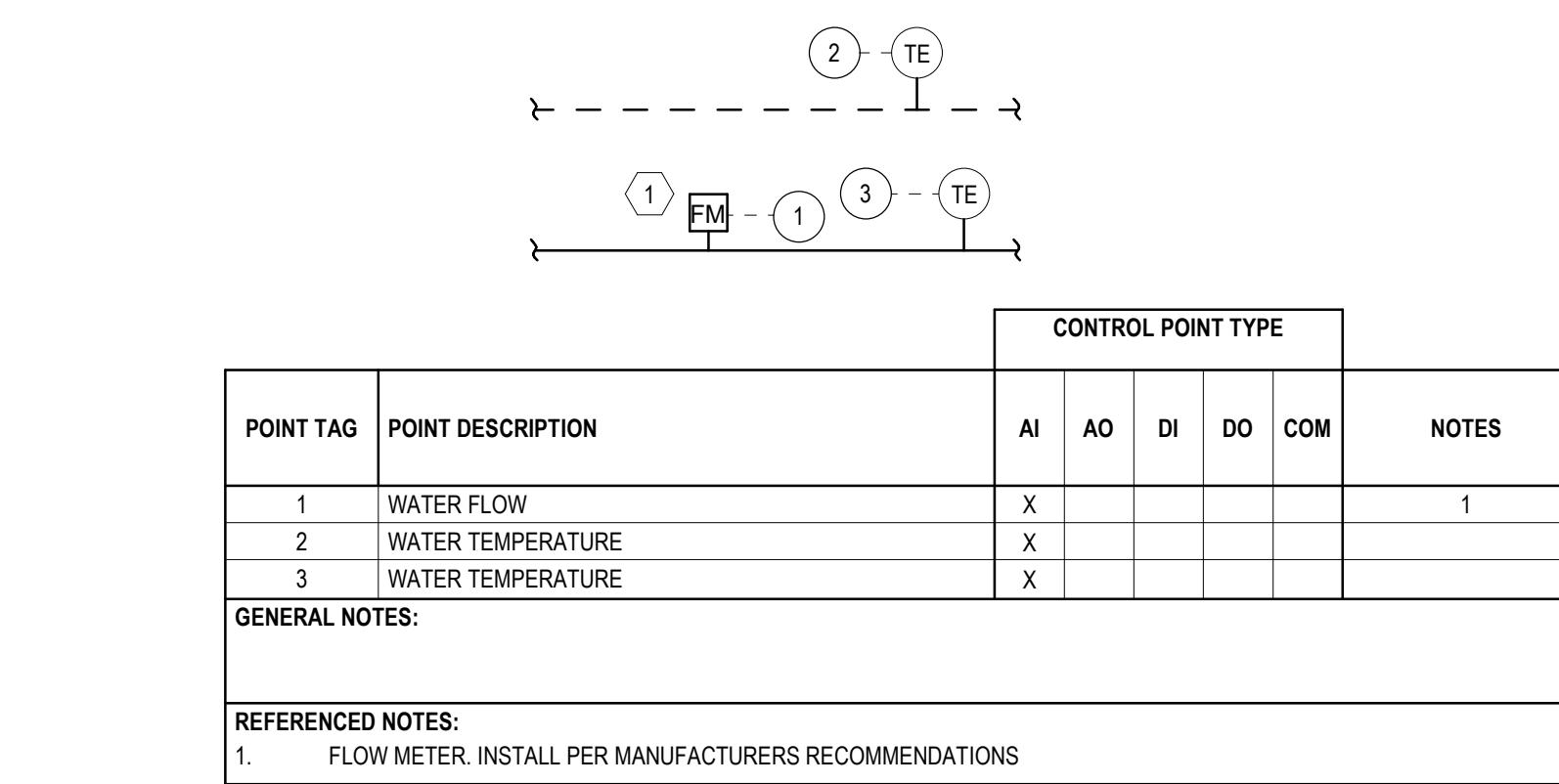
GENERAL NOTES:  
 1. TEMPERATURE SENSORS ARE INTEGRAL TO THE CHILLER. TEMPERATURES SHALL BE TRANSMITTED TO THE BAS THROUGH THE CHILLER BACNET CONNECTION.  
 2. VFD PROVIDED BY ELECTRICAL REFERENCE ELECTRICAL.  
 3. FACTORY INSTALLED TEMPERATURE SENSORS AND PRESSURE SWITCHES. INSTALLATION AND WIRING BACK TO MANUFACTURER CONTROL PANEL BY FACTORY SETTING.  
 4. REFERENCE PUMP DIAGRAM.  
 5. MASTER CONTROLLER BY MANUFACTURER.


**6 MAKE-UP WATER CONTROL DIAGRAM**  
 M-033

SCALE: 1/8" = 1'-0"

CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	MAKE-UP WATER FLOW	X			
2	STATIC PRESSURE	X			

GENERAL NOTES:  
 1. REMOTE SYSTEM DIFFERENTIAL PRESSURE TRANSMITTER SERVES ALL PUMPS IN PARALLEL. REFERENCE SYSTEM DIAGRAM FOR QUANTITY AND LOCATION.  
 2. REFERENCE EQUIPMENT SCHEDULES FOR NUMBER OF PUMPS IN PARALLEL.  
 3. VFD PROVIDED BY ELECTRICAL.  
 4. LOCAL DIFFERENTIAL PRESSURE TRANSMITTER.  
 5. MINIMUM FLOW BYPASS CONTROL VALVE.


**7 FLOW METER CONTROL DIAGRAM**  
 M-033

SCALE: 12" = 1'-0"

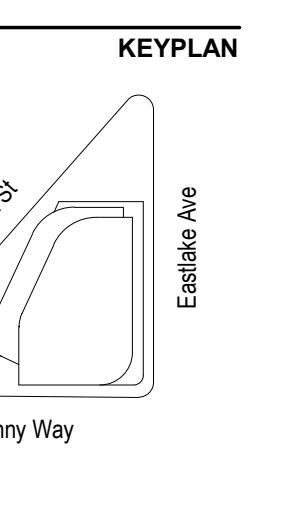
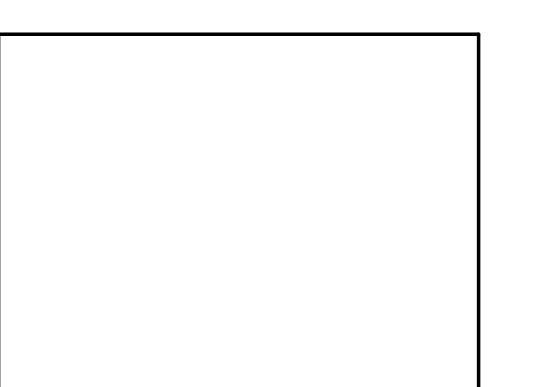
CONTROL POINT TYPE					
POINT TAG	POINT DESCRIPTION	AI	AO	DI	DO
1	WATER FLOW	X			
2	WATER TEMPERATURE	X			
3	WATER TEMPERATURE	X			

GENERAL NOTES:  
 1. FLOW METER. INSTALL PER MANUFACTURERS RECOMMENDATIONS.


**LIFE SCIENCES TOWER**  
 1305 Stewart St  
 Seattle, WA 98109

  
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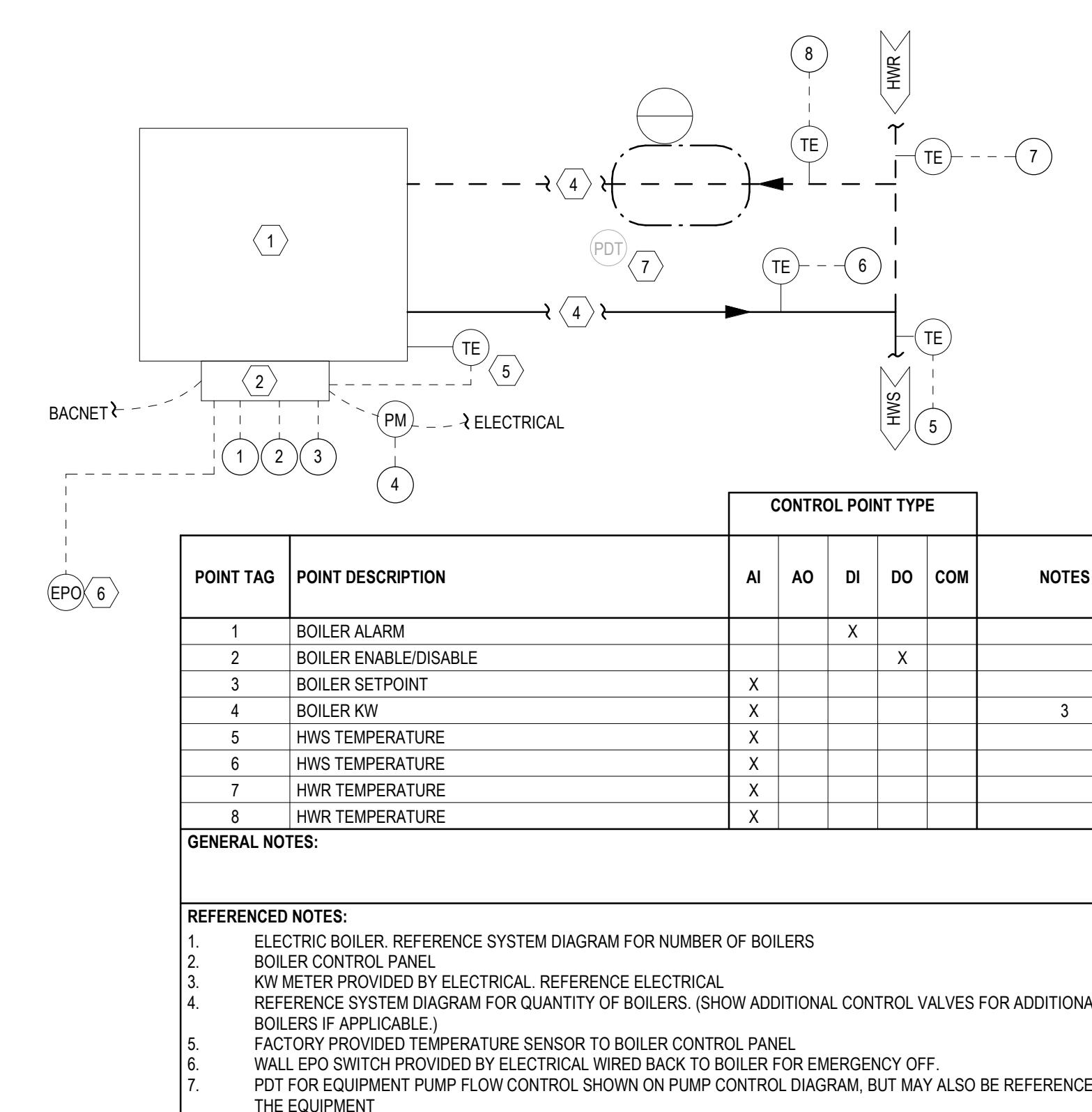
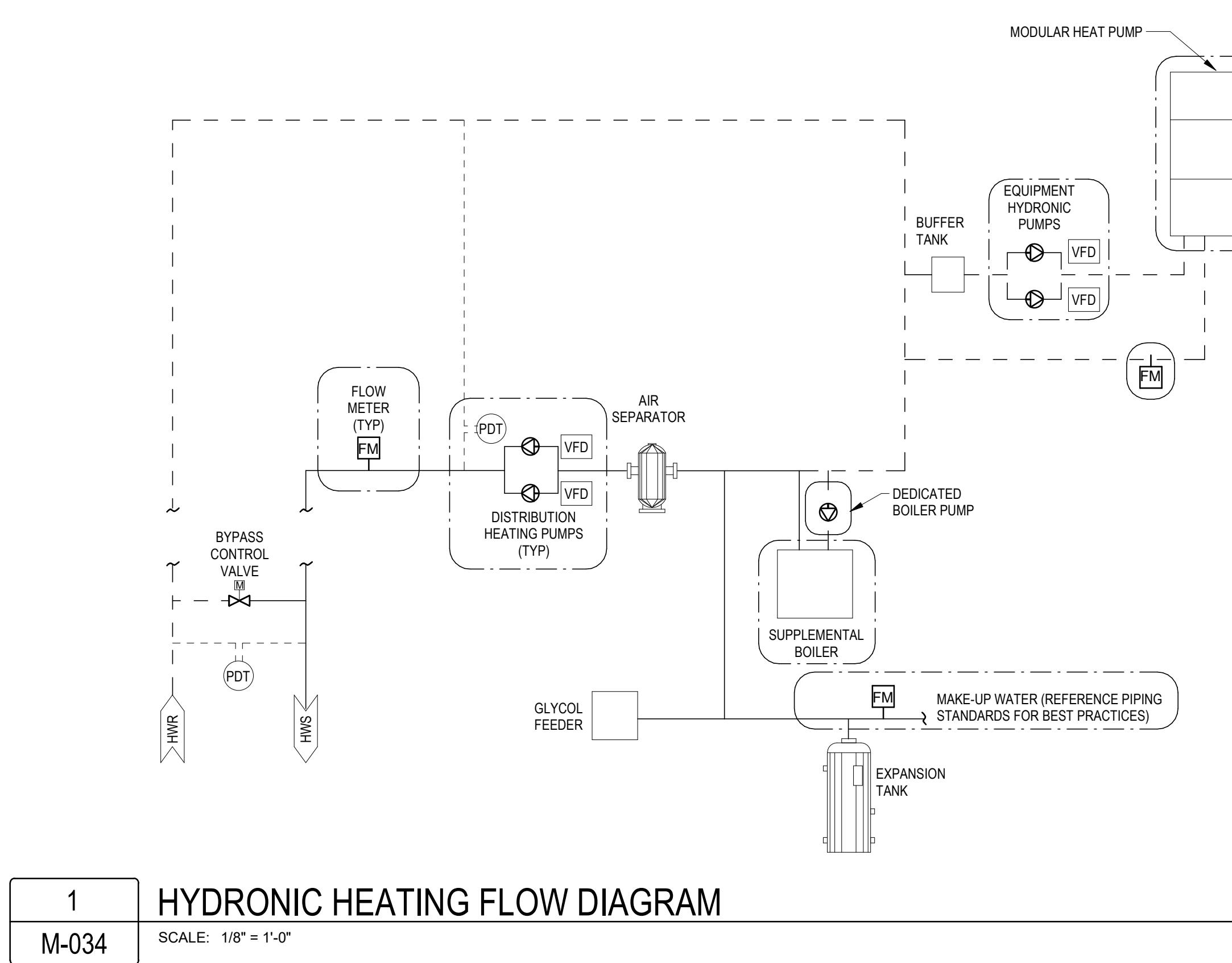
100% DD  
2023/11/03

ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved	<input type="checkbox"/>	D. BUDD

## CONTROL DIAGRAMS

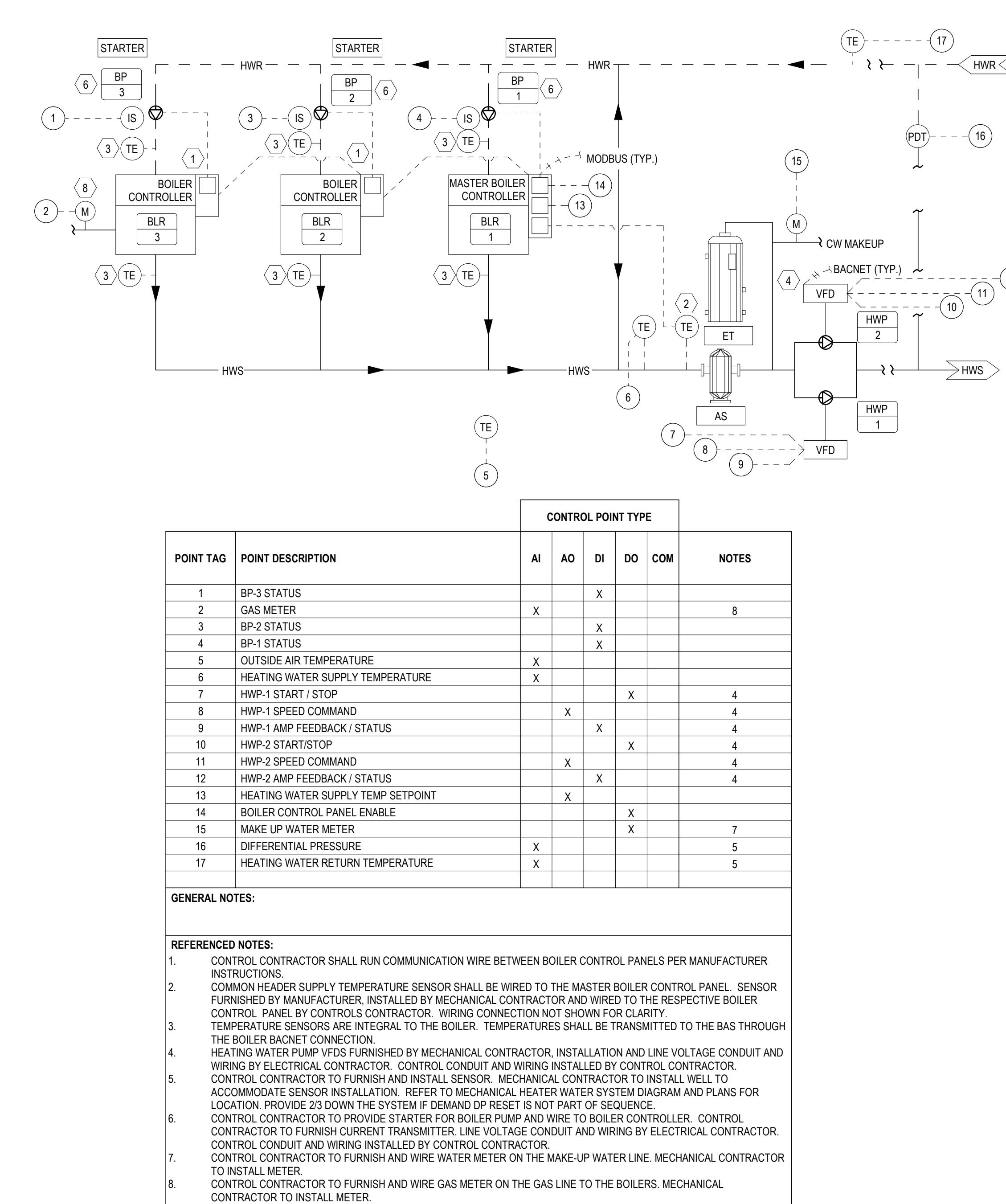
SHEET NUMBER

**M-034**

2 ELECTRIC BOILER CONTROL DIAGRAM

M-034

SCALE: 1/8" = 1'-0"



3 BOILER PLANT CONTROL DIAGRAM

M-034

SCALE: 1/8" = 1'-0"

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved	<input type="checkbox"/>	D. BUDD

## CONTROL DIAGRAMS

SHEET NUMBER

**M-034**

SIDEWALL SUPPLY AND RETURN GRILLE & REGISTER SCHEDULE									
DESCRIPTION			PHYSICAL DIMENSIONS			PERFORMANCE			SPECIFIC NOTES
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	MANUFACTURER	MODEL	RUNOUT SIZE (IN)	NECK SIZE (IN)	FACE SIZE (IN)	MAX AIRFLOW (CFM)	DBL DEFLECTION DISCHARGE GRILLE	OPPOSED BLADE DAMPER
GRD	SAG WWH	SHOEMAKER	933	SEE PLANS	SEE PLANS	SEE PLANS	YES	NO	
GRD	SAR WWH	SHOEMAKER	933	SEE PLANS	SEE PLANS	SEE PLANS	YES	YES	
GRD	SAR WWH	SHOEMAKER	SD-34	SEE PLANS	SEE PLANS	SEE PLANS	YES	YES	1
GRD	RAG WWH	SHOEMAKER	935	SEE PLANS	SEE PLANS	SEE PLANS	NO	NO	
GRD	RAR WWH	SHOEMAKER	935	SEE PLANS	SEE PLANS	SEE PLANS	NO	YES	
GRD	PR WWH	SHOEMAKER	935	SEE PLANS	SEE PLANS	SEE PLANS	YES	YES	

VFD SCHEDULE									
DESCRIPTION			ELECTRICAL			SPECIFIC NOTES			
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SCOPE	AREA/ SYSTEM SERVED	ASSOCIATED EQUIPMENT	VOLTAGE (V)	PHASE (Ø)	MOTOR HORSEPOWER (HP)	PANEL REQUIRED
VFD-ACCCP	I-501	LEVEL 15	S&C	AIR COOLED CHILLER	ACCR-91	460	3	5.0	Yes
VFD-ACCCP	I-502	LEVEL 15	S&C	AIR COOLED CHILLER	ACCR-90	460	3	5.0	Yes
VFD-CHWP	I-501	LEVEL 15	S&C	BUILDING CHILLED WATER	CHWP-15-01	460	3	60.0	Yes
VFD-CHWP	I-502	LEVEL 15	S&C	BUILDING CHILLED WATER	CHWP-15-02	460	3	60.0	Yes
VFD-CHWP	I-503	LEVEL 15	S&C	BUILDING CHILLED WATER	CHWP-15-03	460	3	60.0	Yes
VFD-EF	EF-01	LEVEL 02	S&C	SL EXHAUST	EF-01	460	3	5.0	Yes
VFD-FE	R-01	ROOF	S&C	FUME EXHAUST	FE-R-01	460	3	25.0	Yes
VFD-FE	R-02	ROOF	S&C	FUME EXHAUST	FE-R-02	460	3	25.0	Yes
VFD-GEF	P-01	LEVEL 02	S&C	LOADING DOCK EXHAUST	GEF-P-01	460	3	5.0	Yes
VFD-GEF	P-01	PARKING	S&C	GARAGE EXHAUST	GEF-P-01	460	3	5.0	Yes
VFD-GEF	P-01	PARKING	S&C	GARAGE EXHAUST	GEF-P-01	460	3	7.5	Yes
VFD-GSF	P-01	P2 PARKING	S&C	GARAGE SUPPLY	GSF-P-01	460	3	5.0	Yes
VFD-GSF	P-02	P3 PARKING	S&C	GARAGE SUPPLY	GSF-P-02	460	3	5.0	Yes
VFD-HPPC	I-501	LEVEL 15	S&C	AIR SOURCE HEAT PUMP CIRC	HPPC-15-04	460	3	5.0	Yes
VFD-HPPC	I-502	LEVEL 15	S&C	AIR SOURCE HEAT PUMP CIRC	HPPC-15-03	460	3	5.0	Yes
VFD-HPPC	I-503	LEVEL 15	S&C	AIR COOLED CHILLER	CHWP-15-04	460	3	10.0	Yes
VFD-HPPC	I-504	LEVEL 15	S&C	AIR COOLED CHILLER	CHWP-15-05	460	3	10.0	Yes
VFD-HPPF	R-01	ROOF	S&C	HOISTWAY PRESSURIZATION FAN	HPPF-R-01	460	3	15.0	Yes
VFD-HPPF	R-02	ROOF	S&C	HOISTWAY PRESSURIZATION FAN	HPPF-R-02	460	3	15.0	Yes
VFD-HPPF	R-03	ROOF	S&C	HOISTWAY PRESSURIZATION FAN	HPPF-R-03	460	3	15.0	Yes
VFD-HRCHP	I-501	LEVEL 15	S&C	HEAT RECOVERY CHILLER CIRC	HRCHP-15-01	460	3	15.0	Yes
VFD-HRCHP	I-502	LEVEL 15	S&C	HEAT RECOVERY CHILLER CIRC	HRCHP-15-02	460	3	15.0	Yes
VFD-HRHWP	I-501	LEVEL 15	S&C	HEAT RECOVERY CHILLER CIRC	HRHWP-15-01	460	3	20.0	Yes
VFD-HRHWP	I-502	LEVEL 15	S&C	HEAT RECOVERY CHILLER CIRC	HRHWP-15-02	460	3	20.0	Yes
VFD-HWP	I-501	LEVEL 15	S&C	BUILDING HEATING WATER	HWP-15-01	460	3	50.0	Yes
VFD-HWP	I-502	LEVEL 15	S&C	BUILDING HEATING WATER	HWP-15-02	460	3	50.0	Yes
VFD-HWP	I-503	LEVEL 15	S&C	BUILDING HEATING WATER	HWP-15-03	460	3	50.0	Yes
VFD-RF	RF-01	LEVEL 02	S&C	SMOKE RELIEF FAN	RF-01	460	3	15.0	Yes
VFD-SPF	R-01	ROOF	S&C	STARWELL PRESSURIZATION FAN	SF-01	460	3	7.5	Yes
VFD-SPF	R-02	ROOF	S&C	STARWELL PRESSURIZATION FAN	SF-02	460	3	7.5	Yes

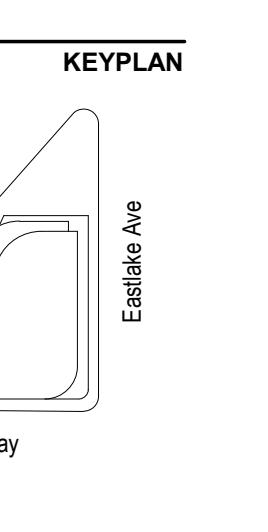
UNIT HEATER SCHEDULE - ELECTRIC									
DESCRIPTION			ELECTRICAL			SPECIFIC NOTES			
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	AREA/ SYSTEM SERVED	STATUS	MANUFACTURER	MODEL	TYPE	OPERATING VOLTAGE (V)	TOTAL HEAT OUTPUT (KW)
EHU	P4-01	STAIRWELL #1	STAR	AS PROPOSED	KING	KAH2760-BW-TAV	ELECTRIC	55.00	6
EHU	P4-02	STAIR	STAR	AS PROPOSED	KING	KAH2760-BW-TAV	ELECTRIC	55.00	6
EHU	P-02	DOMESTIC WATER ROOM	DOMESTIC WATER ROOM	AS PROPOSED	KING	LPAW2740-TP-W	ELECTRIC	24.00	3
EHU	01-01	SOUTH EGRESS CORRIDOR	SOUTH EGRESS CORRIDOR	AS PROPOSED	KING	LPAW2740-TP-W	ELECTRIC	24.00	1
EHU	01-02	NORTH EGRESS CORRIDOR	NORTH EGRESS CORRIDOR	AS PROPOSED	KING	LPAW2740-TP-W	ELECTRIC	24.00	1
EHU	01-03	BIKE STORAGE VESTIBULE	BIKE STORAGE VESTIBULE	AS PROPOSED	KING	LPAW2740-TP-W	ELECTRIC	24.00	1
EHU	02-01	TRASH ROOM	TRASH ROOM	AS PROPOSED	KING	KAH2760-BW-TAV	ELECTRIC	55.00	4

CEILING SUPPLY DIFFUSER SCHEDULE									
NOTES:									
1. EFFECTIVE 10' FLUML NOT INCLUDED IN PRESSURE DROP OR THROW 2. STANDARD MODULAR CORE DIFFUSERS USE A WAVE THROW PATTERN UNLESS SHOWN OTHERWISE ON PLANS. 3. PROVIDE OPPOSED BLADE DAMPER WHERE SHOWN ON PLANS. 4. PROVIDE YOUNG REGULATOR MODEL 270-275 REMOTE DAMPER CONTROL KIT WHERE SHOWN ON PLANS. SEE DETAIL XXXX.									
DESCRIPTION					MANUFACTURER DATA			PHYSICAL DIMENSIONS	
TAG	SCOPE	TYPE	MFG.	MODEL	MATERIAL	RUNOUT SIZE	NECK SIZE	FACE SIZE	MAX CFM
DT6	S&C / TI	MOD CORE	SHOEMAKER	700 MA	STEEL	6"	6x6	24x24	110
DT8	S&C / TI	MOD CORE	SHOEMAKER	700 MA	STEEL	8"	8x8	24x24	220
DT10	S&C / TI	MOD CORE	SHOEMAKER	700 AM	STEEL	10"	10x10	24x24	350
DT12	S&C / TI	MOD CORE	SHOEMAKER	700 MA	STEEL	12"	12x12	24x24	500
DT14	S&C / TI	MOD CORE	SHOEMAKER	700 MA	STEEL	14"	14x14	24x24	880
DT16	S&C / TI	MOD CORE	SHOEMAKER	700 MA	STEEL	16"	16x16	24x24	1120
D6	S&C / TI	MOD CORE	SHOEMAKER	MA	STEEL	6"	6x6	24x24	110
D8	S&C / TI	MOD CORE	SHOEMAKER	MA	STEEL	8"	8x8	24x24	220
DG10	S&C / TI	MOD CORE	SHOEMAKER	MA	STEEL	10"	10x10	24x24	350
DG12	S&C / TI	MOD CORE	SHOEMAKER	MA	STEEL	12"	12x12	24x24	500</td



**LIFE SCIENCES TOWER**  
1305 Stewart St  
Seattle, WA 98104

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ADVANCED HEALTHCARE REAL ESTATE  
200 - 3349 Carmel Mountain Rd  
San Diego, CA 92121  
858.794.1900



## AIR HANDLING UNIT SCHEDULE - 1

GENERAL NOTES																		
1. PROVIDE SHFT GROUNDING RING ON ALL FAN/MOTOR ASSEMBLIES.																		
2. ALL UNITS SHALL BE CONSTRUCTED AS FOLLOWS:																		
A) PAINTED 4" DOUBLE-WALL, GALVANIZED CONSTRUCTION ON WALLS, CEILING AND FLOOR. WITH 4.5 LB./CU FT. INSULATION.																		
B) STAINLESS STEEL CONSTRUCTION FOR ALL AIR FLOW MONITORING IN MAINS AND COOLING COIL SECTIONS.																		
C) PROVIDE MERV 8 PRE-FILTERS AND MERV 14 FINAL FILTERS AT STARTUP. NORMAL OPERATION WITH MERV 14 FILTERS ONLY (EXCEPT WHEN CARBON FILTERS ARE ALSO NOTED).																		
D) MANUFACTURER TO PROVIDE CARBON FILTERS AS NOTED.																		
E) ALL ALUMINUM ULTRALOW LEAKAGE AIRFOIL DAMPERS.																		
F) PROVIDE AND INSTALL BELIMO ROTATING ACTUATORS WITH POSITION INDICATION ON ALL DAMPERS. FACTORY WIRE ACTUATORS TO A TERMINAL STRIP ON UNIT EXTERIOR.																		
3. PROVIDE MOTORS AND ELECTRICAL CONNECTIONS.																		
4. ALL COIL SECTIONS:																		
A) CHILLED WATER DESIGN - 44 DEG F COIL EWT, 65 DEG F COIL LWT																		
B) HOT WATER DESIGN - 105 DEG F COIL EWT, 95 DEG F COIL LWT																		
C) HYDROGEN CO2 FACE VELOCITY NOT TO EXCEED 450 FPM																		
5. ELECTRICAL:																		
A) PROVIDE SINGLE POINT ELECTRICAL CONNECTION.																		
B) EQUIPMENT RATED FOR 60K SCFM.																		
C) PROVIDE 120V/208V/240V/480V VOLTAGE SELECTIONS.																		
D) ALL EQUIPMENT ON SCHEDULE TO BE NORMAL POWER UNLESS NOTED OTHERWISE.																		
6. FANS HAVE BEEN SIZED TO ALLOW PRESSURE DROP ACROSS FINAL FILTERS TO ACCOUNT FOR FILTER LOADING. PROVIDE SINGLE VFD FOR EACH FAN.																		
A) ALLOW FOR 0.3 IN. W.C. INITIAL PRESSURE DROP.																		
B) FILTER CHANGE OUT PRESSURE DROP FOR ALL MERV 8 AND MERV 14 FILTERS AT 0.9" W.G.																		
C) PROVIDE INDICATING FILTER GAUGE ON AIR HANDLER.																		
D) SPECIFY IF DAMPERS MUST BE LOW LEAK.																		
E) PROVIDE IBC 1708.4 COMPLIANCE CERTIFICATE.																		
F) PROVIDE SHFT GROUNDING RING ON ALL FAN/MOTOR ASSEMBLIES.																		
G) ONLY CELLS ARE INTENTIONAL; LEFT BLANK VALUES NOT APPLICABLE TO UNIT....																		

## SPECIFIC NOTES

- 1. CONSTRUCTION:  
A) PERFORATED INTERIOR LINER IN THE FAN SECTIONS.
- 2. MEASUREMENT & CONTROL:  
A) PROVIDE AIRFLOW MONITORING FOR ALL FANS, WITH SUMMARY INFORMATION FOR ARRAY.  
B) OUTSIDE AIRFLOW MEASURING STATIONS ON MINIMUM OUTSIDE AIR DAMPER SECTION ONLY.
- 3. MOISTURE CONTROL:  
A) PROVIDE FILTERS TO BE MOISTURE RESISTANT.
- 4. FILTERS:  
A) PROVIDE FACTORY BASED FILTERS.  
B) SPECIFY FILTER IF FILTER LOADING GAUGE TO BE PROVIDED AND INSTALLED BY MFG.
- 5. FAN REDUNDANCY:  
A) PROVIDE INDICATING FILTER GAUGE ON AIR HANDLER.  
B) PROVIDE 24V CONVENIENT OUTLETS FOR FANS. MAXIMUM 2.0IN DEFLECTION. SPECIFY ANY ADDITIONAL VIBRATION ISOLATION REQUIREMENTS.
- 6. FAN REDUNDANCY:  
A) PROVIDE EMERGENCY POWER FOR THIS EQUIPMENT.  
B) PROVIDE OPTIONAL STANDBY POWER FOR THIS EQUIPMENT.

EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SCOPE	AREA / SYSTEM SERVED	MANUFACTURER	MODEL	PHYSICAL DIMENSIONS		FILTRATION				SUPPLY FAN				EXHAUST FAN				SPECIFIC NOTES
							OPERATING WEIGHT (LBS)	PRE-FILTER SECTION (FPM)	FILTER EFFICIENCY (MERV)	DESIGN FACE VELOCITY (FPM)	FILTER SECTION TYPE (V-BANK, ETC)	INITIAL FILTRATION PRESSURE DROP (IN. W.C.)	BLOW THRUW	FAN AIR ORIGIN	UNIT DESIGN AIR FLOW (CFM)	NUMBER OF FANS (#)	DESIGN AIR FLOW PER FAN (CFM)	TOTAL STATIC PRESSURE (IN. W.C.)	FAN SPEED (RPM)	BRAKE HORSEPOWER (HP	


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 1305 Stewart St  
 Seattle, WA 98109

 200 - 3394 Carmel Mountain Rd  
 San Diego, CA 92121  
 858-794-1909

FAN COIL UNIT SCHEDULE																															
GENERAL NOTES:																															
1. ALL UNITS TO HAVE ECM MOTORS AS PER SEC 2018 2. ALL COOLING COILS SELECTED WITH CHILLED WATER TEMPERATURES OF 42°F CHWS / 58°F CHWR 3. ALL HEATING COILS SELECTED WITH HOT WATER TEMPERATURES OF 115°F HWS / 95°F HWR 4. ALL COOLING COILS SELECTED WITH 500 FPM FACE VELOCITY 5. 25% PROPYLENE GLYCOL 6. PROVIDE CONDENSATE PUMP WHERE GRAVITY DRAIN IS NOT PRACTICAL 7. ALL EQUIPMENT ON SCHEDULE TO BE NORMAL POWER UNLESS NOTED OTHERWISE																															
DESCRIPTION																															
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SCOPE	AREA / SYSTEM SERVED	STATUS	MANUFACTURER	MODEL	PHYSICAL DIMENSIONS	FAN PERFORMANCE	COOLING COIL	HEATING COIL	ELECTRICAL																			
								OPERATING WEIGHT (LBS)	TOTAL SUPPLY AIRFLOW (CFM)	ENTERING AIR DRYBUL (°F)	LEAVING AIR DRYBUL (°F)	FLUID PRESSURE DROP (FT W.C.)	TOTAL CAPACITY REQD (BTUH)	NUMBER OF ROWS	HEAT TYPE	HEATING AIR FLOW (CFM)	ENTERING AIR TEMPERATURE (°F)	LEAVING AIR TEMPERATURE (°F)	FLUID PRESSURE DROP (FT W.C.)	TOTAL CAPACITY REQD (MBH)	NUMBER OF ROWS	VOLTAGE (V)	PHASE (Ø)	MOTOR HORSEPOWER (HP)	FLA (A)	MCA (A)	MAX DISCHARGE SOUND	SPECIFIC NOTES			
FCU	F1-01	LEVEL_01	SAC	FCC	AS PROPOSED	NALOR	D39FH2W	206	1200	ECM	75°F	62°F	6.0	150	2400.0	4	ROW	HEATING WATER	1200	70°F	85°F	1.2	0.0	0.0	277	1	0.5	2.30	0.00	64, 61, 58, 52, 48	
FCU	F2-01	LEVEL_02	SAC	LOBBY	AS PROPOSED	NALOR	D39FH2W	206	1200	ECM	75°F	62°F	6.0	150	2400.0	4	ROW	HEATING WATER	1200	70°F	85°F	1.2	0.0	0.0	277	7	0.5	2.30	0.00	64, 61, 58, 52, 48	

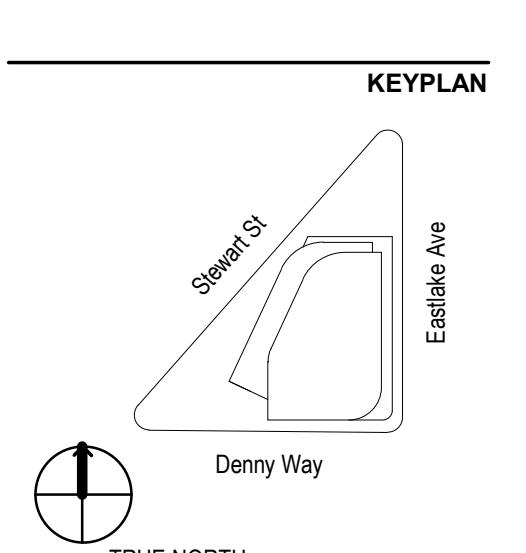
FAN SCHEDULE																																				
SPECIFIC NOTES:																																				
1. EMERGENCY POWER REQUIRED. 2. LEGALLY REQUIRED STANDBY POWER. 3. FUTURE EQUIPMENT NOT SUBJECT TO CHANGE PER TI DESIGN. 4. FUTURE EQUIPMENT NOT PART OF THIS PERMIT. 5. PROVIDE EMERGENCY POWER FOR THIS EQUIPMENT. 6. PROVIDE OPTIONAL STANDBY POWER FOR THIS EQUIPMENT.																																				
DESCRIPTION																																				
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SCOPE	AREA / SYSTEM SERVED	MANUFACTURER	MODEL	ECM / VFD	PHYSICAL DIMENSIONS	PERFORMANCE	ELECTRICAL	ACOUSTICAL	SPECIFIC NOTES																								
								OPERATING WEIGHT (LBS)	DESIGN MAXIMUM ROUTINE AIRFLOW PER (CFM)	DESIGN MINIMUM ROUTINE AIRFLOW PER (CFM)	DESIGN TOTAL STATIC PRESSURE (IN W.C.)	FAN SPEED (RPM)	FAN BRAKE HORSEPOWER (BHP)	FAN HORSEPOWER (HP)	QUANTITY OF ELECTRICAL CONNECTIONS	VOLTAGE (V)	PHASE (Ø)	DISCONNECT BY	SOUND POWER (DB)	SOUND PRESSURE (DB)	@ 63 Hz	@ 125 Hz	@ 250 Hz	@ 500 Hz	@ 1000 Hz	@ 2000 Hz	@ 4000 Hz	@ 8000 Hz								
EF	01-01	L1	SAC	FUEL STORE/TANK ROOM	GREENHECK	AER-24	ECM	950	131.00	1334	0.2	1	120	2	EC	79	68	74	81	80	78	73	69	63	57											
EF	02-01	L2	SAC	ECI TRU	GREENHECK	AER-27	VFD	440.00	12860	12860	1.50	17	47	1	460	3	EC	86	81	86	81	85	80	76	71	62										
EF	03-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	04-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	05-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	06-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	07-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	08-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	09-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	10-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	11-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	12-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	13-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	14-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	15-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones																	
EF	16-01	L3	SAC	L3 NORTH ELECTRICAL	GREENHECK	CSP-A3300-VG	ECM	123.00	225	225	0.50	97	0.7	1	115	1	EC		3.0 Sones			</														

# DAMPER SCHEDULE

**ENERAL NOTES:**  
 FAIL POSITION: LOSS OF POWER. NORMAL POSITION: LOSS OF CONTROL SIGNAL  
 OUT-OF-WALL DAMPER ACCESS IS ACCEPTABLE OPTION WHERE APPLICABLE  
 OUTDOOR ACTUATORS SHALL BE HAVE A NEMA 4 ENCLOSURE  
 LOW VELOCITY: UP TO 2000 FPM; MED VELOCITY: 2001 TO 2999 FPM; HI VELOCITY:  
 REATER THAN 3000 FPM  
 MANUFACTURER SHALL CONFIRM ACTUATOR QUANTITY BASED ON DAMPER SIZE  
 CONTROLS CONTRACTOR TO INDICATE ACTUATOR TYPE & QUANTITY  
 ACTUATOR HANDING TO BE CONFIRMED BY DETAILING  
 ELECTRICAL CONTRACTOR TO PROVIDE ACTUATOR POWER (EITHER DIRECTLY TO THE  
 AMPER OR TO THE CONTROL SYSTEM 24V TRANSFORMER)  
 ALL EQUIPMENT ON SCHEDULE TO BE NORMAL POWER UNLESS NOTED OTHERWISE

**SPECIFIC NOTES:**  
 1 FSD TO BE USED AS 2-POSITION (OPEN/CLOSE) MOTORIZED DAMPER DURING NORMAL MODE VIA A RELAY FOR BMS CONTROL  
 FIRE MODE, THE BUILDING FIRE ALARM CONTROL SYSTEM WILL TAKE OVER VIA ANOTHER RELAY IN SERIES.  
 2 CONTROLS CONTRACTOR TO INTERLOCK DAMPER (ACTUATOR OR END SWITCH) TO ASSOCIATED FAN VIA BAS.  
 3 CONTROLS CONTRACTOR TO PROVIDE POSITION FEEDBACK INDICATION FROM ACTUATOR TO BAS.  
 4 CONTROLS CONTRACTOR TO WIRE END SWITCHES FOR DAMPER POSITION FEEDBACK TO BAS  
 5 FIRE ALARM CONTRACTOR TO WIRE END SWITCHES FOR DAMPER POSITION FEEDBACK TO FIRE ALARM / SMOKE CONTROL  
 SYSTEM.  
 6 FIRE ALARM CONTRACTOR(ELECTRICAL CONTRACTOR) TO INTERLOCK DAMPER POSITION END SWITCHES WITH FAN START A  
 7 ELECTRICAL CONTRACTOR TO WIRE 120V ACTUATOR FOR FAN CONTROL INTERLOCK.  
 8. PROVIDE EMERGENCY POWER FOR THIS EQUIPMENT.

DESCRIPTION								ACTUATOR		SPECIFIC N
TAG	LOCATION	SYSTEM SERVED	EQUIPMENT SERVED	MANUFACTURER	MODEL	FAIL POSITION	NORMAL POSITION	VOLTAGE		
SD	02-01			GREENHECK	FSD-312	OPEN	CLOSE	120		8
SD	03-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	04-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	05-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	06-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	07-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	08-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	09-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	10-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	11-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	12-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	13-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
SD	14-01	L14	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
MD	01-01	L01	ERV	ERV-02-01 EXHAUST	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	01-02	L01	ERV	ERV-02-01 SUPPLY	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	HPF-R-01	ROOF	HOISTWAY PRESSURIZATION	HPF-R-01	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	HPF-R-02	ROOF	HOISTWAY PRESSURIZATION	HPF-R-02	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	HPF-R-03	ROOF	HOISTWAY PRESSURIZATION	HPF-R-03	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	SPF-R-01	ROOF	STAIRWAY PRESSURIZATION	SPF-R-01	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	SPF-R-01	ROOF	STAIRWAY PRESSURIZATION	SPF-R-01	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	SPF-R-02B	ROOF	STAIRWAY PRESSURIZATION	SPF-R-02B	GREENHECK	VDC-23	OPEN	CLOSE	120	8
MD	SPF-R-02	ROOF	STAIRWAY PRESSURIZATION	SPF-R-02	GREENHECK	VDC-23	OPEN	CLOSE	120	8
FSD	P4-03	P4	P4 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P4-04	P4	P4 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P3-01	P3	P3 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P3-02	P3	P3 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P3-05	P3	P3 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P3-06	P3	P3 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P2-01	P2	P2 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P2-02	P2	P2 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P1-01	P1	P1 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P1-02	P1	P1 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P1-06	P1	P1 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	P1-07	P1	P1 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	F1-02	L1	L1 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	F1-01	L1	L1 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	F2-01	L2	L2 RETURN	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	F2-02	L2	L2 SUPPLY	ERV 02-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-01	L03	L03 RETURN	EAHU 15-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-02	L03	L03 RETURN	EAHU 15-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-03	L03	L03 SUPPLY	SAHU R-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-04	L03	L03 SUPPLY	SAHU R-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-05	L03	ELECTRICAL INTAKE	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-06	L03	ELECTRICAL EXHAUST	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-07	L03	FUME EXHAUST	FUME EXHAUST	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	03-08	L03	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
FSD	03-09	L03	L03 SUPPLY	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-01	L04	L04 RETURN	EAHU 15-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-02	L04	L04 RETURN	EAHU 15-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-03	L04	L04 SUPPLY	SAHU R-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-04	L04	L04 SUPPLY	SAHU R-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-05	L04	ELECTRICAL INTAKE	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-06	L04	ELECTRICAL EXHAUST	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-07	L04	FUME EXHAUST	FUME EXHAUST	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	04-08	L04	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
FSD	04-09	L04	L04 SUPPLY	EF 04-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-01	L05	L05 RETURN	EAHU 15-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-02	L05	L05 RETURN	EAHU 15-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-03	L05	L05 SUPPLY	SAHU R-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-04	L05	L05 SUPPLY	SAHU R-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-05	L05	ELECTRICAL INTAKE	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-06	L05	ELECTRICAL EXHAUST	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-07	L05	FUME EXHAUST	FUME EXHAUST	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	05-08	L05	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
FSD	07-09	L05	L05 SUPPLY	EF 05-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-01	L06	L06 RETURN	EAHU 15-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-02	L06	L06 RETURN	EAHU 15-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-03	L06	L06 SUPPLY	SAHU R-01/02	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-04	L06	L06 SUPPLY	SAHU R-03/04	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-05	L06	ELECTRICAL INTAKE	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-06	L06	ELECTRICAL EXHAUST	EF 03-01	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-07	L06	FUME EXHAUST	FUME EXHAUST	GREENHECK	FSD-312	CLOSE	OPEN	120	8
FSD	06-08	L06	SMOKE CONTROL PRESSURE RELIEF	PRESSURE RELIEF	GREENHECK	FSD-312	OPEN	CLOSE	120	8
FSD	06-09	L06	L06 SUPPLY	EF 06-01	GREENHECK	FSD-312	CLOSE	OPEN	120	


**M - CHILLER (HEAT RECOVERY) SCHEDULE**

GENERAL NOTES										SPECIFIC NOTES																	
1. ALL EQUIPMENT ON SCHEDULE TO BE NORMAL POWER UNLESS NOTED OTHERWISE.										2. STANDBY POWER PROVIDED.																	
DESCRIPTION										ELECTRICAL																	
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	AREA / SYSTEM SERVED	LOCATION	MANUFACTURER	MODEL	OPERATING WEIGHT	EVAPORATOR FLUID PRESSURE DROP (FT H2O)	EVAPORATOR ENTERING WATER TEMPERATURE (°F)	EVAPORATOR LEAVING WATER TEMPERATURE (°F)	EVAPORATOR FOULING FACTOR	EVAPORATOR DESIGN GPM	CONDENSER NOMINAL CAPACITY	CONDENSER DESIGN GPM	CONDENSER DESIGN FLOW RATE (GPM)	CONDENSER ENTERING WATER TEMPERATURE (°F)	CONDENSER LEAVING WATER TEMPERATURE (°F)	NUMBER OF COMPRESSORS	DESIGN FULL LOAD EFFICIENCY (COP)	CODE FULL LOAD EFFICIENCY (COP)	REFRIGERANT TYPE	REFRIGERANT CHARGE	VOLTAGE	PHASE	MINIMUM CIRCUIT AMPACITY (A)	MAXIMUM OVERCURRENT PROTECTION (MCA)	DISCONNECT PROVIDED BY	NOTES
HRC	15-01	CHILLED & HEATING WATER SYSTEM	L15	YORK	YKD1DQA-EPM-HP	14.40	54	44	0.0001	713	4360.0	879	18	105	95	9.69	8.33	R-515A	1007 b	460 V	3	415.00 A	700.00 A	EC			
HRC	15-02	CHILLED & HEATING WATER SYSTEM	L15	YORK	YKD1DQA-EPM-HP	14.40	54	44	0.0001	713	4360.0	879	18	105	95	9.69	8.33	R-515A	1007 b	460 V	3	415.00 A	700.00 A	EC			

**AIR COOLED CHILLER SCHEDULE - 1**

GENERAL NOTES										SPECIFIC NOTES												
1. SEE STRUCTURAL DRAWINGS FOR REINFORCING INFORMATION. 2. WINTER AMBIENT CONDITION - MINIMUM OPERATING AIR TEMPERATURE FOR CHILLER, 24°F 3. SUMMER AMBIENT CONDITION - LOCAL MAXIMUM AIR TEMPERATURE FOR CHILLER, 89°F 4. LOW AMBIENT - DESIGN MIN OPERATING OUTSIDE AIR TEMPERATURE 8.9°F 5. EVAPORATOR FOULING FACTOR - 0.0001 HR FT2/FBTU (ARI GUIDELINE E-1997) 6. ALL EQUIPMENT ON SCHEDULE TO BE NORMAL POWER UNLESS NOTED OTHERWISE.										1. ARI RATING REQUIRED. 2. STANDBY POWER PROVIDED. 3. HANDLING AND LOSS SURGE PROTECTION BY MANUFACTURER. 4. CONTROL POWER PROTECTION BY MANUFACTURER. 5. FACTORY MOUNTED STARTER OF UNIT BY MANUFACTURER. 6. DOCUMENTED FACTORY TEST OF UNIT BY MANUFACTURER. 7. MANUFACTURER'S CERTIFICATE OF COMPLIANCE INCLUDED PER IBC 1708.4 8. FACTORY MOUNTED STARTER BY MANUFACTURER.												
DESCRIPTION										PHYSICAL PROPERTIES												
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	AREA / SYSTEM SERVED	MANUFACTURER	MODEL	TYPE	OPERATING WEIGHT (LBS)	CHILLER NOMINAL CAPACITY AT SPECIFIED CONDITIONS (TONS)	CHILLER CAPACITY AT FULL LOAD CONDITIONS (TONS)	PERFORMANCE	CHILLER IPV AT ARI CONDITIONS (EER)	CHILLER IPV AT DESIGN CONDITIONS (EER)	CHILLER IPV AT MINIMUM LOAD CONDITIONS (% FOR CHILLER)	PERCENT PROPYLENE GLYCOL IN FLUID (%)	EVAPORATOR ENTERING WATER TEMPERATURE (°F)	EVAPORATOR LEAVING WATER TEMPERATURE (°F)	EVAPORATOR FOULING FACTOR (H-FT²-FBTU)	EVAPORATOR DESIGN FLOW (GPM)	EVAPORATOR DESIGN FLOW (W/G)	REFRIGERANT EVAPORATOR	POUNDS OF REFRIGERANT IN EACH CHILLER(LBS)	SPECIFIC NOTES
CH	R-01	ROOF (LEVEL 16)	BUILDING CHILLED WATER	YORK	YVA032EXV4B8RV5XX	SCREW	19760	270.0	230.0	10.63	19.45	14	25	56	44	0.0001	540	410	13.40	R-515A	590.80	123.4,5,6,7,8
CH	R-02	ROOF (LEVEL 16)	BUILDING CHILLED WATER	YORK	YVA032EXV4B8RV5XX	SCREW	19760	270.0	230.0	10.63	19.45	14	25	56	44	0.0001	540	410	13.40	R-515A	590.80	123.4,5,6,7,8

**AIR COOLED CHILLER SCHEDULE - 2**

DESCRIPTION										COMPRESSOR / CONDENSER										ELECTRICAL										ACOUSTICAL																			
EQUIPMENT CLASSIFICATION										EQUIPMENT ID										TYPE(S) OF COMPRESSORS										QUANTITY OF ELECTRICAL CONNECTIONS										MIN. REQUIRED SCCR (KA)									
OPERATING VOLTAGE (V)										PHASE										M (AMPS PER CONNECTION)										UL OR ETL LABELED										SOUND PRESSURE @ 62 Hz									
OPERATING VOLTAGE (V)										PHASE										M (AMPS PER CONNECTION)										UL OR ETL LABELED										SOUND PRESSURE @ 62 Hz									
CH	R-01	ROOF (LEVEL 16)	BUILDING CHILLED WATER	YORK	YVA032EXV4B8RV5XX	SCREW	19760	270.0	230.0	10.63	19.45	14	25	56	44	0.0001	540	410	13.40	R-515A	590.80	123.4,5,6,7,8																											
CH	R-02	ROOF (LEVEL 16)	BUILDING CHILLED WATER	YORK																																													

1301 Fifth Avenue  
Suite 2300  
Seattle, WA 98101  
t 206.381.6000  
f 206.441.4981  
[www.perkinswill.com](http://www.perkinswill.com)

# **BUFFER TANK SCHEDULE**

GENERAL NOTES:										SPECIFIC NOTES:									
1. SEE MATERIALS MATRIX FOR MATERIALS OF CONSTRUCTION. 2. PRECHARGE TO MINIMUM OPERATING PRESSURE AT TANK LOCATION										1. ASME RATING REQUIRED. MANUFACTURER'S CERTIFICATE OF COMPLIANCE INCLUDED PER IBC 1708.4 2. TWO (2) PORTS 3. FOUR (4) PORTS. PROVIDE R-12.5 FOAM INSULATION FOR OUTDOOR INSTALLATION									
DESCRIPTION					PHYSICAL DIMENSIONS				PERFORMANCE								SPECIFIC NOTES		
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	MANUFACTURER	MODEL	TYPE AND ARRANGEMENT	DIAMETER x HEIGHT (IN)	INLET SIZE (IN)	INLET CONNECTION TYPE	OPERATING WEIGHT	FLUID TYPE	SYSTEM VOLUME (GAL)	TANK VOLUME REQUIRED (GAL)	TANK VOLUME CAPACITY (GAL)	SYSTEM TEMPERATURE RANGE (F)	SYSTEM PRESSURE RANGE AT TANK CONNECTION (PSIG)	RELIEF VALVE SETTING (PSIG)	INITIAL TANK PRECHARGE (PSIG)	MAX. WORKING PRESSURE (PSIG)	MAX. OPERATING TEMPERATURE (F°)	
BT	15-01	WESSELS	CUSTOM	VERTICAL	96 x 110	12"	FLANGED	25000	30% GLYCOL	2980	0	2500	42	0.00	120.00	45 psi	125 psi	60 °F	
BT	15-02	WESSELS	CUSTOM	VERTICAL	96 x 110	12"	FLANGED	25000	30% GLYCOL	2980	0	2500	42	0.00	120.00	45 psi	125 psi	60 °F	

# HYDRONIC EXPANSION TANK SCHEDULE

HYDRONIC EXPANSION TANK SCHEDULE																							
GENERAL NOTES:								SPECIFIC NOTES:															
1. SEE MATERIALS MATRIX FOR MATERIALS OF CONSTRUCTION. 2. MANUFACTURER'S CERTIFICATE OF COMPLIANCE INCLUDED PER IBC 1708.4. 3. PRECHARGE TO MINIMUM OPERATING PRESSURE AT TANK LOCATION								1. ASME RATING REQUIRED 2. SHELL MATERIAL - CARBON STEEL 3. DIAPHRAGM - HEAVY DUTY BUTYL RUBBER															
DESCRIPTION								PHYSICAL DIMENSIONS				PERFORMANCE					SPECIFIC NOTES						
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SCOPE	AREA / SYSTEM SERVED	MANUFACTURER	MODEL	TYPE AND ARRANGEMENT	DIAMETER x HEIGHT (IN)	INLET SIZE (IN)	INLET CONNECTION TYPE	OPERATING WEIGHT	FLUID TYPE	SYSTEM VOLUME (GAL)	REQUIRED TANK VOLUME (GAL)	REQUIRED ACCEPTANCE VOLUME (GAL)	TANK VOLUME CAPACITY (GAL)	TANK ACCEPTANCE VOLUME CAPACITY (GAL)	SYSTEM TEMPERATURE RANGE (F)	SYSTEM PRESSURE RANGE AT TANK CONNECTION (PSIG)	RELIEF VALVE SETTING (PSIG)	INITIAL TANK PRECHARGE (PSIG)	MAX. WORKING PRESSURE (PSIG)	MAX. OPERATING TEMPERATURE (F°)
HET	15-01	LEVEL 15	S&C	CHILLED WATER	BELL & GOSSETT	B-400	VERTICAL	30 X 49	1"	NPT	1238	25% GLYCOL	5000	91	50	106	44	40.00	45	12 psi	125 psi	270 °F	1,2,3
HET	15-02	LEVEL 15	S&C	HEATING WATER	BELL & GOSSETT	B-800	VERTICAL	32 X 76	1"	NPT	2351	25% GLYCOL	5000	204	113	211	130	40.00	45	12 psi	125 psi	270 °F	1,2,3

# AIR SEPARATOR SCHEDULE

	SPECIFIC NOTES
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AIR SEPARATOR SCHEDULE																
GENERAL NOTES:							SPECIFIC NOTES:									
1. ASME SECTION VIII, DIVISION 1 2. PROVIDE WITH MANUFACTURERS AUTOMATIC AIR VENT 3. PARTICULATE REMOVAL TO 5 MICRON 4. AIR VENT SUITABLE UP TO 30% GLYCOL							1. ENGINEER TO SPECIFY PROJECT SPECIFIC OPTIONS - PROVIDE SKIRT (WITH OR WITHOUT MOUNTING CLIPS), REMOVEABLE COVER, OTHER OPTIONS PER SUBMITTAL 2. DEFINE SHELL MATERIAL 3. TYPICAL ONE PER RUN-AROUND LOOP									
DESCRIPTION							PHYSICAL DIMENSIONS	PERFORMANCE								
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SCOPE	AREA / SYSTEM SERVED	MANUFACTURER	TYPE	OPERATING WEIGHT (LBS)	FLUID TYPE	DESIGN FLOW (GPM)	PRESSURE DROP (FT W.C.)	ENTERING FLUID TEMPERATURE (°F)	TYPE OF CONNECTION	CONNECTION SIZE (IN)	BLOWDOWN DRAIN CONNECTION (IN)	MAX FLUID PRESSURE (PSIG)	SPECIFIC NOTES
AS	15-01	LEVEL 15	S&C	CHILLED WATER	ROLAIRTROL	RL-10F	2100.00	25% PG	2300	3.0	55	FLANGE	10"	2"	125 psi	1,2
AS	15-02	LEVEL 15	S&C	HEATING WATER	ROLAIRTROL	RL-10F	2100.00	25% PG	2200	3.0	55	FLANGE	10"	2"	125 psi	1,2



# LIFE SCIENCES TOWER

1305 Stewart St  
Seattle, WA 98109



200 - 3394 Carmel Mountain Rd  
San Diego, CA 92121  
858.794.1200

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**SDCI Use Only**

A Keyplan map showing a section of Seattle. It includes streets labeled "Stewart St" and "Eastlake Ave". A major road labeled "Denny Way" runs diagonally across the area. In the bottom left corner, there is a circular compass rose with an arrow pointing upwards, labeled "TRUE NORTH".

0% DD  
023/11/03

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## ISSUE CHART

NO	ISSUE	DATE
<b>Job Number</b>		207092-001
<b>Checked</b>	O. NNAMDI-EMETAROM, BGM	
<b>Approved</b>		D. BUDD
		<b>TITLE</b>

# MECHANICAL SCHEDULES

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SHEET NUMBER

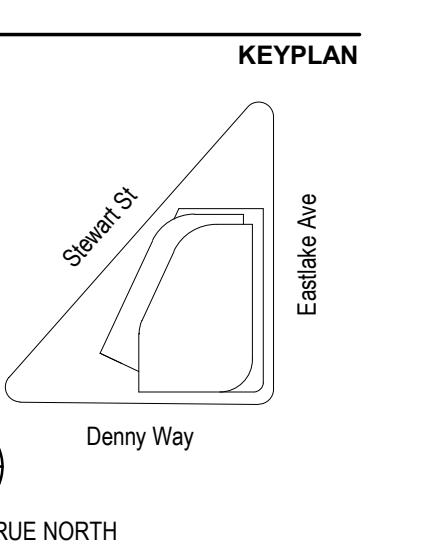
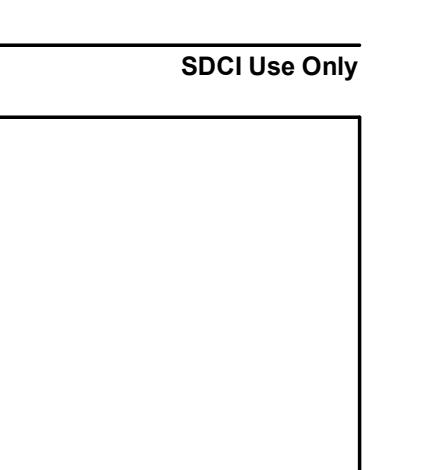
**M-065**





**LIFE SCIENCES TOWER**  
1305 Stewart St  
Seattle, WA 98109

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ADVANCED HEALTHCARE REAL ESTATE  
200 - 3394 Carmel Mountain Rd  
San Diego, CA 92121  
858-794-1900



**100% DD**  
2023/11/03

ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD

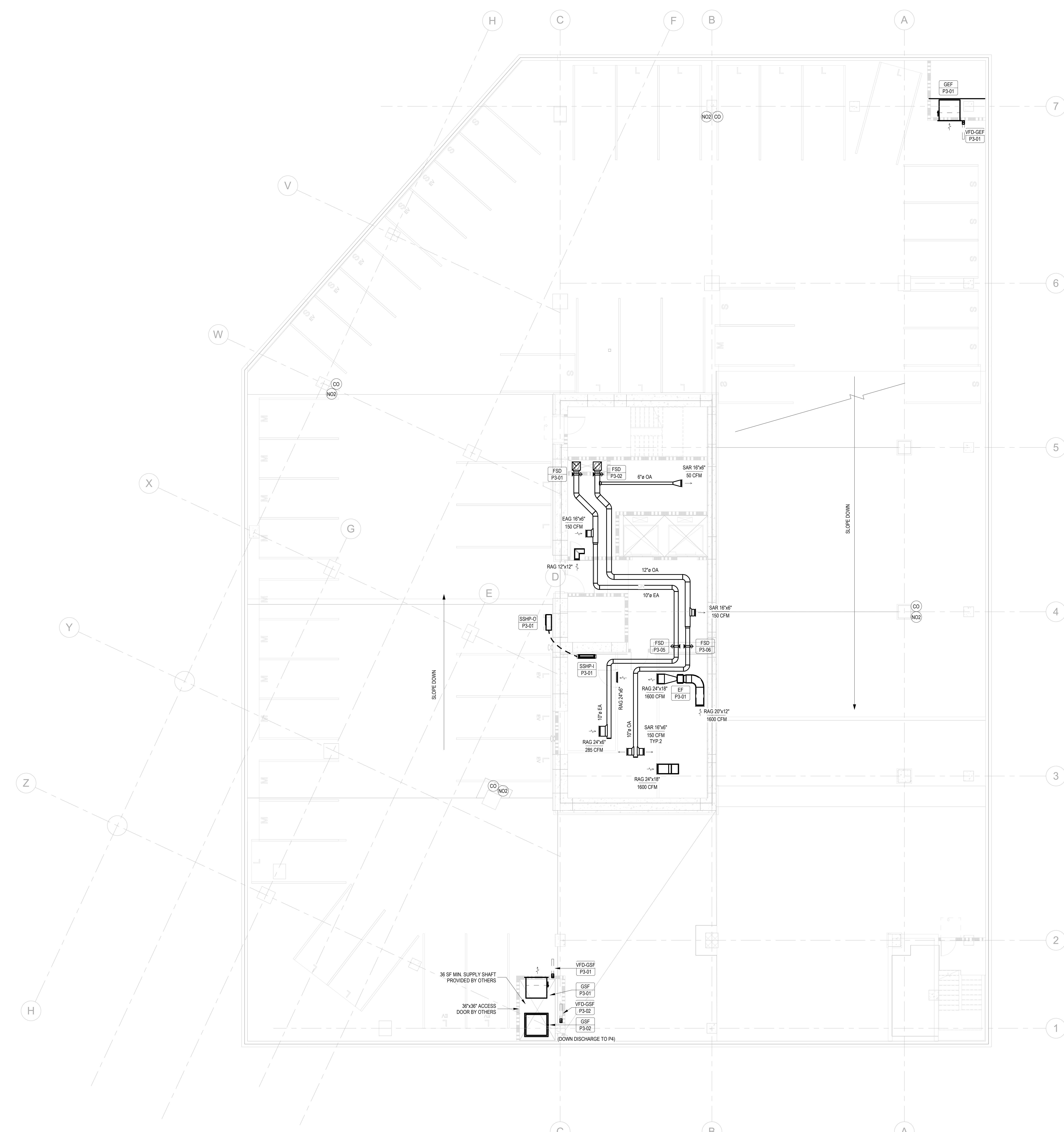
**LEVEL P3 HVAC PLAN**

SHEET NUMBER

**MH108**

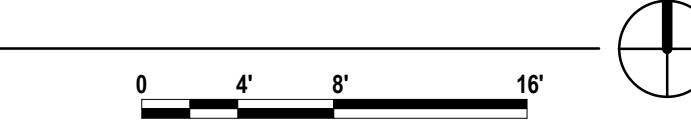
GENERAL NOTES  
A. NOT USED  
B. NOT USED

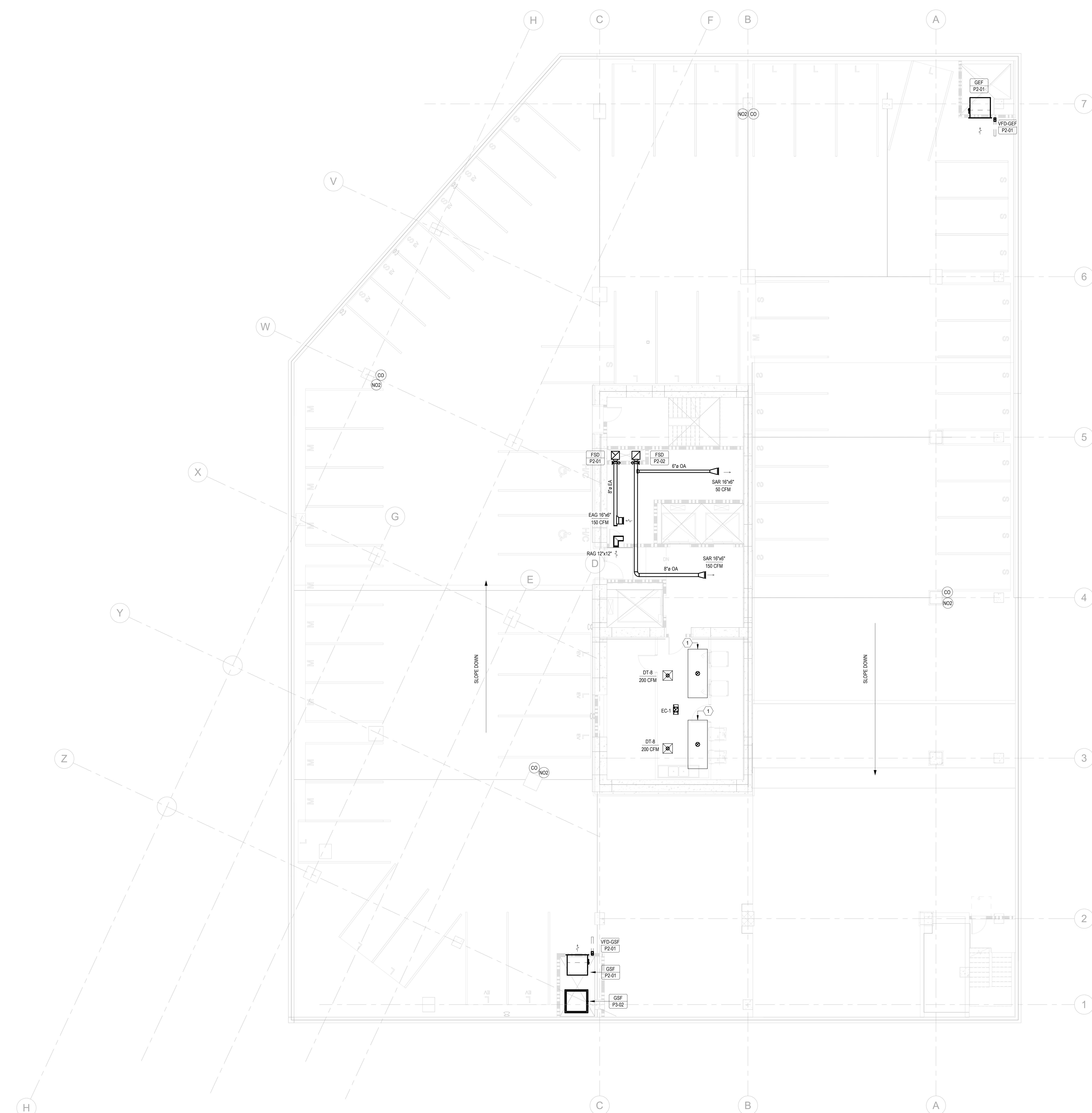
## KEYNOTES



1 LEVEL P3 HVAC PLAN  
MH108

SCALE: 18" = 1'-0"





## GENERAL NOTES

A. NOT USED

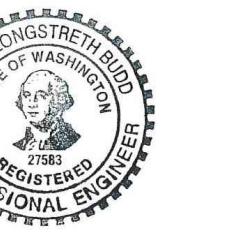
B. NOT USED

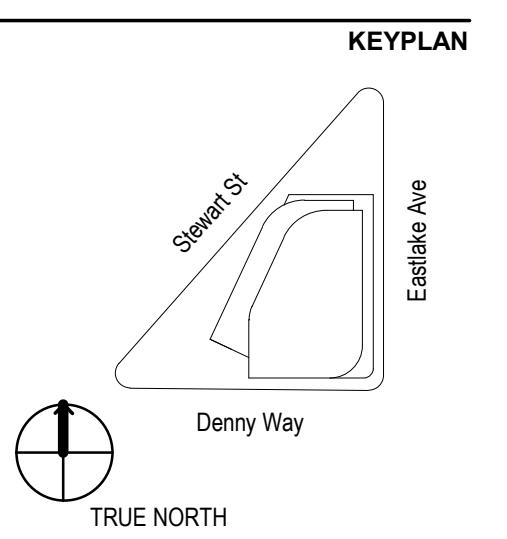
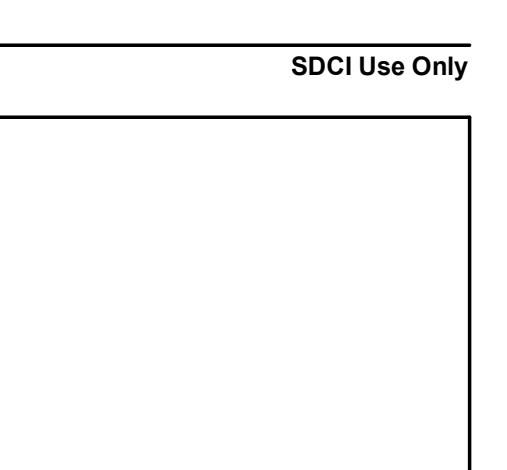
## KEYNOTES

1 200 CFM CANOPY HOOD SERVING AUTOCLAVE AND GLASS WASH EQUIPMENT. CANOPY HOOD SHALL BE INSTALLED BY MECHANICAL.

**Perkins & Will**1301 Fifth Avenue  
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1206.441.4981  
www.perkinswill.com

CONSULTANTS

Civil **CPL**  
900 - 801 2nd Ave  
Seattle, WA 98104  
1206.340.0460Landscape **Site Workshop**  
3800 Woodland Park Ave N  
Seattle, WA 98103  
1206.285.3208Mechanical / Plumbing **McKinstry**  
5301 15th Ave N  
Seattle, WA 98134  
1206.762.3311Electrical **KPPF**  
1600 - 1601 5th Ave  
Seattle, WA 98101  
1206.622.5822Coffman Engineers  
400 - 110 2nd Ave  
Seattle, WA 98108  
1206.823.0717General Contractor **JTM Construction**  
110 - 5900 Airport Way S  
Seattle, WA 98108  
1206.387.4000
**LIFE SCIENCES TOWER**  
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Seattle, WA 98109

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TRUE NORTH

100% DD  
2023/11/03


ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved	<input type="checkbox"/>	D. BUDD
TITLE		

**LEVEL P2 HVAC PLAN**

SHEET NUMBER

**MH109**



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e, WA 98101  
206.381.6000  
206.441.4981  
[kinswill.com](http://kinswill.com)

# GENERAL NOTES

A. NOT USED  
B. NOT USED

# KEYNOTES

A. NOT  
B. NOT

**ULTANTS**  
Civil  
**CPL**  
301 2nd Ave  
e, WA 98104  
06.343.0460

**orkshop**  
1 Park Ave N  
e, WA 98103  
06.285.3026

**Kinstry**  
5 3rd Ave S  
, WA 98134  
06.762.3311

**Structural**  
**KPFF**  
601 5th Ave  
, WA 98101

**Electrical  
Engineers**  
101 2nd Ave  
, WA 98108  
6.623.0717

**struction**  
port Way S  
, WA 98108  
06.587.4000



# LIFE SCIENCES TOWER

1305 Stewart St

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San Diego, CA 92121  
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---

## **SDCI Use Only**

---

The diagram shows a map of a street intersection. A diagonal line from the bottom-left to the top-right is labeled "Stewart St". A vertical line on the right is labeled "Eastlake Ave". A horizontal line at the bottom is labeled "Denny Way". In the bottom-left corner, there is a partial circle with a north arrow pointing upwards, labeled "TRUE NORTH".

# 100% DD

2023/11/03

---

## ISSUE CHART

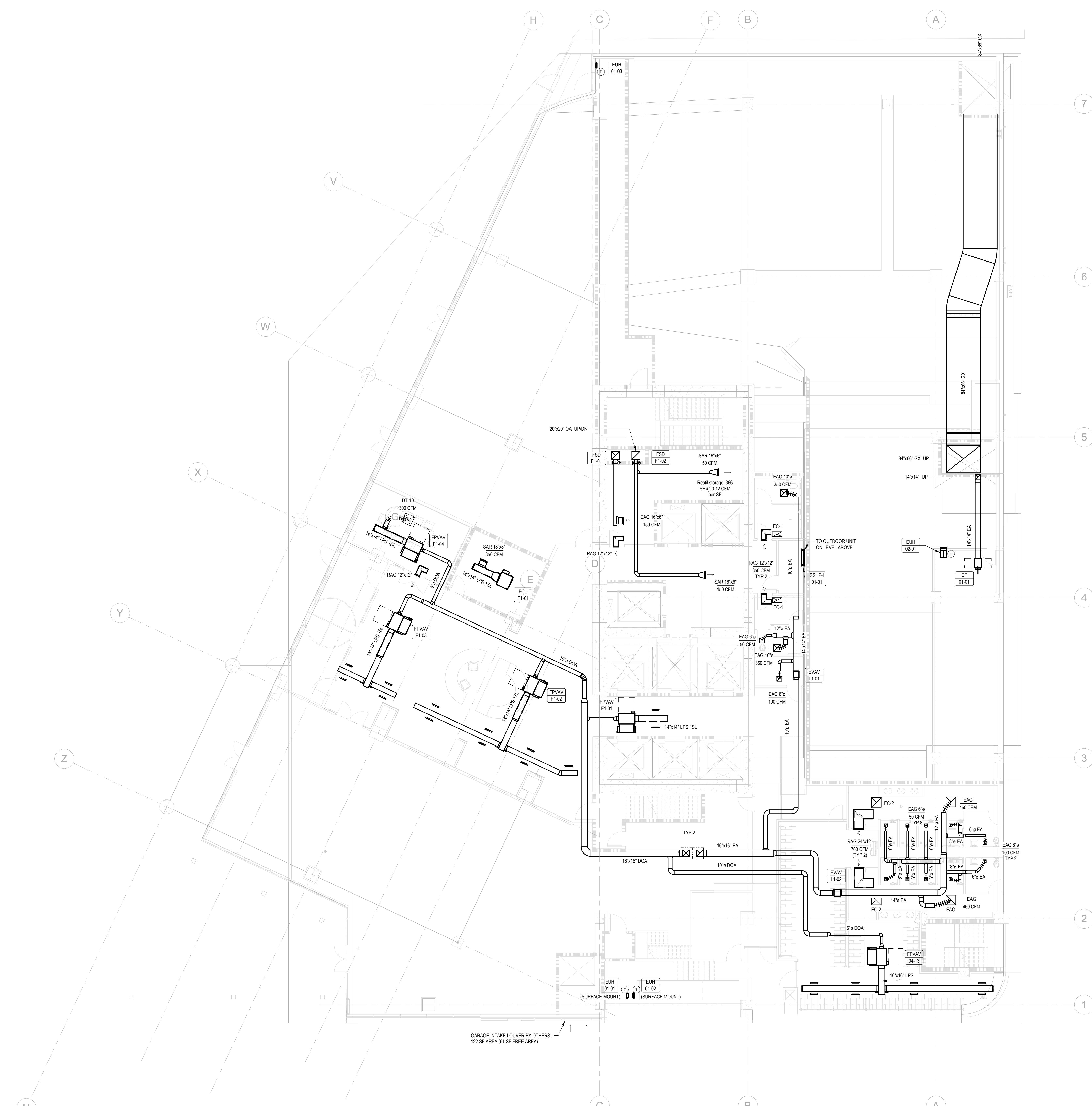
## **ISSUE CHART**

ISSUE	DATE
umber	207092-001
I O. NNAMDI-EMETAROM, BGM	
d	D. BUDD
	<b>TITLE</b>

# LEVEL 01 HVAC PLAN

## NUMBER

**MH111**



1	LEVEL 01 HVAC PL
MH111	SCALE: 1/8" = 1'-0"

GENERAL NOTES  
A. NOT USED  
B. NOT USED

KEYNOTES  
3 16'x16' SUPPLY DUCT FLOOR PENETRATION TO BE A MIN OF 58"X28", SHAFT  
OPENING TO BE A MIN OF 59"X34"

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Seattle, WA 98104  
1206.343.0460

Landscape  
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3800 Woodland Park Ave N  
Seattle, WA 98133  
1206.285.3026

Mechanical / Plumbing  
McKinstry  
5301 15th Ave N  
Seattle, WA 98134  
1206.762.3311

Electrical  
KPF  
1600 - 1601 5th Ave  
Seattle, WA 98101  
1206.622.5822

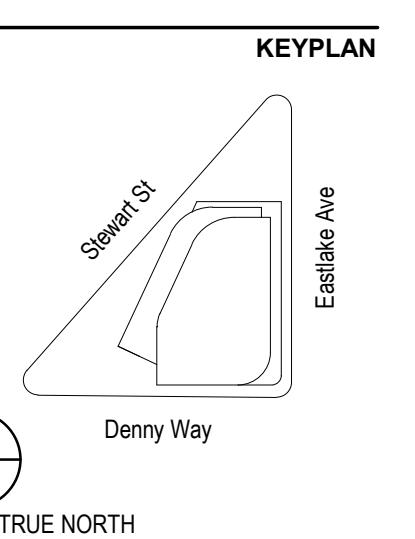
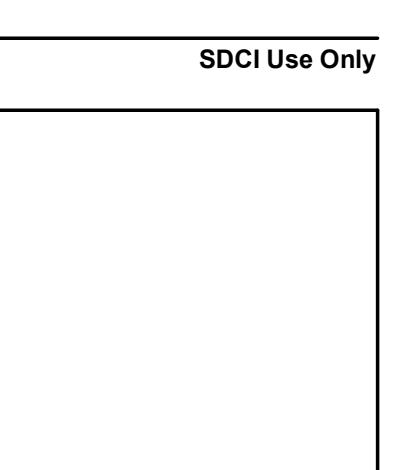
Electrical  
Coffman Engineers  
400 - 110 2nd Ave  
Seattle, WA 98108  
1206.823.0717

General Contractor  
JTM Construction  
110 - 5900 Airport Way S  
Seattle, WA 98108  
1206.387.4400



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TRUE NORTH



100% DD  
2023/11/03

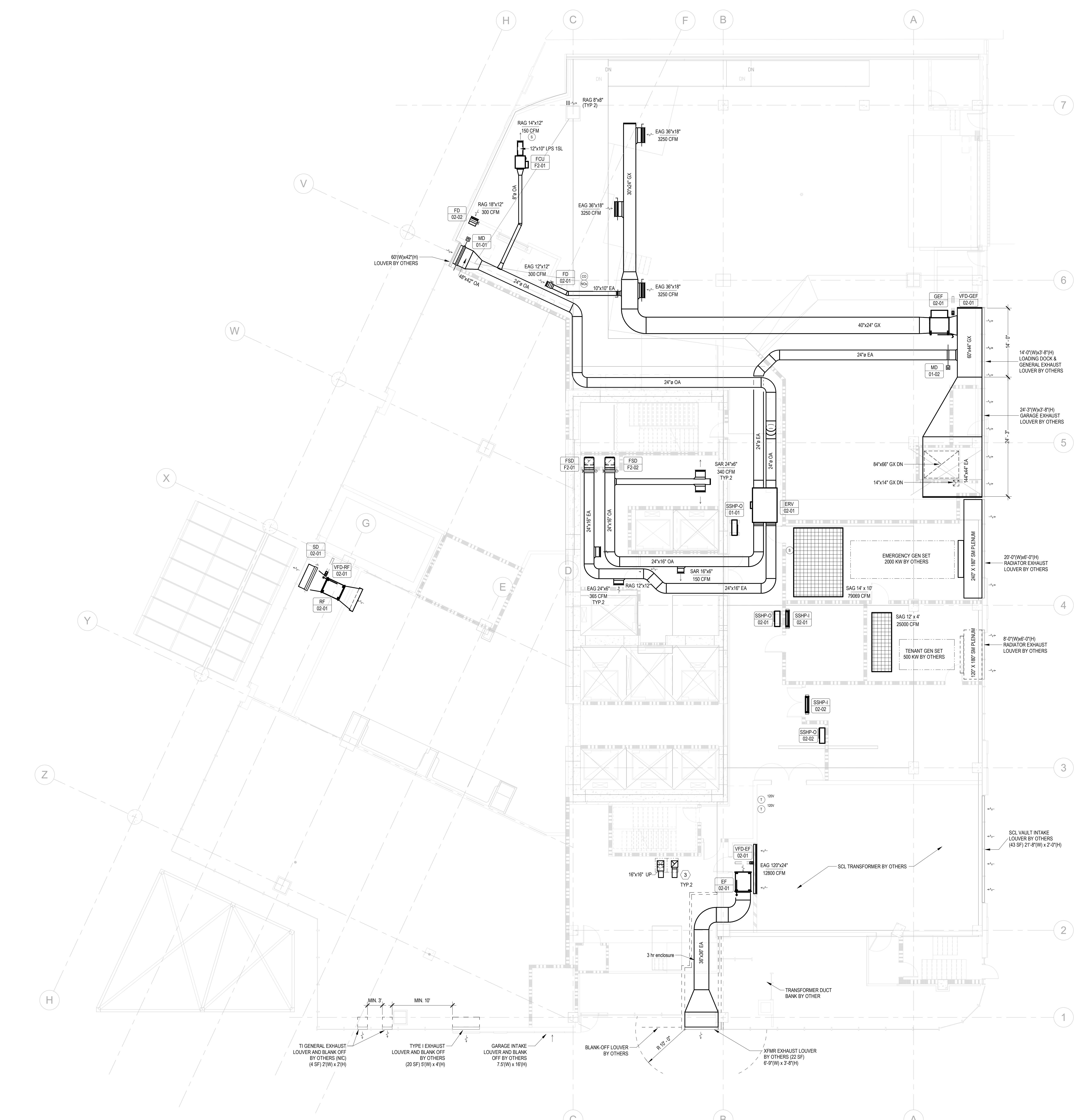
ISSUE CHART

NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
TITLE		

LEVEL 02 HVAC  
PLAN

SCALE: 18' = 1'-0"

MH112



## GENERAL NOTES

- A. NOT USED
- B. NOT USED

# KEYNOTES

- 1 44"X20" DEDICATED OUTSIDE AIR CAPPED FOR FUTURE.
  - 2 32"x16" FUME EXHAUST AIR CAPPED FOR FUTURE.
  - 3 44" X 20" SUPPLY/EXHAUST DUCT. SHAFT OPENING TO BE A MINIMUM OF 112" X 38".
  - 4 POTENTIAL FUTURE TENANT SPECIALTY EXHAUST OR OTHER. 100"X46" SLAB BUCKOUT BY GENERAL CONTRACTOR.
  - 5 STUB OUT EXTENSION FROM SHAFT FOR PURPOSE OF FIRE SMOKE DAMPER.
  - 6 SHEAR WALL PENETRATION FOR DUCTWORK.
  - 7 44"X20" EXHAUST AIR CAPPED FOR FUTURE.

# Perkins&Will

1301 Fifth Avenue  
Suite 2300  
Seattle, WA 98101  
t 206.381.6000  
f 206.441.4981  
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# CONSULTANTS

Civil  
**CPL**  
900 - 801 2nd Ave  
Seattle, WA 98104  
t 206.343.0460

**e Workshop**  
oodland Park Ave N  
Seattle, WA 98103  
t 206.285.3026

**McKinstry**  
5005 3rd Ave S  
Seattle, WA 98134  
t 206.762.3311

**Structural**  
**KPFF**

600 - 1601 5th Ave  
Seattle, WA 98101  
t 206.622.5822

**Electrical  
Engineers**  
100 - 1101 2nd Ave  
Seattle, WA 98108  
t 206.623.0717

5900 Airport Way S  
Seattle, WA 98108  
t 206.587.4000



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1305 Stewart St

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San Diego, CA 92121  
858.794.1000**

394 Carmel Mountain Rd  
San Diego, CA 92121  
858.794.1000

---

## **SDCI Use Only**

A map showing the intersection of Stewart St and Eastlake Ave. The map includes a compass rose indicating 'TRUE NORTH'.

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2023/11/03

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**ISSUE CHART**

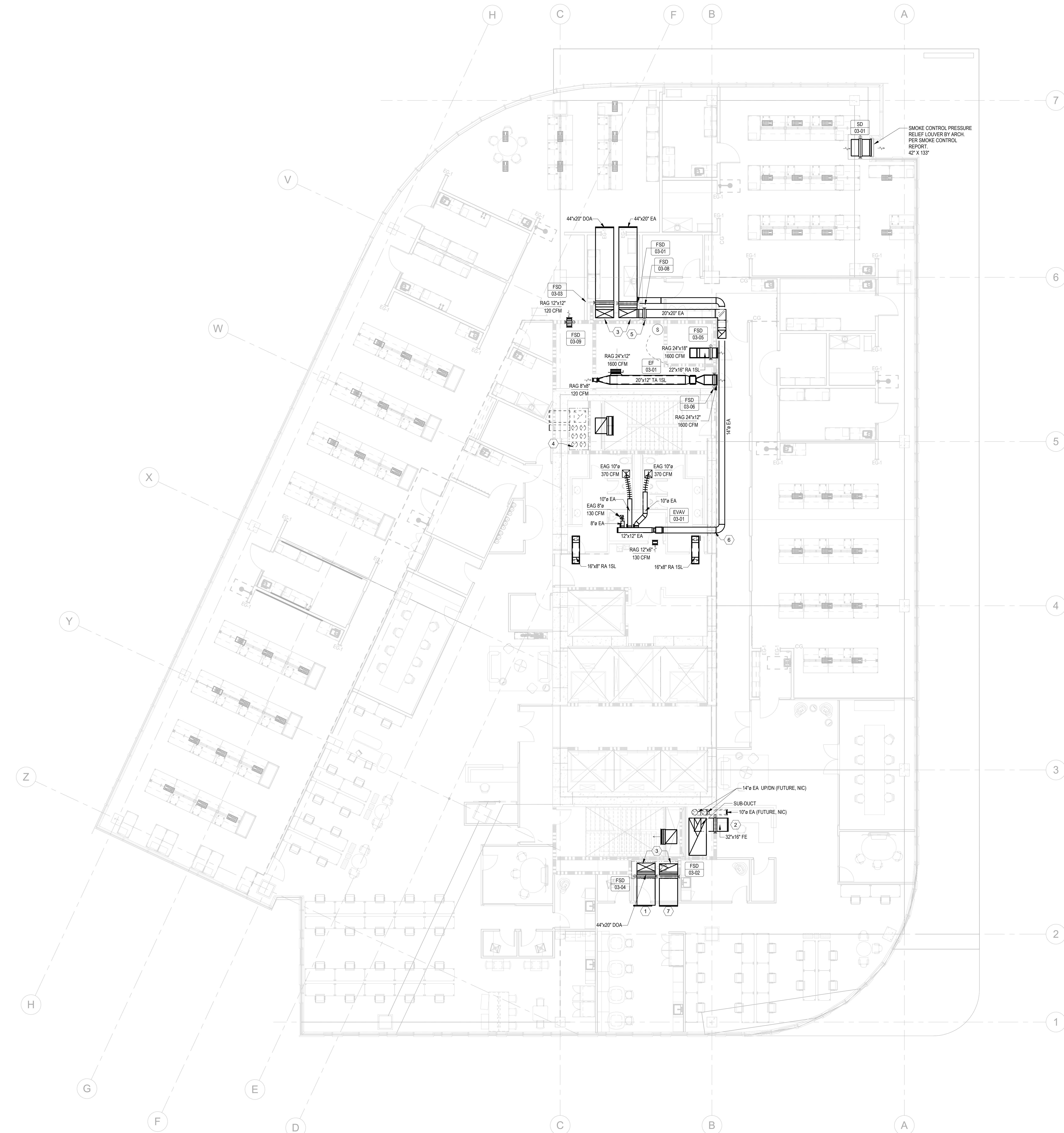
## ISSUE CHART

ISSUE	DATE
Number	207092-001
I O. NNAMDI-EMETAROM, BGM	
d	D. BUDD
TITLE	

# LEVEL 03 HVAC PLAN

# **HEET NUMBER**

**MH113**



1	LEVEL 03 HVAC PLAN
MH113	SCALE: 1/8" = 1'-0"

A horizontal scale bar representing 16 feet. It has tick marks at 0, 4', 8', and 16'. To the right of the scale bar is a circle containing a vertical line.

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## GENERAL NOTES

A. NOT USED  
B. NOT USED

# KEYNOTES

- 1 44"X20" DEDICATED OUTSIDE AIR CAPPED FOR FUTURE.
  - 2 32"x16" FUME EXHAUST AIR CAPPED FOR FUTURE.
  - 3 44"X20" EXHAUST AIR CAPPED FOR FUTURE.
  - 4 94"X30" SUPPLY/EXHAUST DUCT DN TO 44"X20" DUCT. FLOOR PENETRATION TO BE A MINIMUM OF 112"X38" AND SHAFT OPENING TO BE A MINIMUM OF 212"X48".
  - 5
  - 6 SHEAR WALL PENETRATION FOR DUCTWORK.
  - 7 STUB OUT EXTENSION FROM SHAFT FOR PURPOSE OF FIRE SMOKE DAMPER.
  - 8 POTENTIAL FUTURE TENANT SPECIALTY EXHAUST OR OTHER. 100"X46" SLAB BUCKOUT BY GENERAL CONTRACTOR.

# ULTANTS

**Civil  
CPL**  
301 2nd Ave  
B, WA 98104  
206.343.0460

Landscape  
orkshop  
 Park Ave N  
, WA 98103  
06.285.3026

**Kinstry**  
5 3rd Ave S  
, WA 98134  
06.762.3311

**Structural**  
**KPFF**  
601 5th Ave  
, WA 98101

**Electrical  
Engineers**  
101 2nd Ave  
, WA 98108  
6.623.0717

port Way S  
, WA 98108  
6.587.4000



# LIFE SCIENCES TOWER

1305 Stewart St

---

## **SDCI Use Only**

The map shows a triangular intersection. One street runs diagonally from the top-left towards the bottom-right, labeled "Stewart St". Another street runs vertically along the right side, labeled "Eastlake Ave". A third street, "Denny Way", forms the base of the triangle and extends slightly beyond the bottom edge. In the bottom-left corner, there is a circular compass rose with the words "TRUE NORTH" written below it.

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2023/11/03

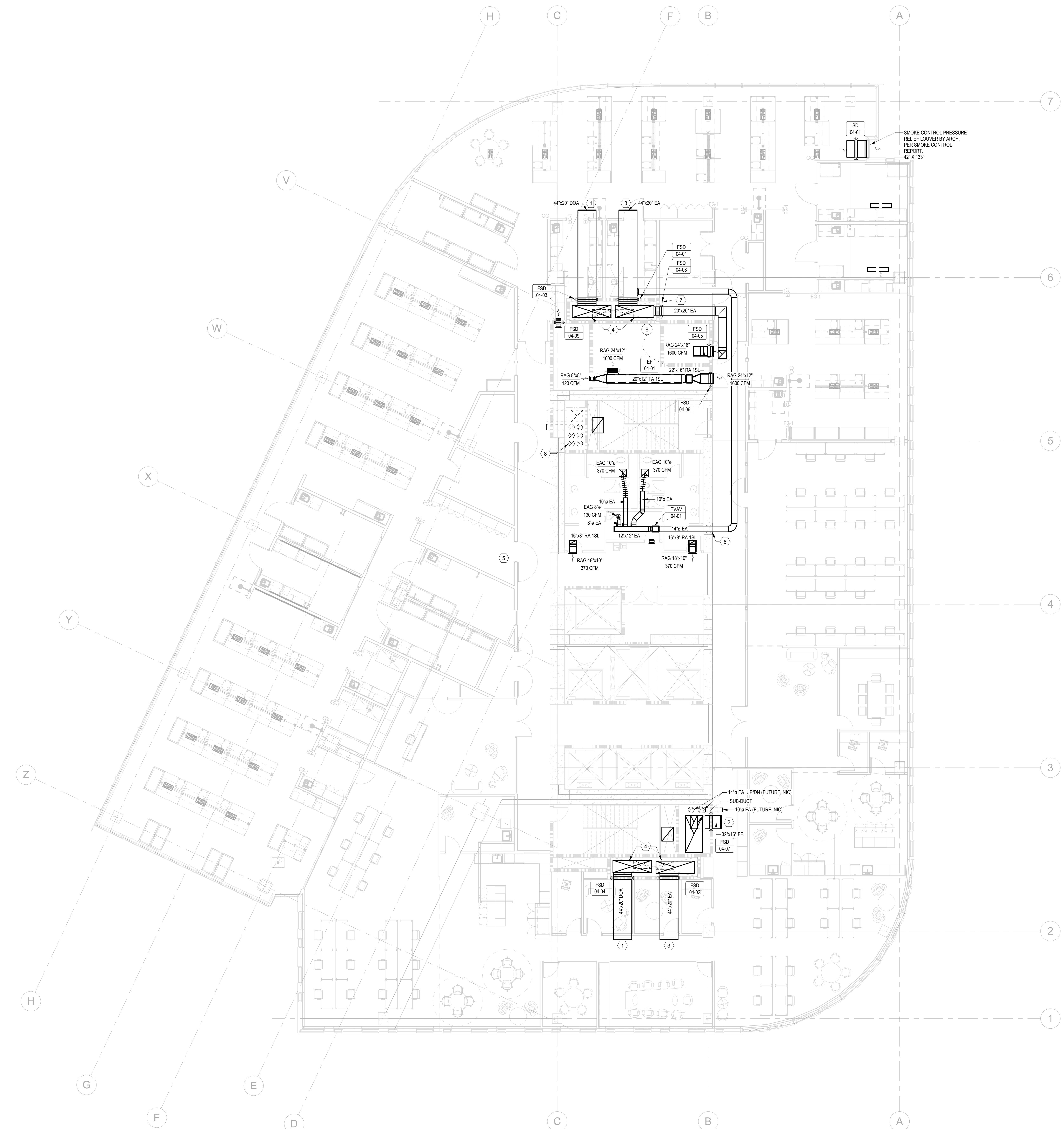
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ISSUE	DATE
ber	207092-001
I O. NNAMDI-EMETAROM, BGM	
d	D. BUDD
	<b>TITLE</b>

# LEVEL 04 HVAC PLAN

## NUMBER


**MH114**





1	LEVEL 04 HVAC PLA
MH114	SCALE: 1/8" = 1'-0"

MH114 SCALE: 1/8" = 1'-0"

A horizontal scale bar representing 16 feet. It has tick marks at 0, 4', 8', and 16'. To the right of the scale bar is a circle containing a vertical line.







**GENERAL NOTES**

A. NOT USED  
B. NOT USED

**KEYNOTES**

- 1 44"x20' DEDICATED OUTSIDE AIR CAPPED FOR FUTURE.
- 2 32"x16' FUME EXHAUST AIR CAPPED FOR FUTURE.
- 3 44"x20' EXHAUST AIR CAPPED FOR FUTURE.
- 4 POTENTIAL FUTURE VENT SPECIALTY EXHAUST OR OTHER. 100"x46" SLAB BUCKOUT BY CONTRACTOR.
- 5 100"x46" SUPPLY EXHAUST DUCT DOWN TO 100"x46" DUCT. FLOOR PENETRATION TO BE A MINIMUM OF 26"X26". SHAFT OPENING TO BE A MINIMUM OF 26"X26".
- 6 SHEAR WALL PENETRATION FOR DUCTWORK.
- 7 STUB OUT EXTENSION FROM SHAFT FOR PURPOSE OF FIRE SMOKE DAMPER.

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3800 Woodland Park Ave N  
Seattle, WA 98103  
(206) 285-3206

Mechanical / Plumbing **McKinstry**  
5501 15th Ave N  
Seattle, WA 98134  
(206) 762-3311

Structural **KPF**  
1600 - 1601 5th Ave  
Seattle, WA 98101  
(206) 622-5822

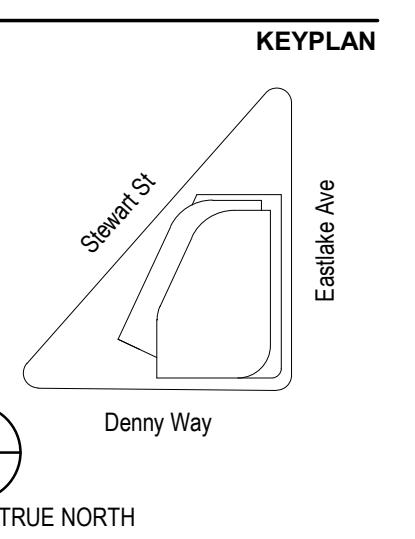
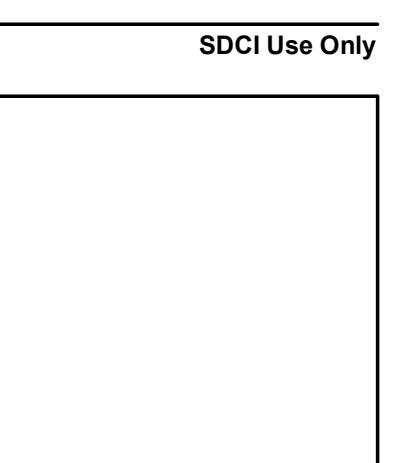
Electrical **Coffman Engineers**  
400 - 110 2nd Ave  
Seattle, WA 98108  
(206) 823-0717

General Contractor **JTM Construction**  
110 - 5900 Airport Way S  
Seattle, WA 98108  
(206) 387-4000



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ISSUE CHART

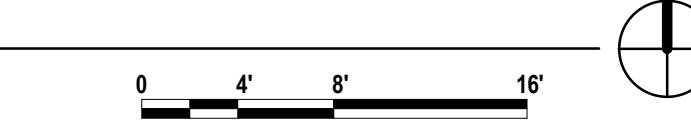
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Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD


**LEVEL 08 HVAC PLAN**


SHEET NUMBER

**MH118**

1 LEVEL 08 HVAC PLAN  
MH118  
SCALE: 18' = 1'-0"





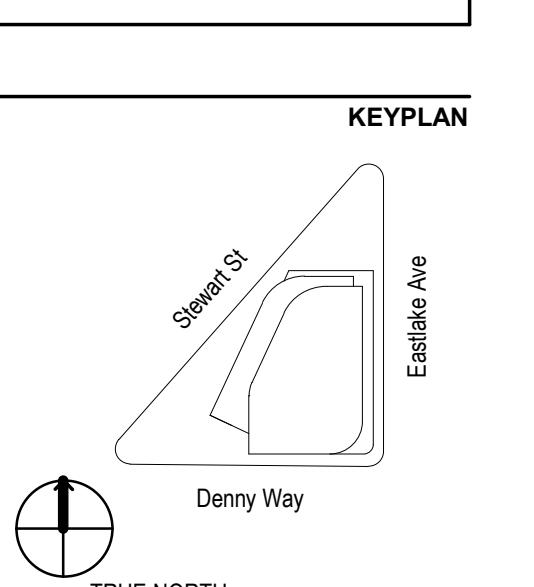




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TRUE NORTH

Denny Way

Eastlake Ave

Stewart St

100% DD

2023/11/03

ISSUE CHART

NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD

TITLE

**LEVEL 11 HVAC PLAN**

SHEET NUMBER

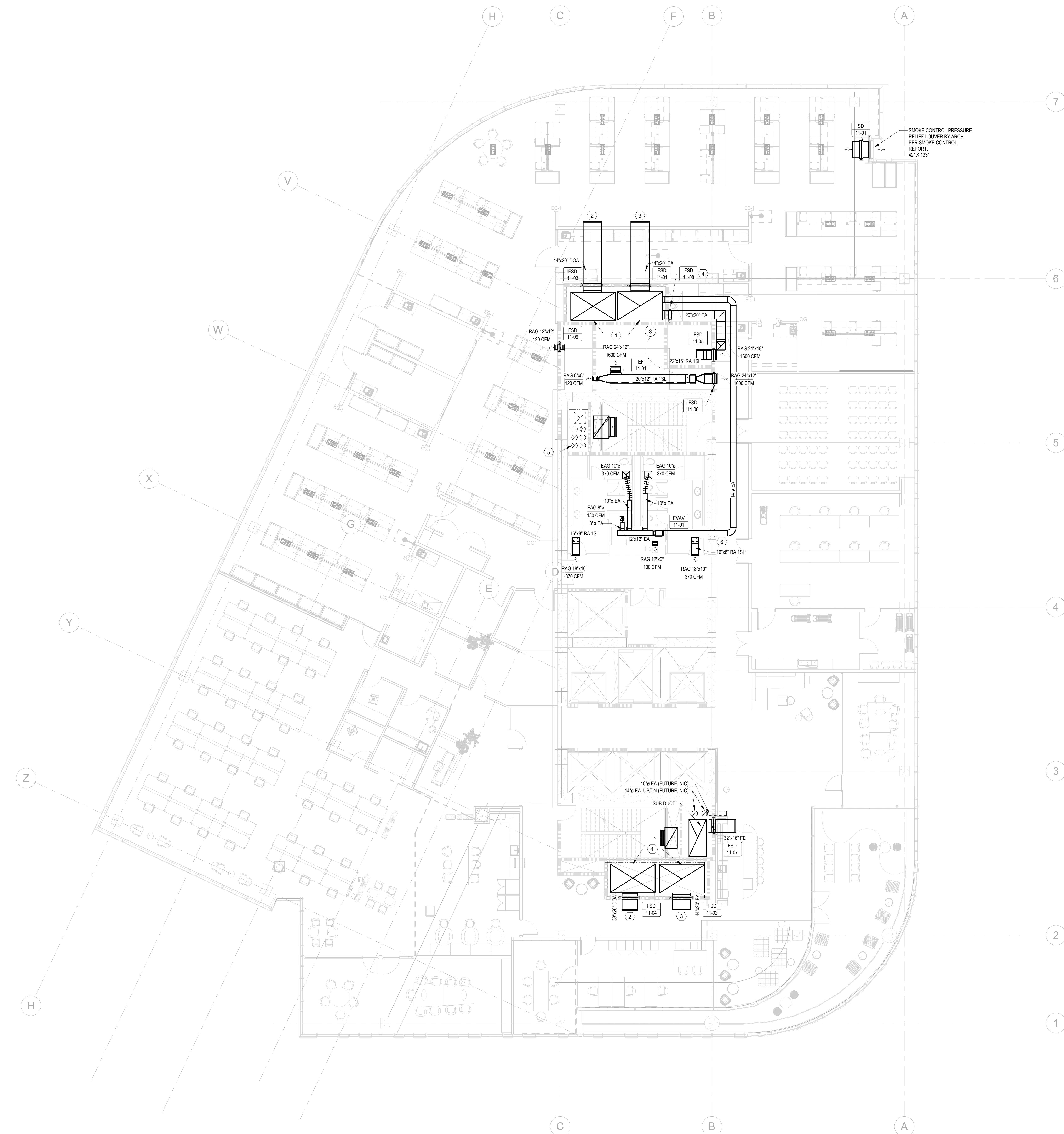
**MH121**

## GENERAL NOTES

A. NOT USED  
B. NOT USED

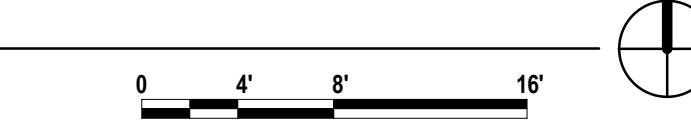
## KEYNOTES

- 1 100'x30' SUPPLY VENTILATION DUCT, FLOOR PENETRATION TO BE A MINIMUM OF 240'x30'.
- 2 44"x20' DEDICATED OUTSIDE AIR CAPPED FOR FUTURE.
- 3 44"x20' EXHAUST AIR CAPPED FOR FUTURE.
- 4 STUB OUT EXTENSION FROM SHAFT FOR PURPOSE OF FIRE SMOKE DAMPER.
- 5 POTENTIAL FUTURE TENANT SPECIALTY EXHAUST OR OTHER. 100'x46' SLAB BUCKOUT BY GENERAL CONTRACTOR.
- 6 SHEAR WALL PENETRATION FOR DUCTWORK.



1 LEVEL 11 HVAC PLAN  
MH121

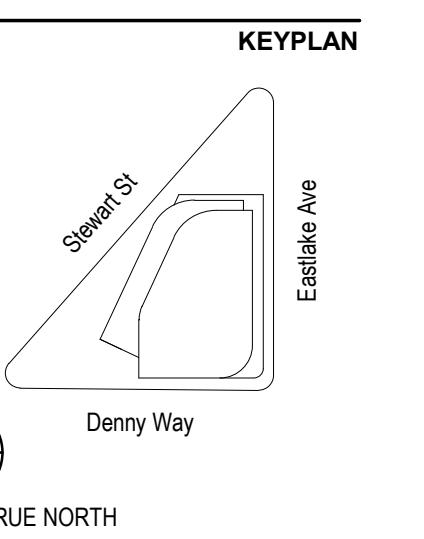
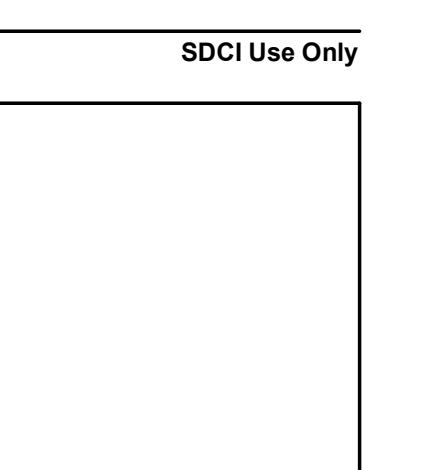
SCALE: 18' = 1'-0"





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1305 Stewart St  
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858-794-1900



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ISSUE CHART

NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD

**LEVEL 12 HVAC PLAN**

SHEET NUMBER

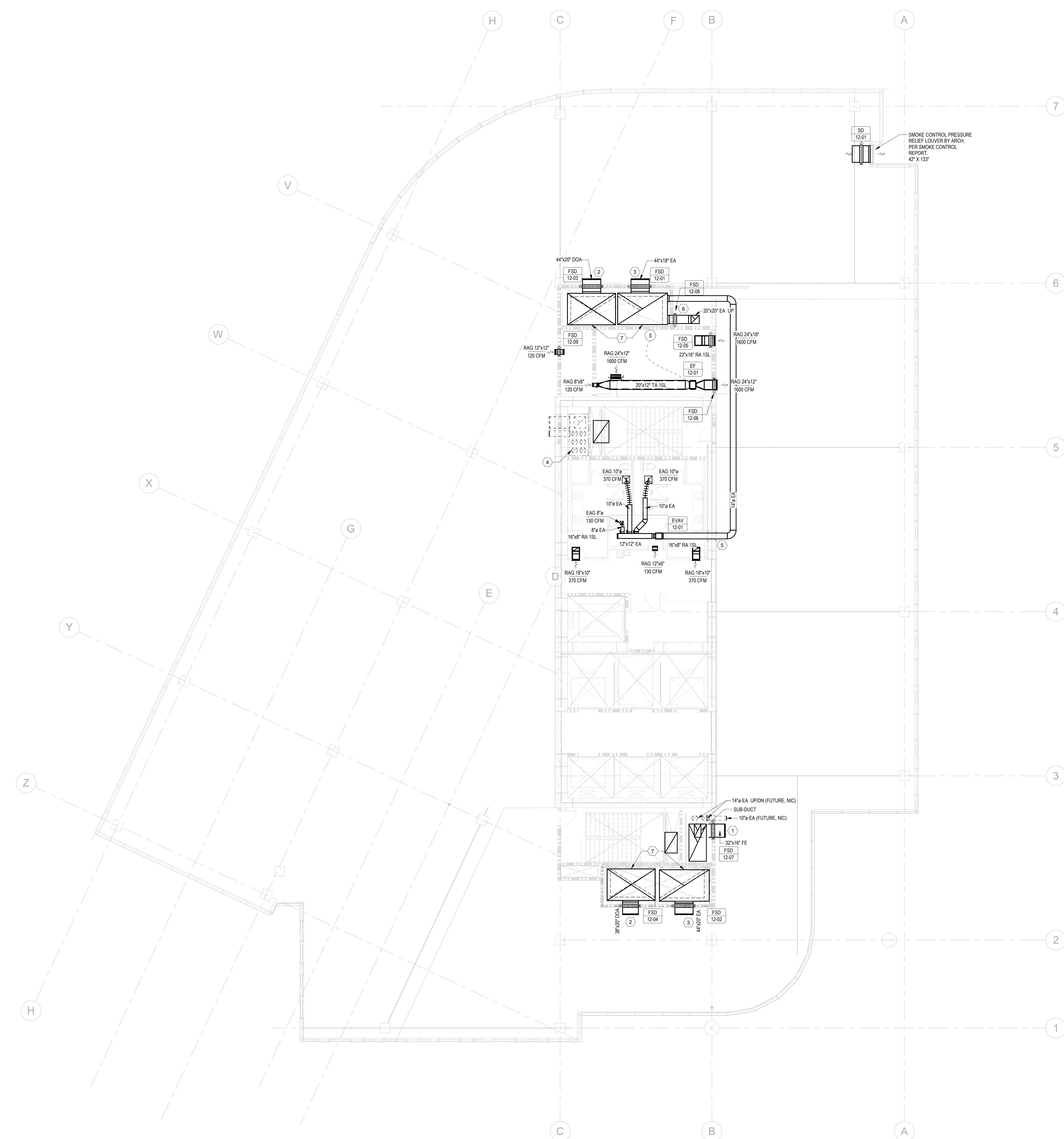
**MH122**


**GENERAL NOTES**


A. NOT USED  
B. NOT USED

**KEYNOTES**

- 1 32"x16" FUME EXHAUST AIR CAPPED FOR FUTURE.
- 2 44"x20" DEDICATED OUTSIDE AIR CAPPED FOR FUTURE.
- 3 44"x20" EXHAUST AIR CAPPED FOR FUTURE.
- 4 POTENTIAL FUTURE SPECIALTY EXHAUST OR OTHER. 100"x46" SLAB BUCKOUT BY CONTRACTOR.
- 5 SHEAR WALL PENETRATION FOR DUCTWORK.
- 6 STUB OUT EXTENSION FROM SHAFT FOR PURPOSE OF FIRE SMOKE DAMPER.
- 7 116"Y/R SUPPLY/EXHAUST DUCT DOWN TO 108"X68" SUPPLY/EXHAUST DUCT. FLOOR PENETRATION TO BE A MINIMUM OF 240"X88" AND SHAFT OPENING TO BE A MINIMUM OF 267"X97".







**erkins&Will**

Fifth Avenue  
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## GENERAL NOTES

A. NOT USED  
B. NOT USED

# KEYNOTES

- 1 FLOOR PENETRATION TO BE A MINIMUM OF 260"X94". SHAFT OPENING TO BE A  
MINIMUM OF 266"X102".

2 POTENTIAL FUTURE TENANT SPECIALTY EXHAUST OR OTHER. 100"X46" SLAB BUCKOUT  
BY GENERAL CONTRACTOR.

## **CONSULTANTS**

Civil  
**CPL**  
301 2nd Ave  
e, WA 98104  
06.343.0460

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Woodland Park Ave N  
Seattle, WA 98103  
t 206.285.3026

cal / Plumbing  
Kinstrey

**MCKINSTRY**  
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Seattle, WA 98134  
t 206.762.3311

**Structural  
KPFF**  
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**Electrical  
an Engineers**  
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Seattle, WA 98108  
t 206 623 0717

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Seattle, WA 98108  
t 206.587.4000

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94-1900

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SDCI Use Only

A Keyplan diagram showing the intersection of three streets: Stewart St, Denny Way, and Eastlake Ave. The diagram consists of several nested, rounded rectangular outlines representing the street boundaries. The text labels are placed outside the boundaries: "Stewart St" is angled along the top-left boundary, "Denny Way" is at the bottom center, and "Eastlake Ave" is vertical on the right side. In the bottom-left corner, there is a small circular compass rose with a vertical arrow pointing upwards.

1

DD  
1/03

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**ISSUE CHART**

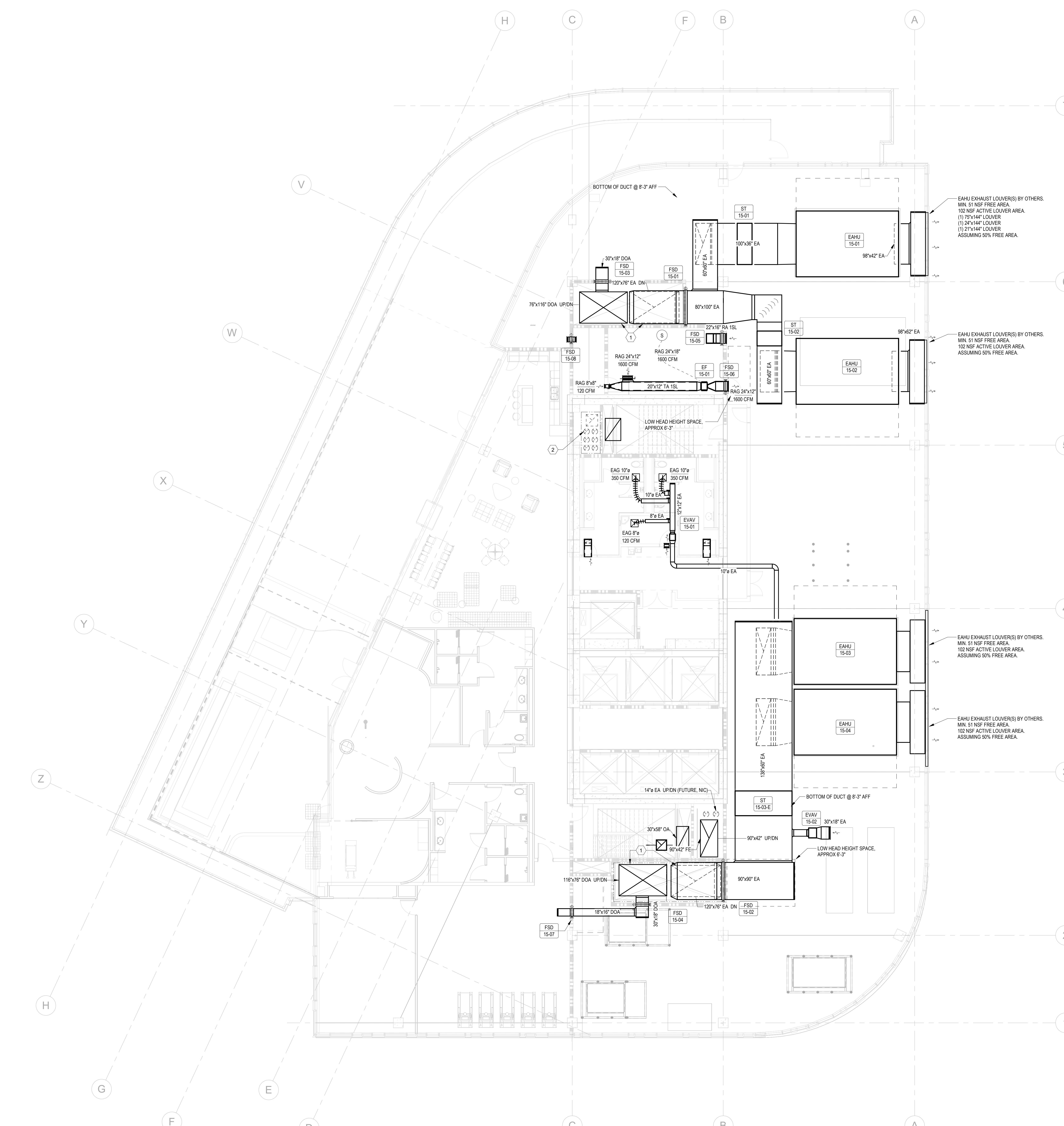
ISSUE	DATE
Number	207092-001
cked	O. NNAMDI-EMETAROM, BGM
roved	D. BUDD

# LEVEL 15 HVAC PLAN

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— 1 —

**MH125**

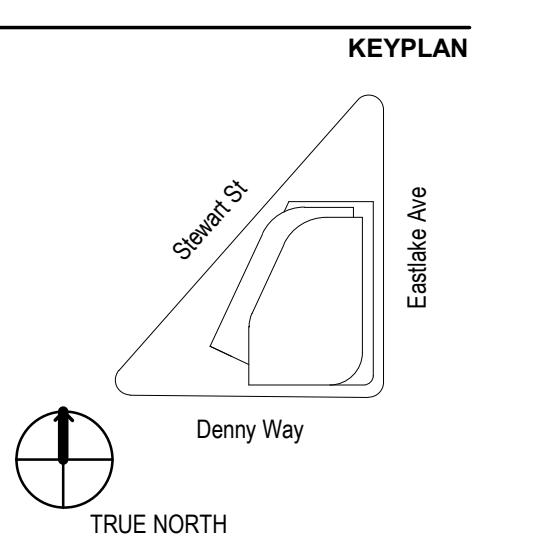
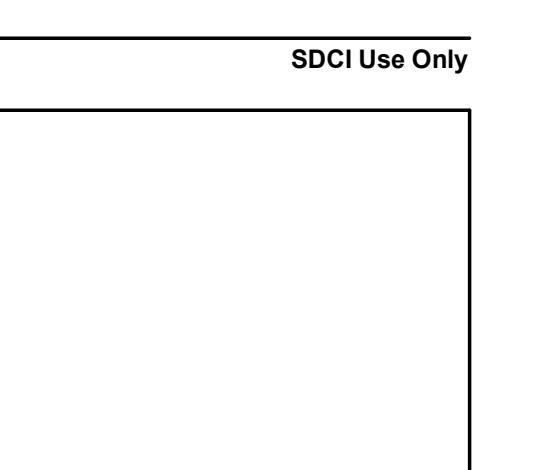


1	<b>LEVEL 15 HVAC PLA</b>
MH125	SCALE: 1/8" = 1'-0"



**LIFE SCIENCES TOWER**  
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2023/11/03

ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved	<input type="checkbox"/>	D. BUDD
TITLE		

**LEVEL 16 ROOF HVAC PLAN**

SHEET NUMBER

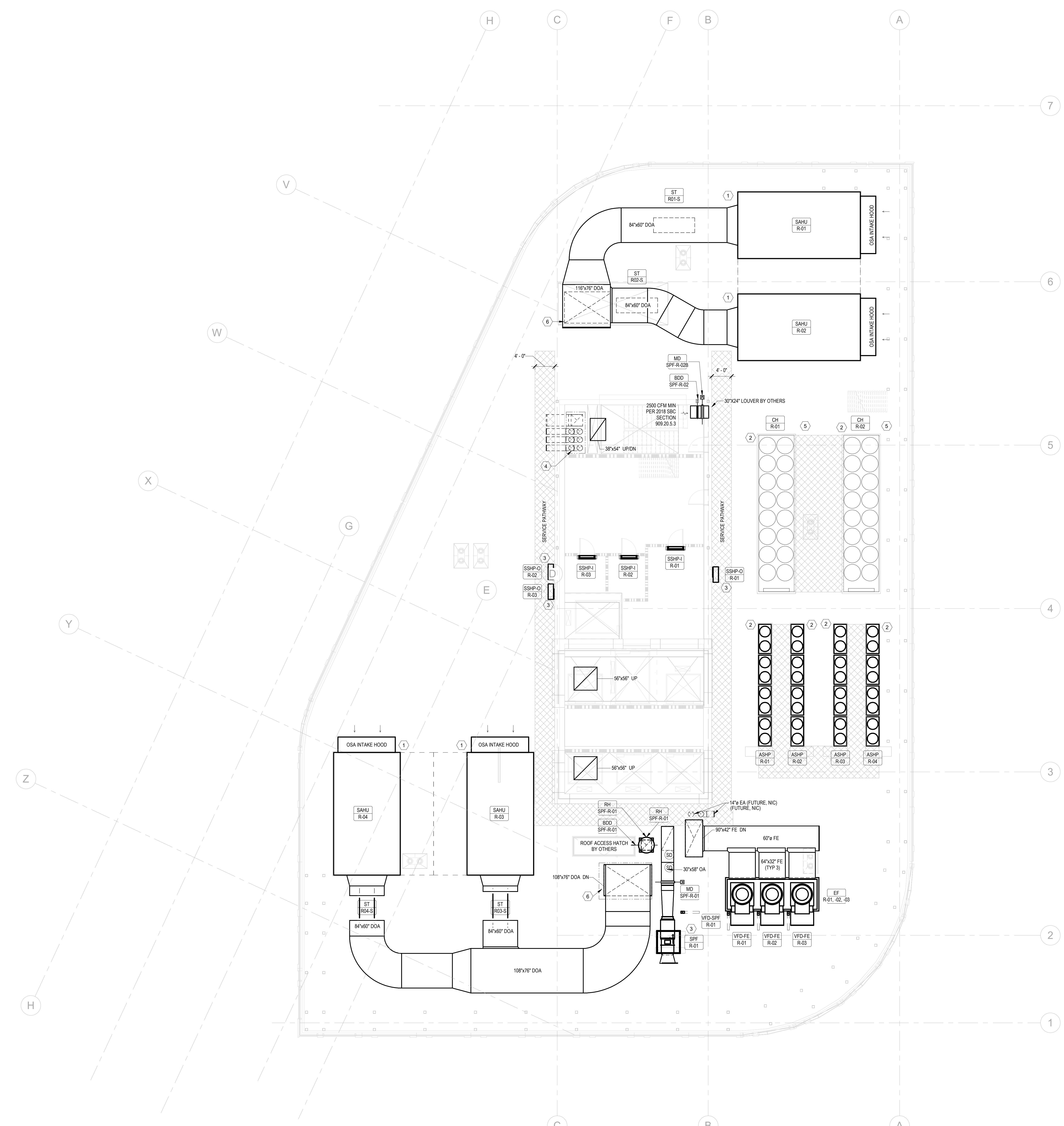
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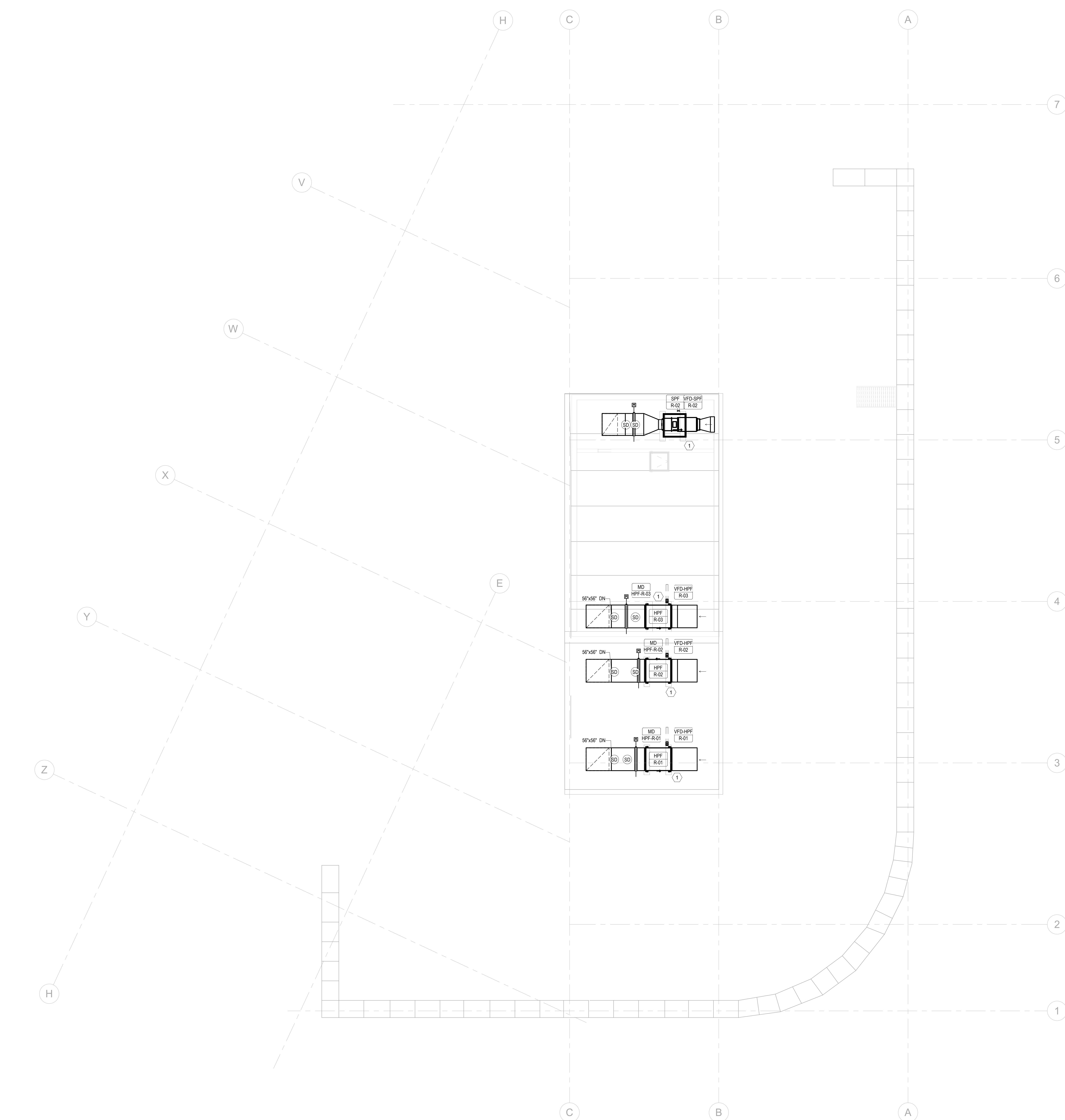
### GENERAL NOTES

A. NOT USED  
B. NOT USED

### KEYNOTES

1. MECHANICAL UNIT MOUNTED ON CURB 18" ABOVE HIGHEST POINT OF FLOOR. DIMENSIONS TO MATCH THE UNIT COORDINATED WITH STRUCTURAL.
2. 4" TALL HOUSE KEEPING PAD BY G.C. WITH CHAMFERED EDGES.
3. MECHANICAL UNIT MOUNTED ON (2) 18" CURB RAILS. COORDINATED WITH STRUCTURAL.
4. POTENTIAL FUTURE TENANT SPECIALTY EXHAUST OR OTHER. 100X46" SLAB BUCKOUT BY GENERAL CONTRACTOR.
5. 4" TALL HOUSE KEEPING PAD BY G.C. WITH CHAMFERED EDGES. 8' MINIMUM LENGTH ON THE EDGE ON THE LONG SIDE BEYOND ANY BOLTED CONNECTION TO THE EDGE OF THE PAD. 12' MINIMUM LENGTH ON THE SHORT SIDE.
6. 116X10' SUPPLY DUCT. ROOF PENETRATION AND CURB OPENING TO BE A MINIMUM OF 128X80".





## GENERAL NOTES

A. NOT USED  
B. NOT USED

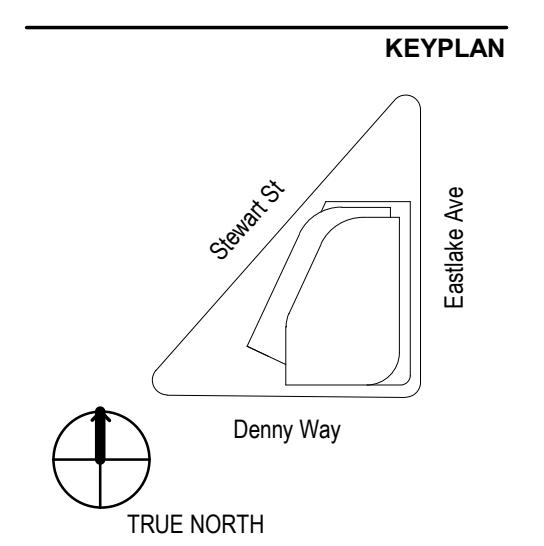
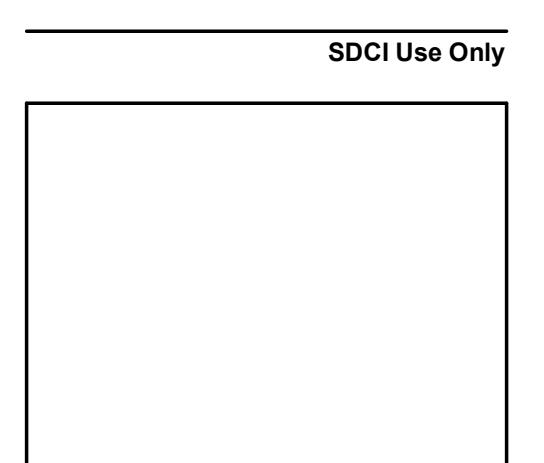
## KEYNOTES

1. MECHANICAL UNIT MOUNTED ON (2) 18" CURB RAILS. COORDINATED WITH STRUCTURAL.

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1206.762.3311Structural **KPF**  
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Seattle, WA 98108  
1206.823.0717General Contractor **JTM Construction**  
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1206.387.4000
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ISSUE CHART

NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD

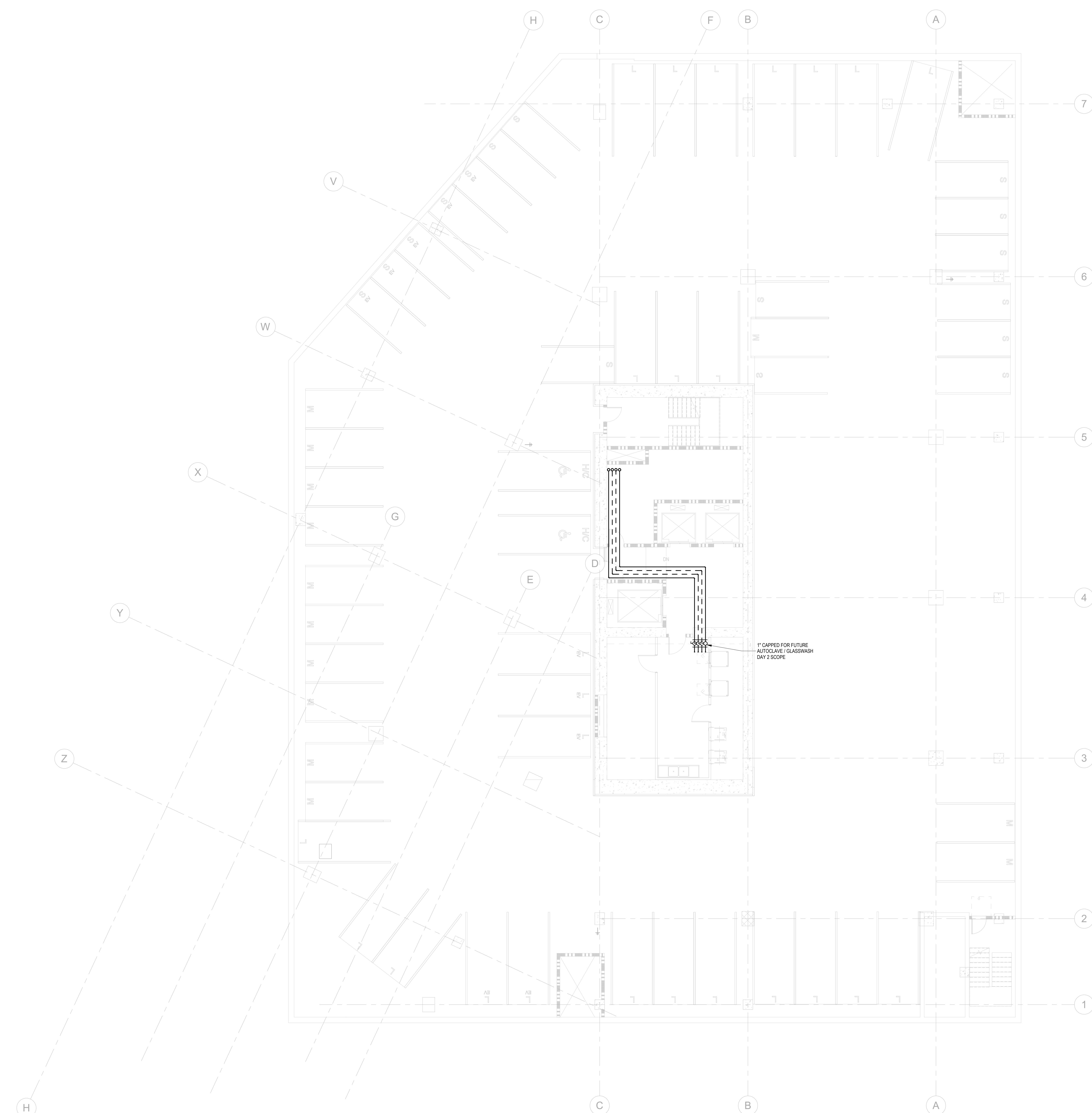
TITLE

LEVEL 17 UPPER  
ROOF HVAC PLAN

SHEET NUMBER

**MH127**





1 LEVEL P2 - PIPING PLAN  
MP109

SCALE: 18" = 1'-0"

GENERAL NOTES  
A. GENERAL NOTE 1- PIPING  
B. GENERAL NOTE 2

KEYNOTES

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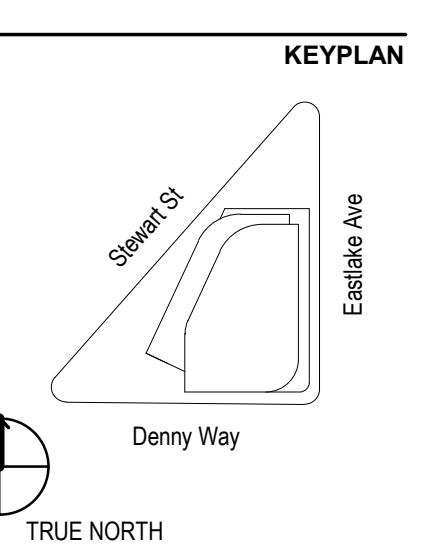
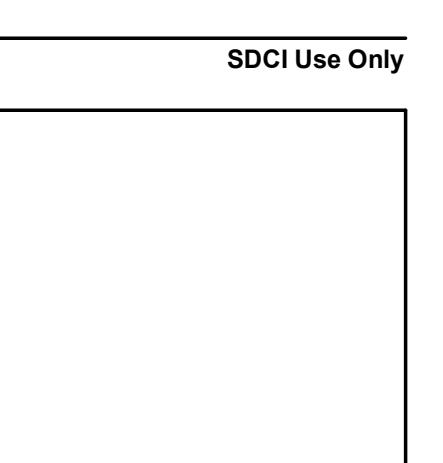
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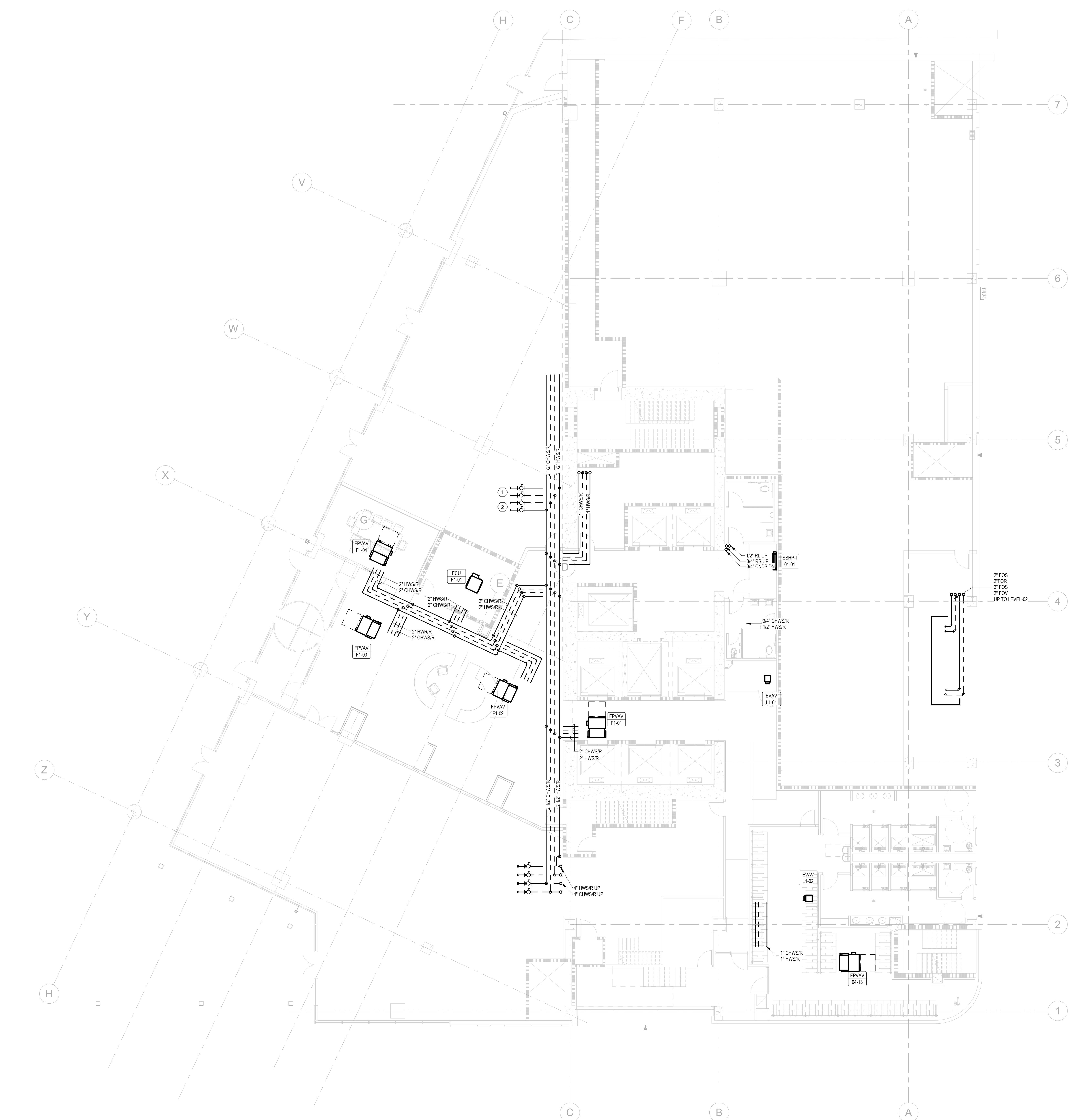
NO	ISSUE	DATE
Job Number	207092-001	
Checked	O NNAMDI-EMETAROM, BGM	
Approved	D. BUDD	
TITLE		

**LEVEL P2 PIPING PLAN**

SHEET NUMBER

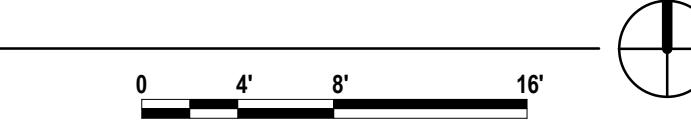
**MP109**





1 LEVEL 01 PIPING PLAN  
MP111

SCALE: 18" = 1'-0"



NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
		TITLE

**LEVEL 01 PIPING PLAN**

SHEET NUMBER

**MP111**

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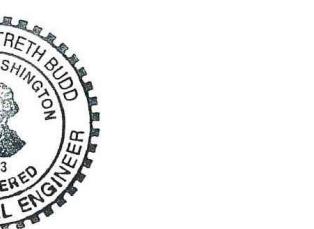
Landscape **Site Workshop**  
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1206.762.3311

Structural **KPF**  
1600 - 1601 5th Ave  
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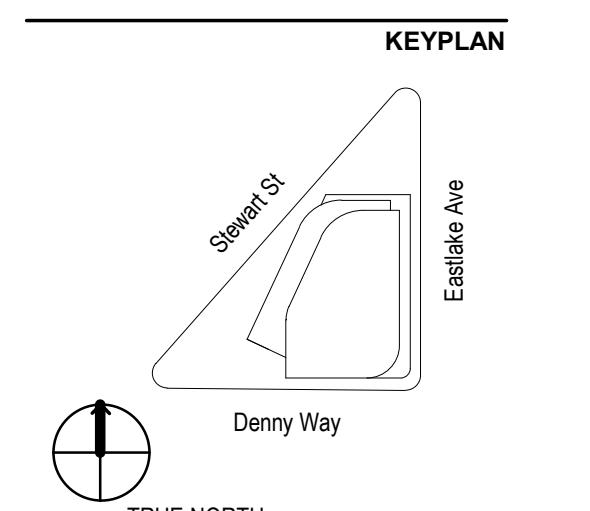
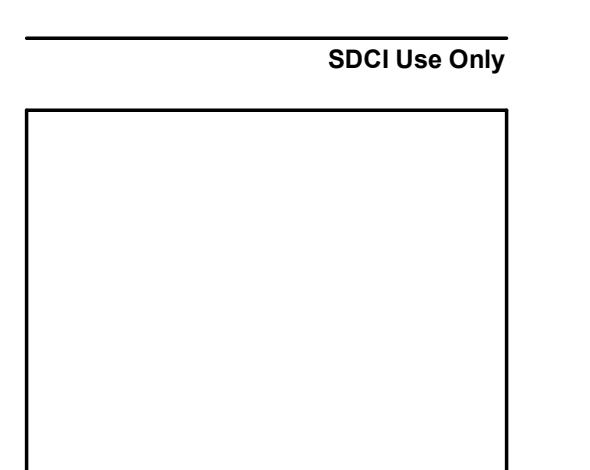
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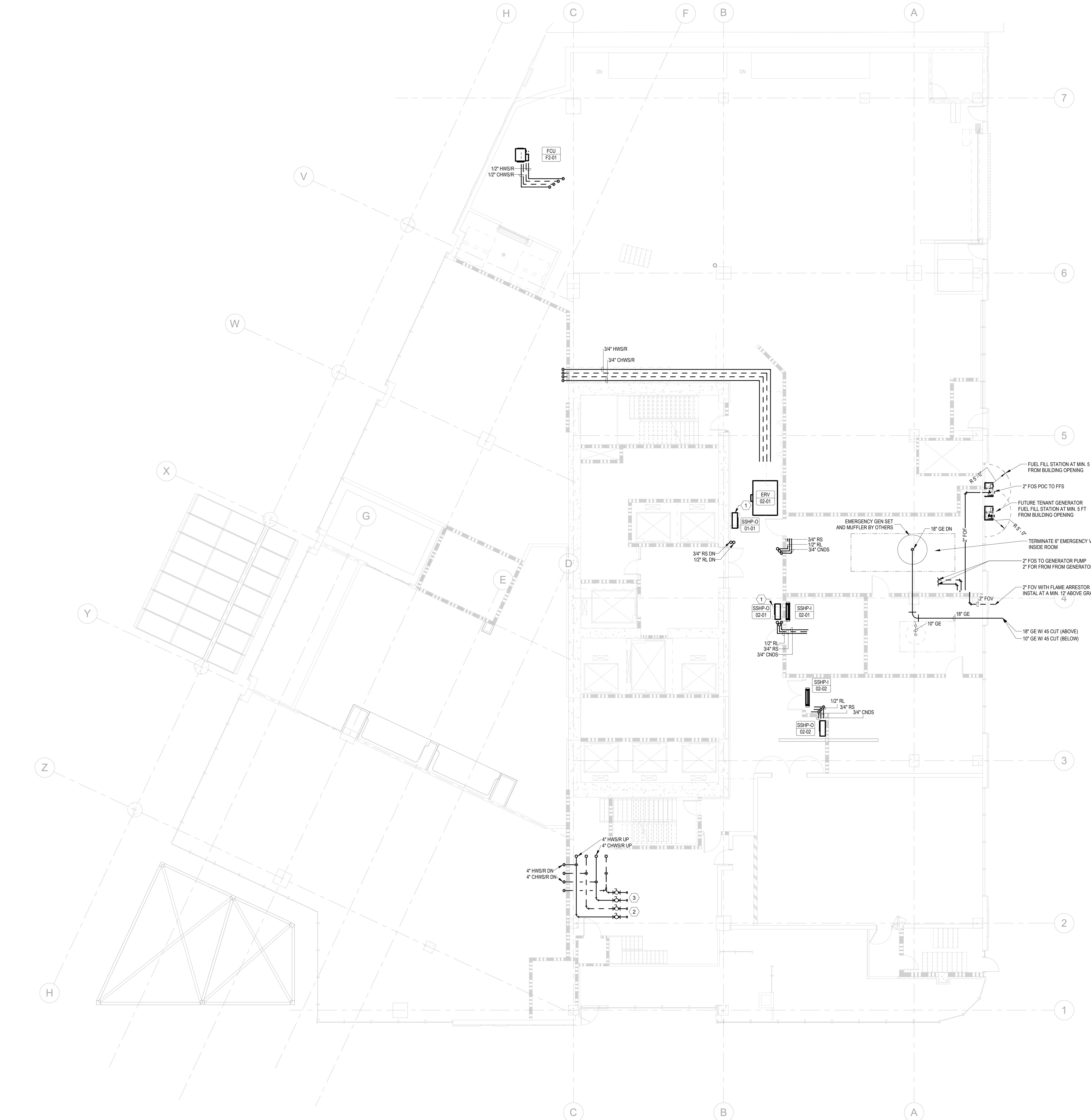
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NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
		TITLE

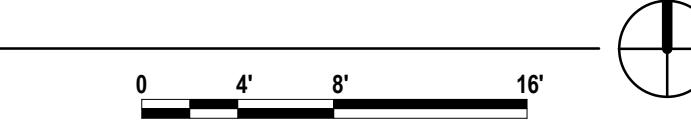
**LEVEL 01 PIPING PLAN**

SHEET NUMBER

**MP111**



1 LEVEL 02 - PIPING PLAN  
MP112  
SCALE: 18' = 1'-0"



NO	ISSUE	DATE
Job Number	207092-001	
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		TITLE

**LEVEL 02 PIPING PLAN**

SHEET NUMBER

**MP112**

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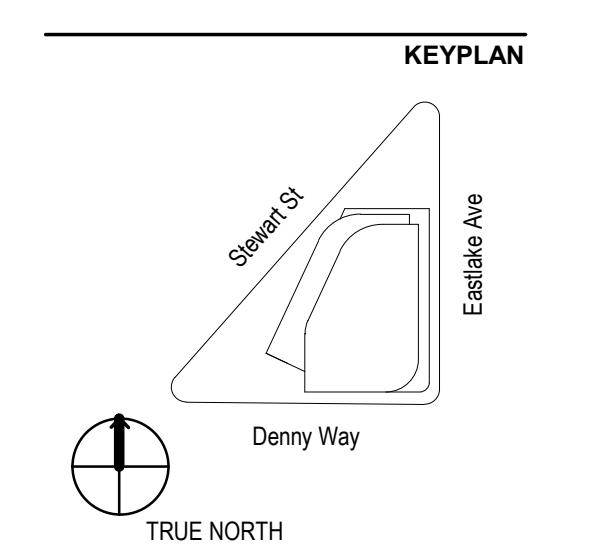
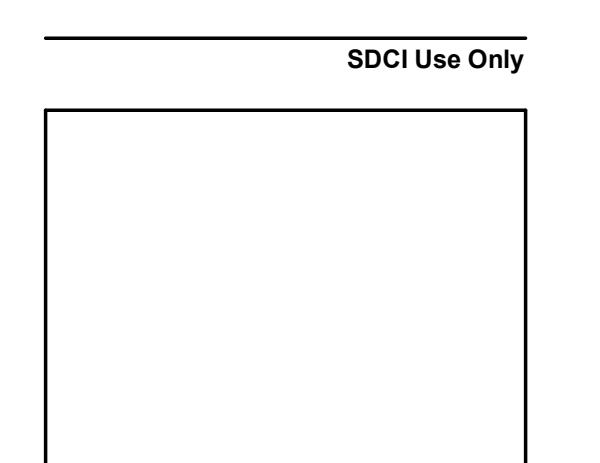
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TRUE NORTH



KEYPLAN



TRUE NORTH



KEYPLAN



TRUE NORTH



TRUE NORTH



TRUE NORTH



TRUE NORTH



TRUE NORTH



TRUE NORTH



TRUE NORTH



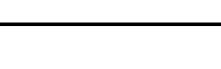
TRUE NORTH



TRUE NORTH



TRUE NORTH

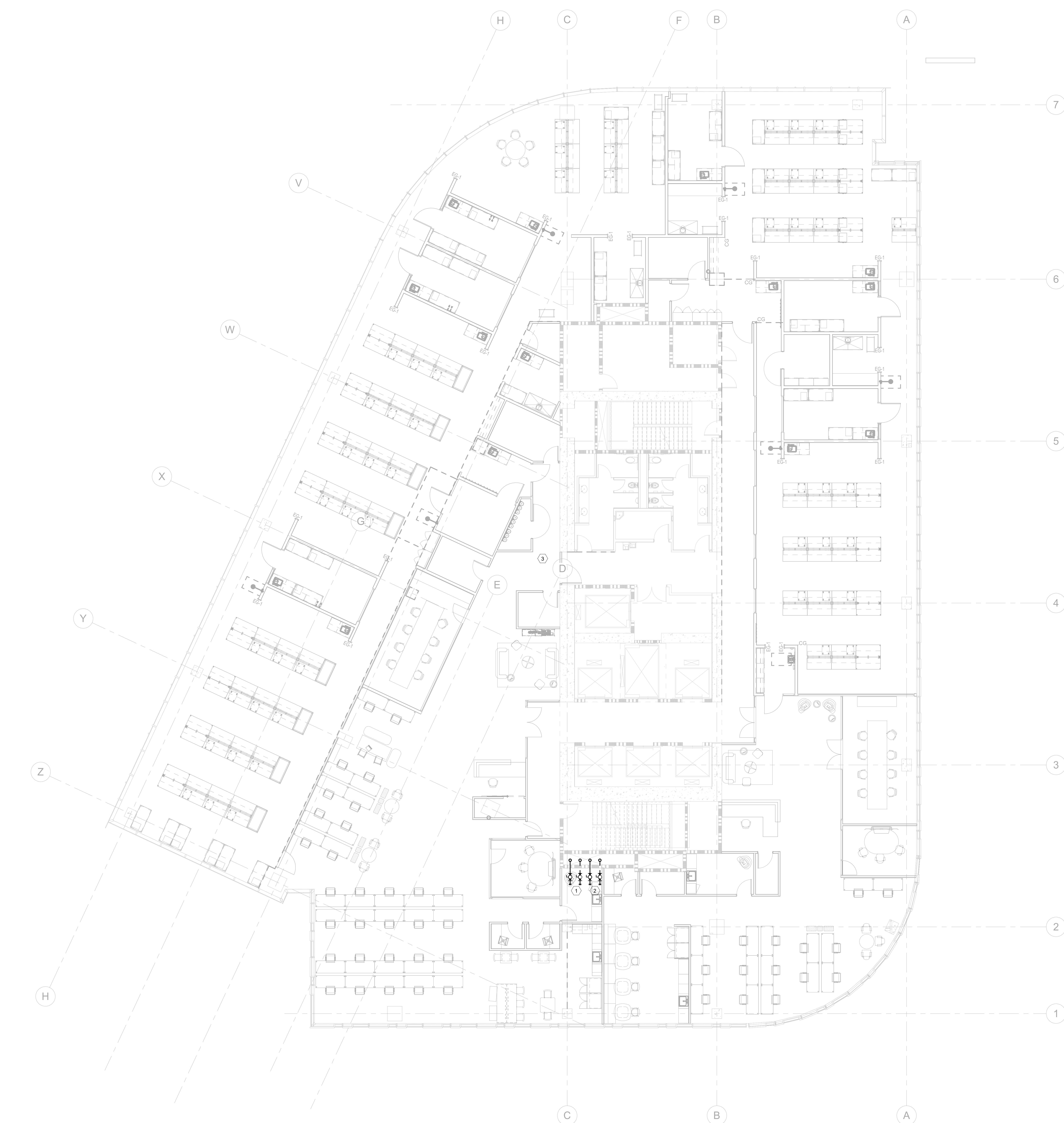


TRUE NORTH



TRUE NORTH





1 LEVEL 03 - PIPING PLAN  
MP113

SCALE: 18' = 1'-0"

**GENERAL NOTES**

A. GENERAL NOTE 1- PIPING  
B. GENERAL NOTE 2

**KEYNOTES**

- 1 PROVIDE 3 1/2" MVS/R VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 2 PROVIDE 2 1/2" CHW/SR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.
- 3

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Seattle, WA 98134  
1206.762.3311

**Electrical KPFF**  
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Seattle, WA 98101  
1206.622.5822

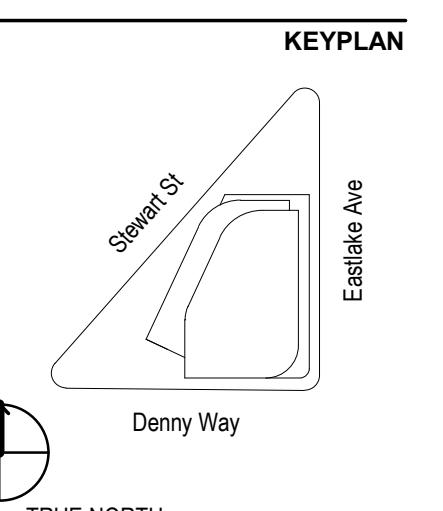
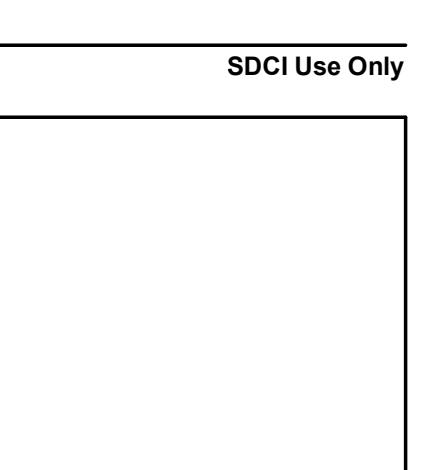
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**KEYPLAN**

Stewart St

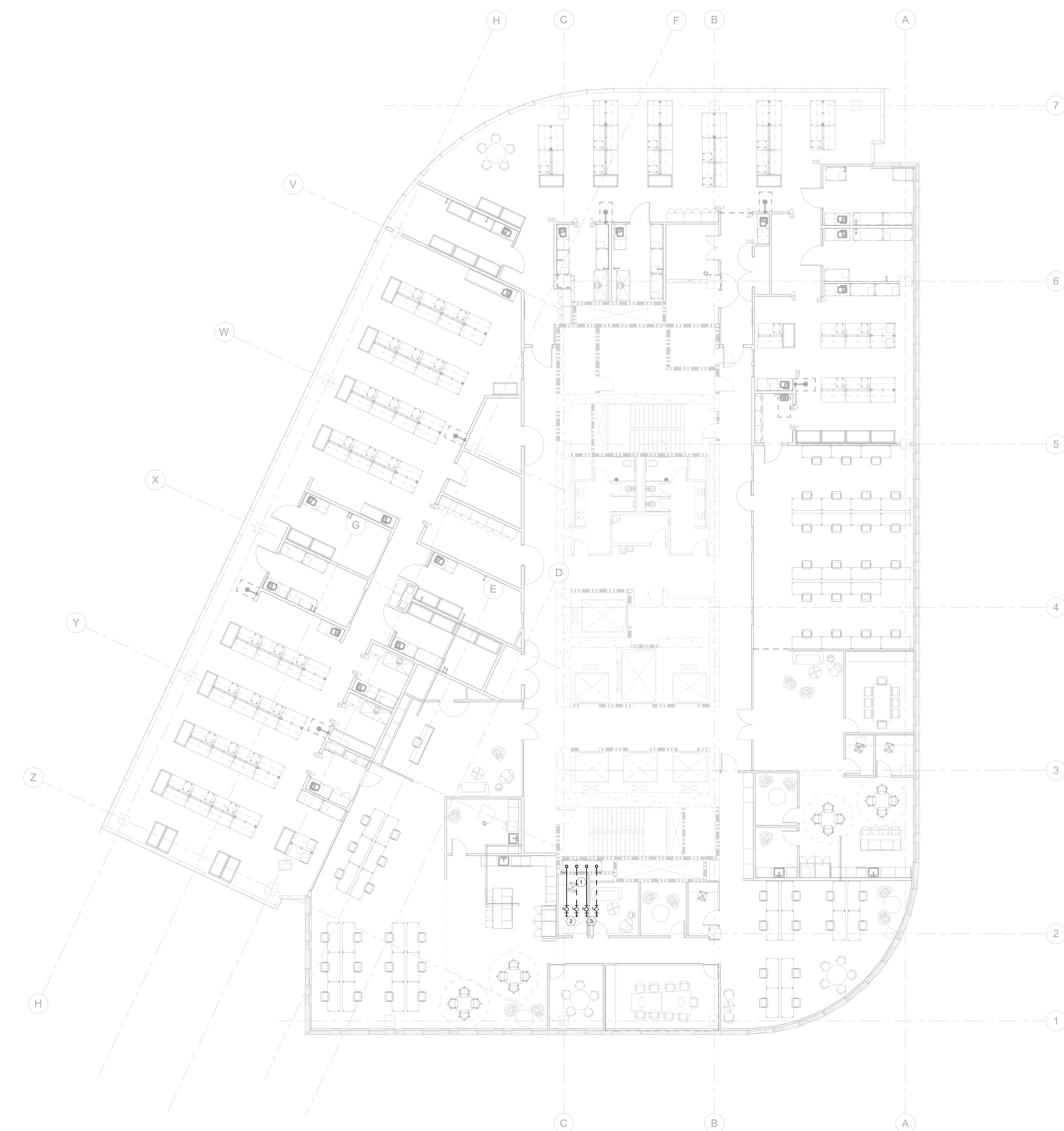
Denny Way

TRUE NORTH

Eastlake Ave

TRUE NORTH

</div



1 LEVEL 04 - PIPING PLAN  
MP114

SCALE: 18' = 1'-0"

**GENERAL NOTES**

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

**KEYNOTES**

- 1 INSULATE CHW AND RH PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 9'7" X 2'7".
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.

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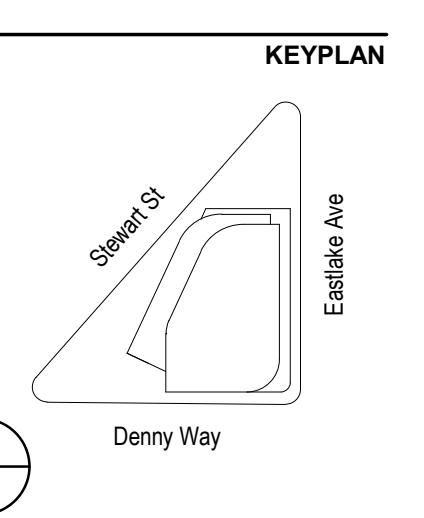
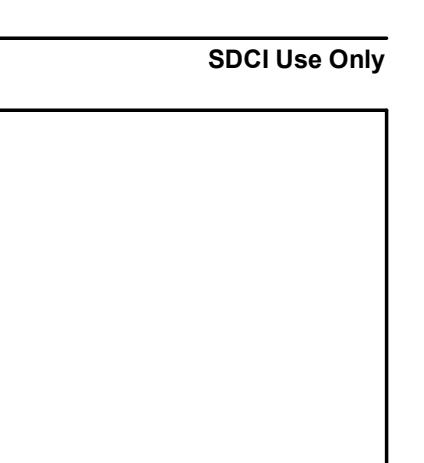
**Electrical**  
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**ISSUE CHART**

NO	ISSUE	DATE
Job Number		207092-001
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Approved		D. BUDD
		TITLE

**LEVEL 04 PIPING PLAN**

**SHEET NUMBER**

**MP114**

## GENERAL NOTES

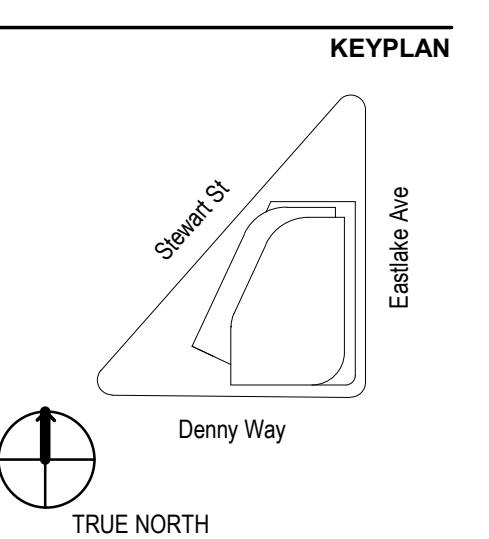
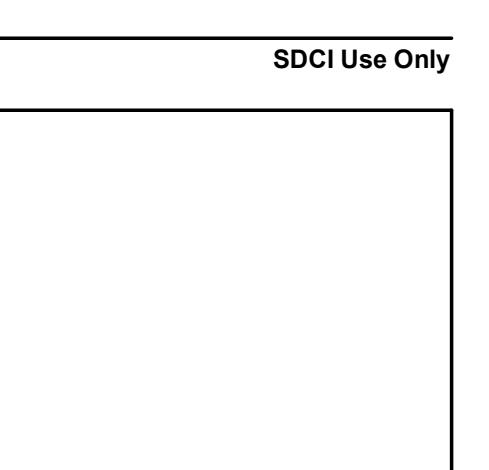
A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

## KEYNOTES

- 1 INSULATE CHW AND RW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 90" X 29"
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM

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TRUE NORTH



KEYPLAN

Stewart St

Eastlake Ave

Denny Way

TRUE NORTH

KEYPLAN

Stewart St

Eastlake Ave

Denny Way

TRUE NORTH

KEYPLAN

Stewart St

Eastlake Ave

Denny Way

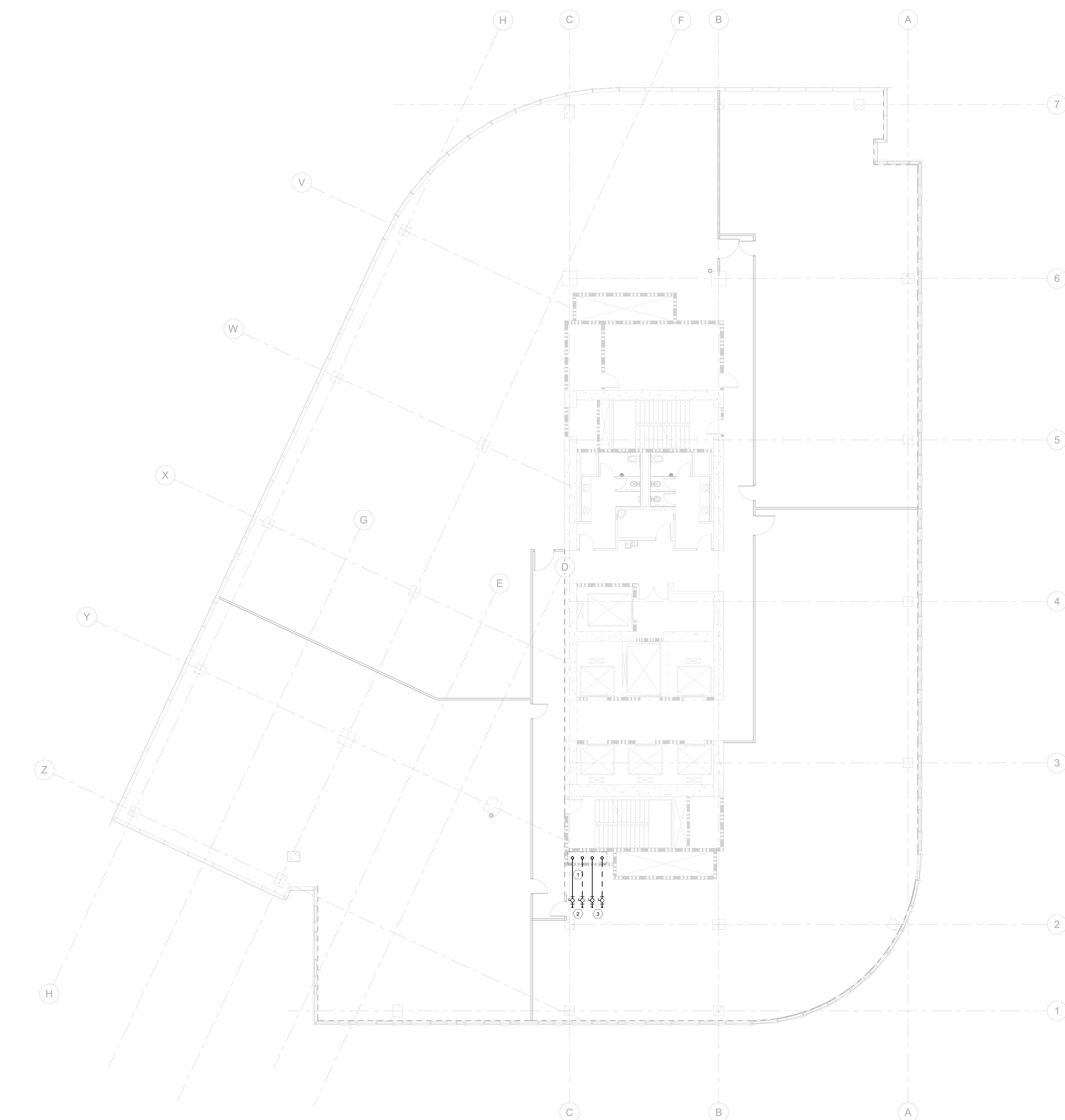
TRUE NORTH

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/> NNAMDI-EMETAROM, BGM	
Approved	D. BUDD	TITLE

**LEVEL 05 PIPING PLAN**

SHEET NUMBER

**MP115**



1 LEVEL 06 - PIPING PLAN  
MP116

SCALE: 18' = 1'-0"

**GENERAL NOTES**

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

**KEYNOTES**

- 1 INSULATE CHW AND RW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 90" X 29".
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.

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(206) 762-3311

**Structural**  
**KPF**  
1600 - 1601 5th Ave  
Seattle, WA 98101  
(206) 622-5822

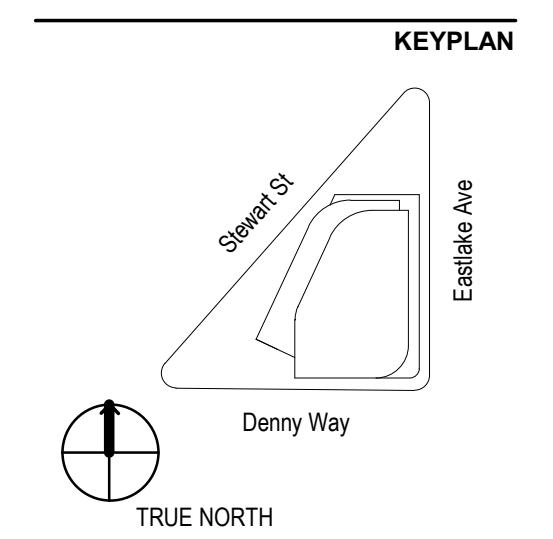
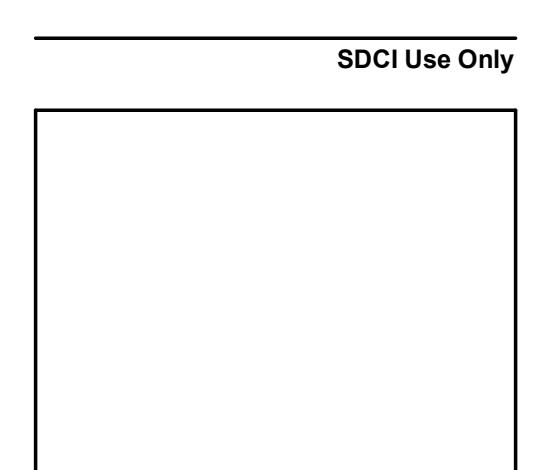
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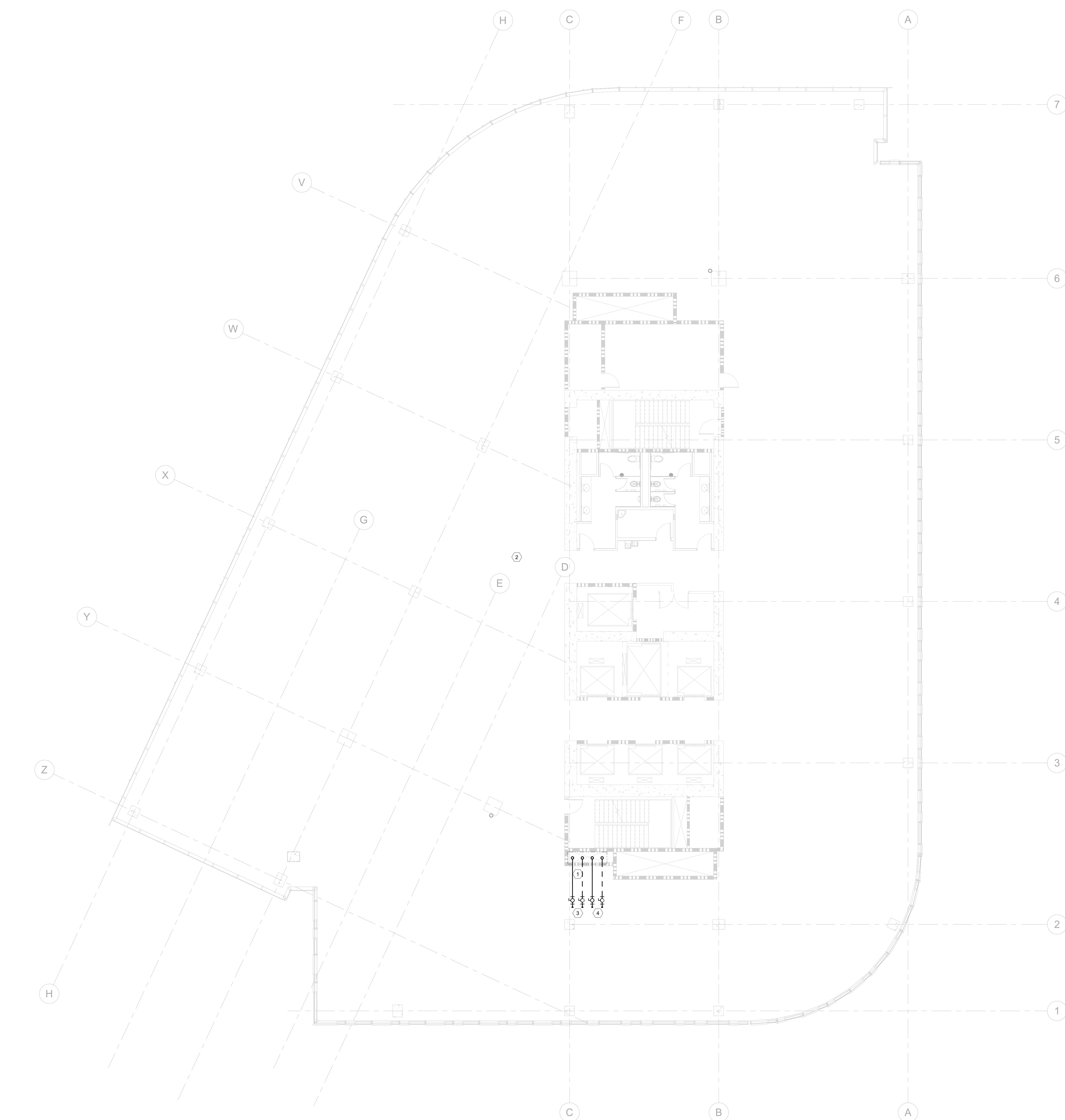
**ISSUE CHART**

NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
		TITLE

**LEVEL 06 PIPING PLAN**

**SHEET NUMBER**

**MP116**



## GENERAL NOTES

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

## KEYNOTES

- 1 INSULATE CHW AND HW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 30" X 27"
- 2
- 3 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 4 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.

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Seattle, WA 98103  
(206) 285-3206

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**McKinstry**  
550 1st Ave  
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(206) 762-3311

Structural  
**KPF**  
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(206) 622-5822

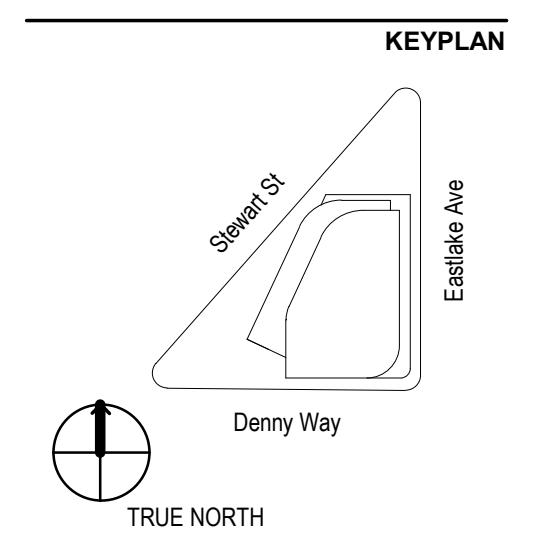
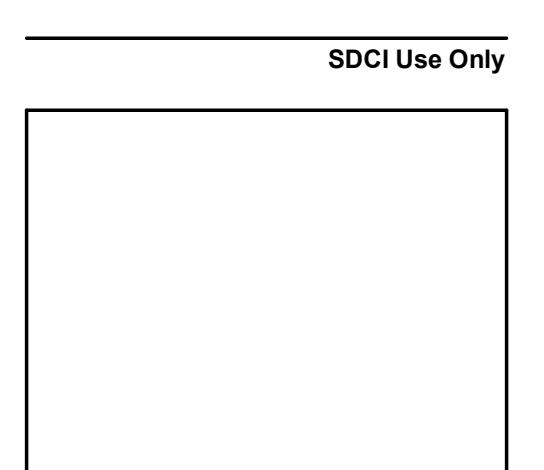
Electrical  
**Coffman Engineers**  
400 - 110 2nd Ave  
Seattle, WA 98108  
(206) 823-0717

General Contractor  
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Seattle, WA 98109

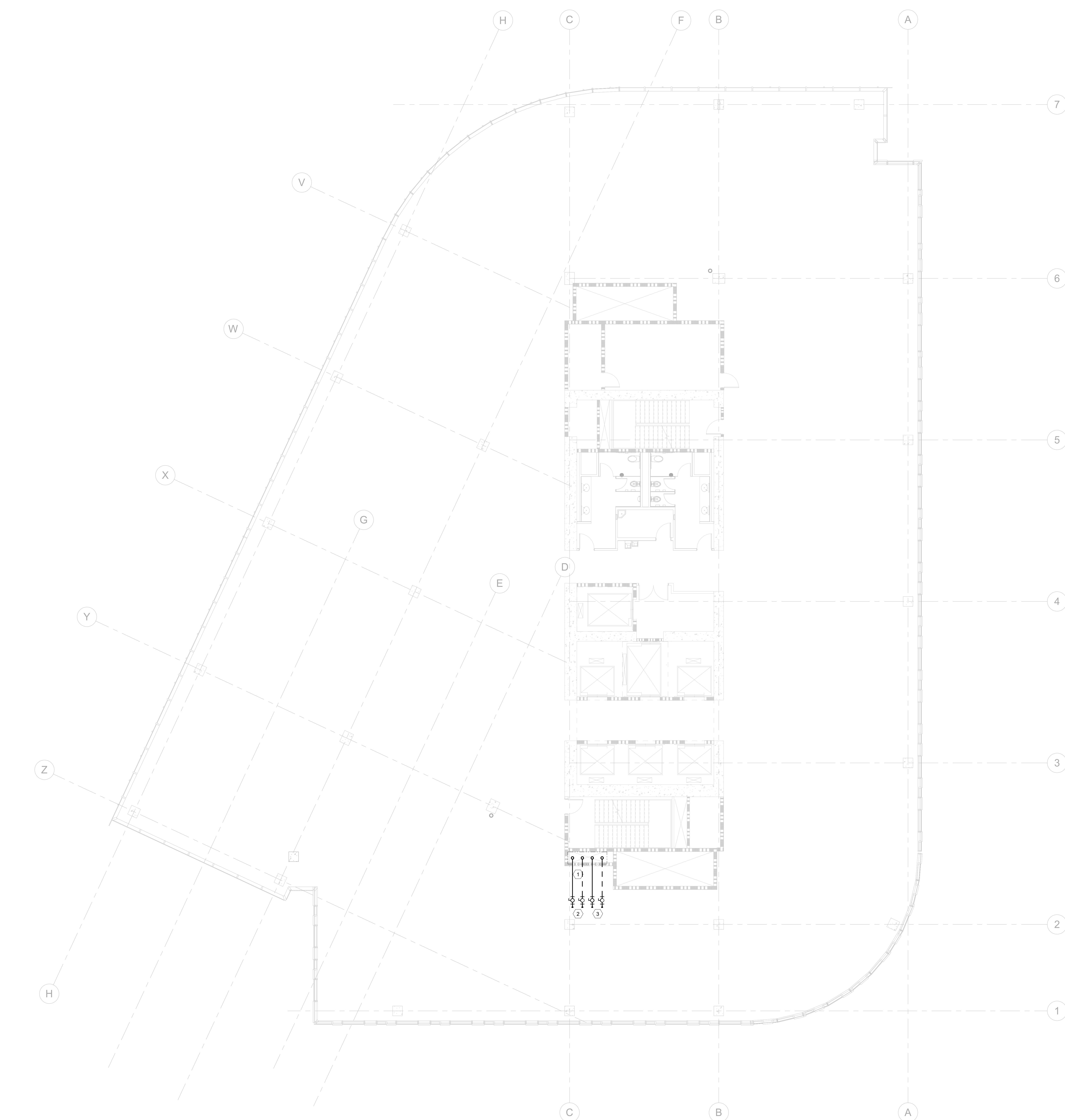
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TRUE NORTH



KEYPLAN



1 LEVEL 08 - PIPING PLAN  
MP118

SCALE: 18' = 1'-0"

GENERAL NOTES

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

KEYNOTES

- 1 INSULATE CHW AND RW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 90" X 29".
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.

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5501 15th Ave  
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(206) 762-3311

Structural  
**KPF**  
1600 - 1601 5th Ave  
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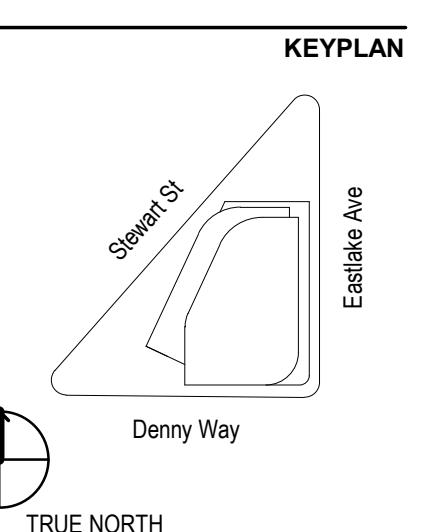
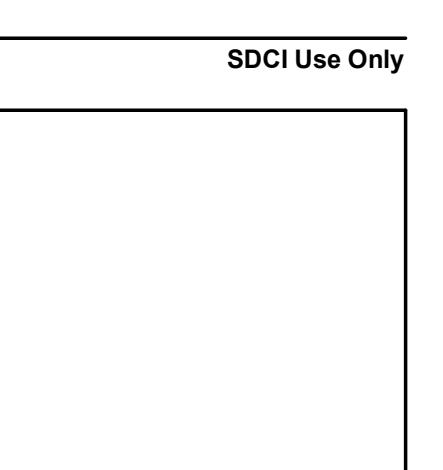
Electrical  
**Coffman Engineers**  
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General Contractor  
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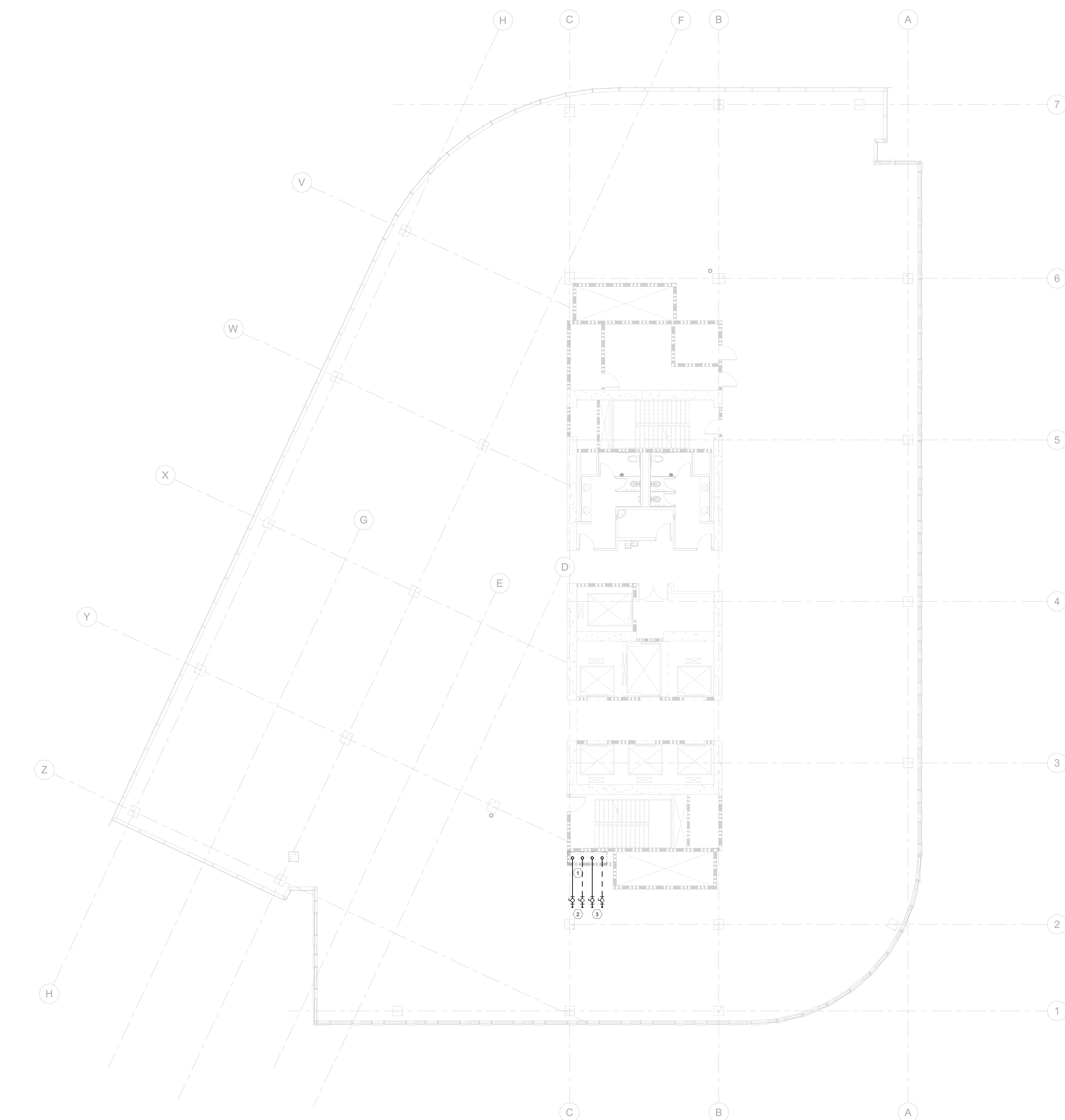
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NO	ISSUE	DATE
Job Number		207092-001
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
		TITLE

**LEVEL 08 PIPING PLAN**

SHEET NUMBER

**MP118**



1 LEVEL 09 - PIPING PLAN  
MP119

SCALE: 18' = 1'-0"

**GENERAL NOTES**

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

**KEYNOTES**

- 1 INSULATE CHW AND RW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 90" X 29".
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.

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1600 - 1601 5th Ave  
Seattle, WA 98101  
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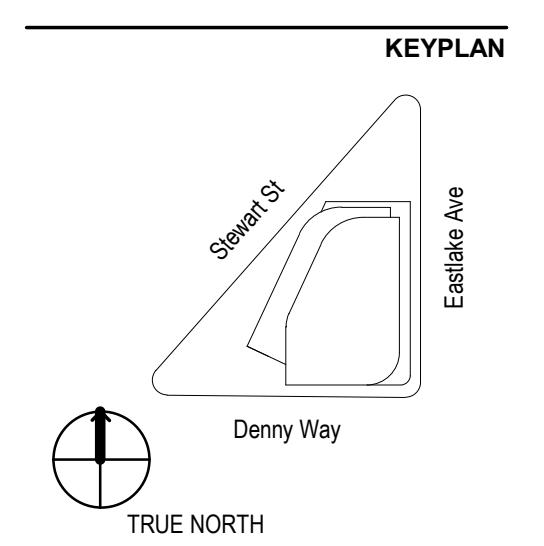
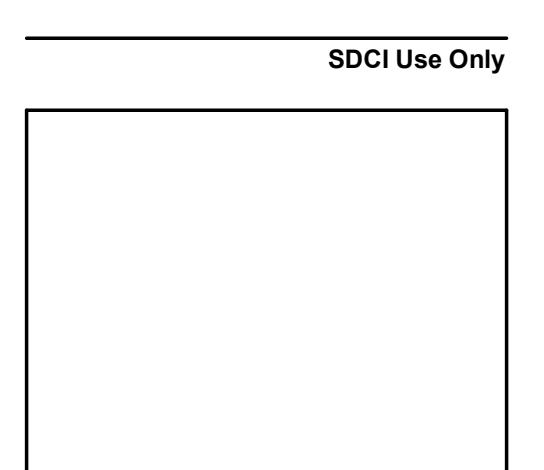
**Coffman Engineers**  
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
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NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
Approved		D. BUDD
		TITLE

**LEVEL 09 PIPING PLAN**

**SHEET NUMBER**

**MP119**





1 LEVEL 11 - PIPING PLAN  
MP121

SCALE: 18' = 1'-0"

**GENERAL NOTES**

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

**KEYNOTES**

- 1 INSULATE CHW AND RW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 9" X 27"
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM

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Eustis Ave  
Denny Way  
TRUE NORTH

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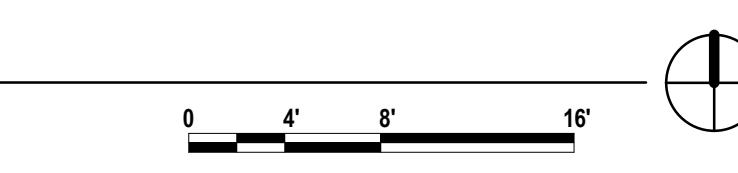
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
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Approved		D. BUDD
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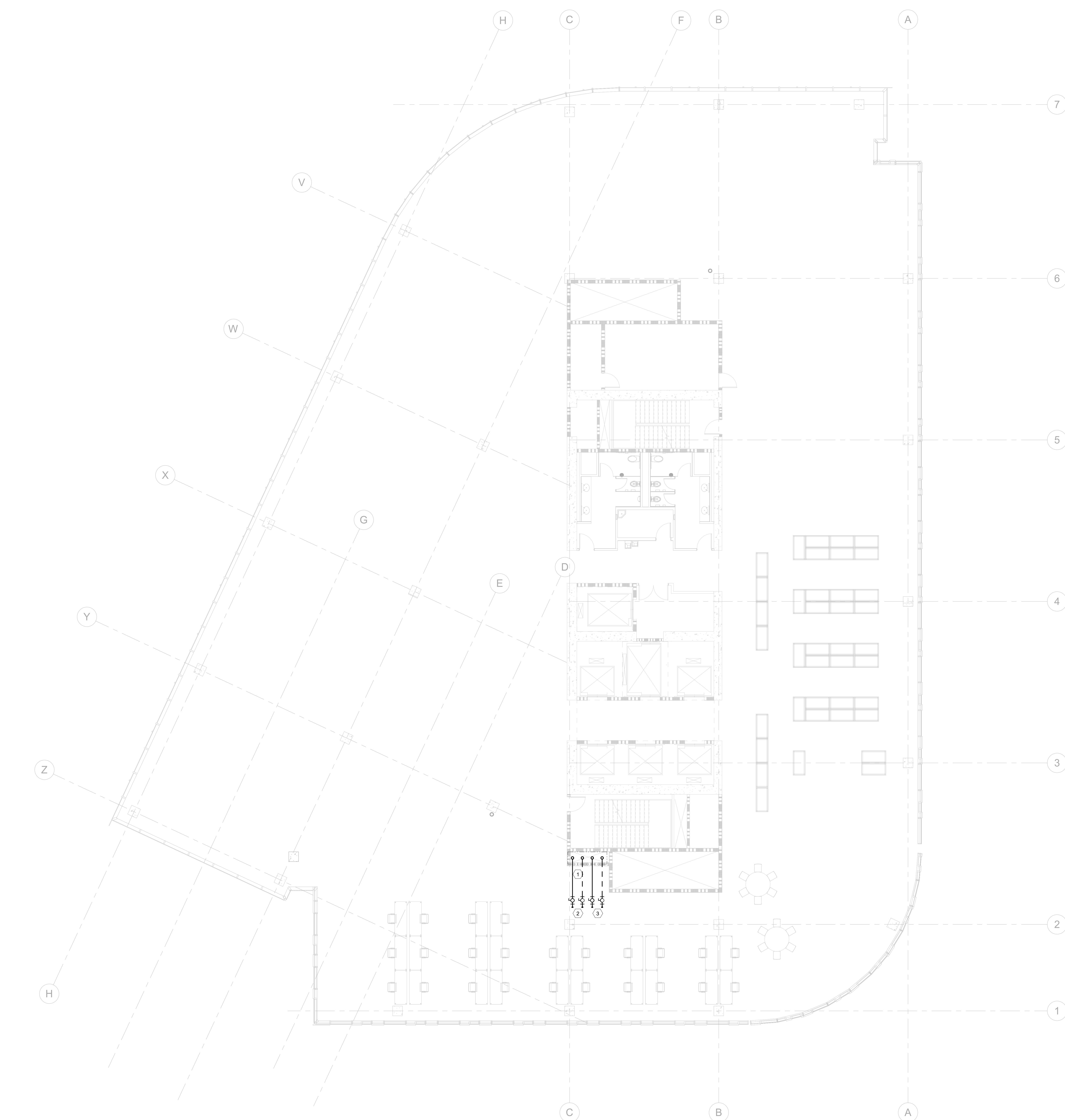
**LEVEL 11 PIPING PLAN**

SHEET NUMBER

**MP121**







1 LEVEL 13 - PIPING PLAN  
MP123

SCALE: 18' = 1'-0"

GENERAL NOTES

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

KEYNOTES

- 1 INSULATE CHW AND RW PIPE RISER WITH 1.5" INSULATION. SHAFT OPENING TO BE A MINIMUM OF 9'7" X 2'7".
- 2 PROVIDE 2 1/2" HWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-022 HOT WATER PIPING DIAGRAM.
- 3 PROVIDE 2 1/2" CHWSR VALVE AND CAP FOR FUTURE TI. REFERENCE M-021 CHILLED WATER PIPING DIAGRAM.

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**McKinstry**  
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Seattle, WA 98134  
1206.762.3311

Structural  
**KPF**  
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Seattle, WA 98101  
1206.622.5822

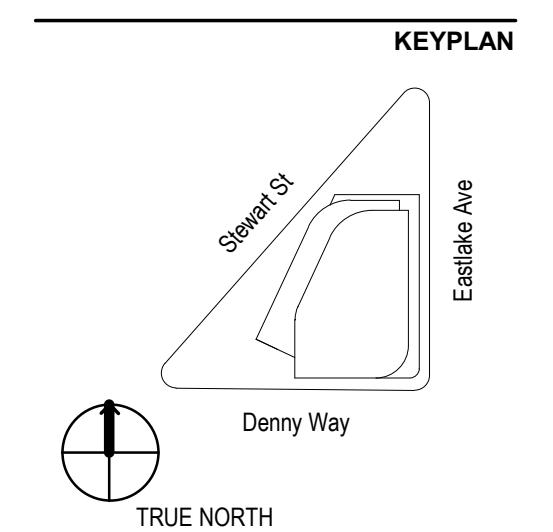
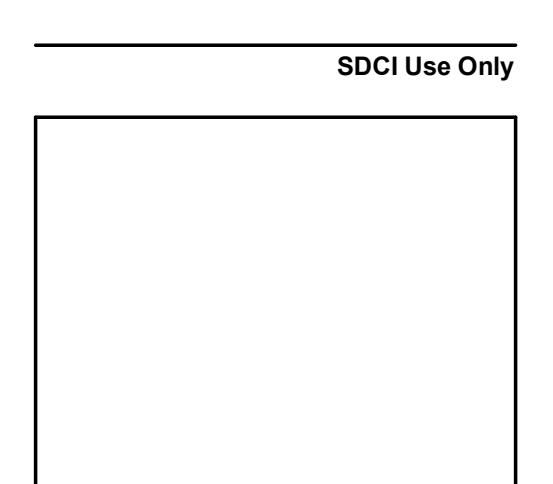
Electrical  
**Coffman Engineers**  
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Seattle, WA 98108  
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
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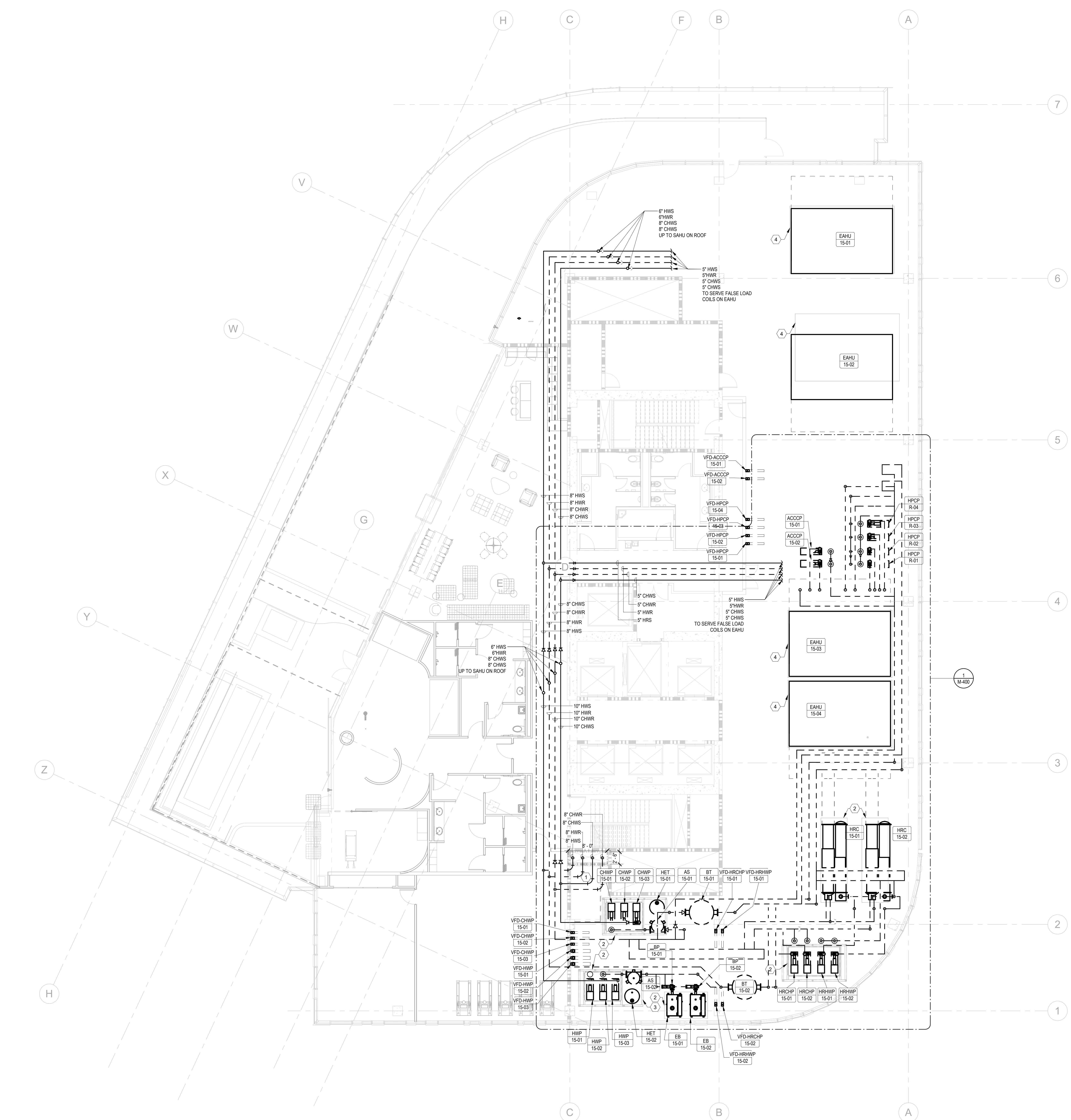
NO	ISSUE	DATE
Job Number		207092-001
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Approved		D. BUDD
		TITLE

**LEVEL 13 PIPING PLAN**

SHEET NUMBER

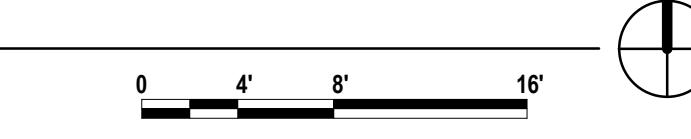
**MP123**





1 LEVEL 15 - PIPING PLAN  
MP125

SCALE: 18" = 1'-0"



NO	ISSUE	DATE
Job Number	207092-001	
Checked	<input checked="" type="checkbox"/>	NNAMDI-EMETAROM, BGM
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		TITLE

**LEVEL 15 PIPING PLAN**

SHEET NUMBER

**MP125**

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 1301 Fifth Avenue  
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 Civil **CPL**  
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 1206.340.0460

Landscape **Site Workshop**  
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Mechanical / Plumbing **McKinstry**  
 5501 16th Ave N  
 Seattle, WA 98134  
 1206.762.3311

Electrical **KPFM**  
 1600 - 1601 5th Ave  
 Seattle, WA 98101  
 1206.622.5822

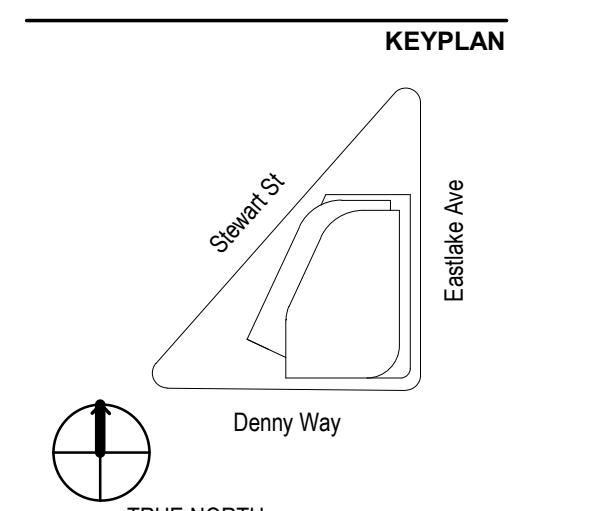
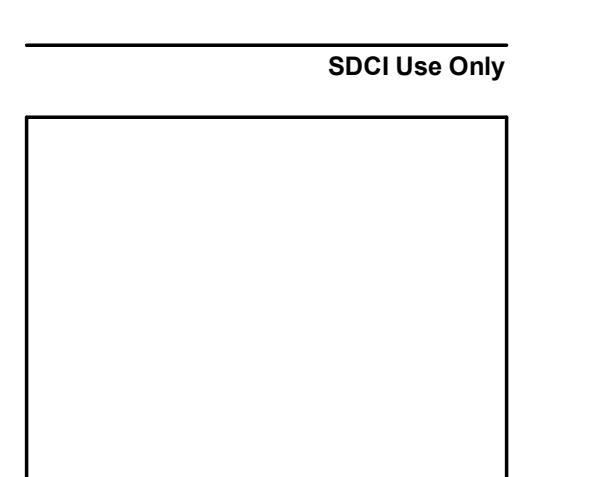
Electrical **Coffman Engineers**  
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General Contractor **JTM Construction**  
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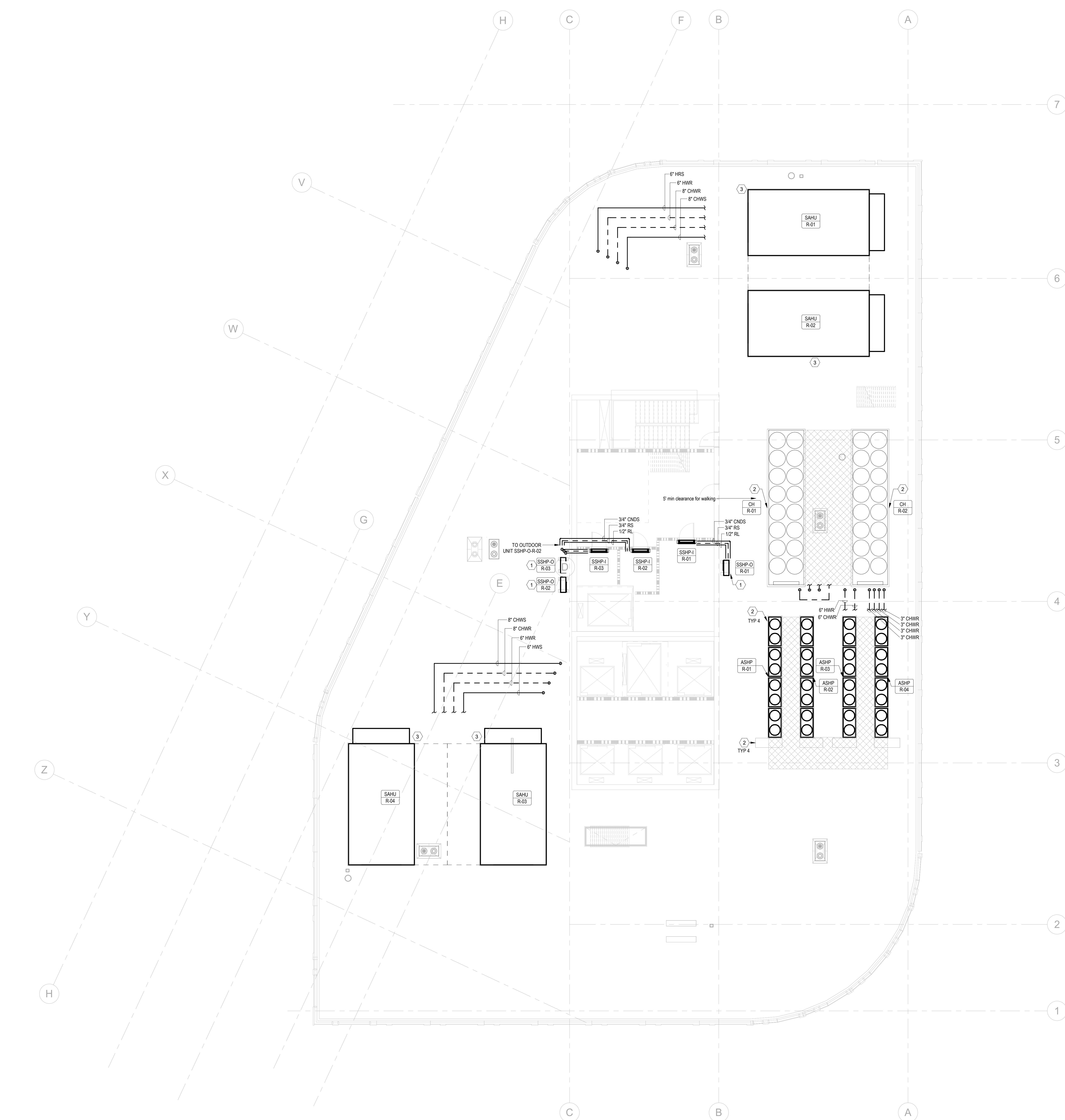
ISSUE CHART

NO	ISSUE	DATE
Job Number	207092-001	
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		TITLE

**LEVEL 15 PIPING PLAN**

SHEET NUMBER

**MP125**



1 LEVEL 16 ROOF 1 - PIPING PLAN  
MP126

SCALE: 18' = 1'-0"

GENERAL NOTES

A. GENERAL NOTE 1 - PIPING  
B. GENERAL NOTE 2

KEYNOTES

- 1 MECHANICAL UNIT MOUNTED ON (2) 18" CURB RAILS. COORDINATED WITH STRUCTURAL.
- 2 4" TALL HOUSE KEEPING PAD BY G.C. WITCH CHAMFERED EDGES.
- 3 MECHANICAL UNIT MOUNTED ON CURB 18" ABOVE HIGHEST POINT OF FLOOR. DIMENSIONS TO MATCH THE UNIT COORDINATED WITH STRUCTURAL.

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Seattle, WA 98134  
1206.762.3311

Electrical **KPF**  
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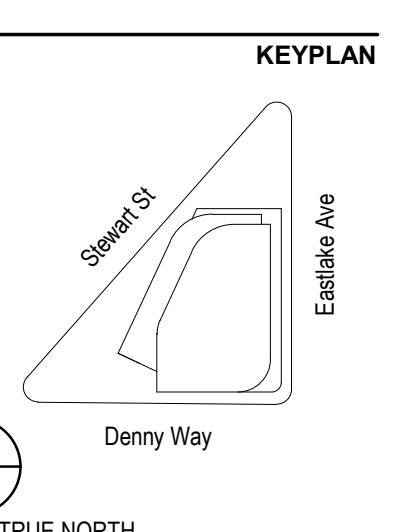
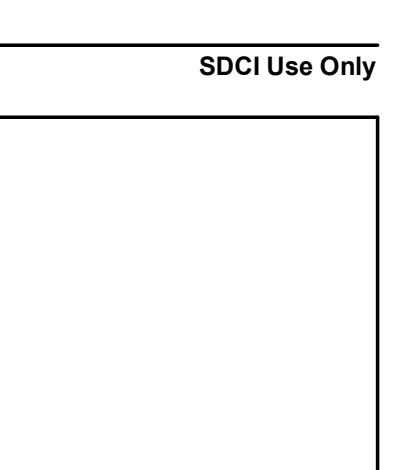
Electrical **Coffman Engineers**  
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Seattle, WA 98108  
1206.822.0717

General Contractor **JTM Construction**  
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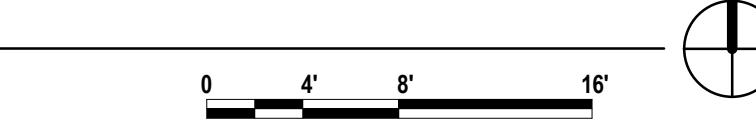
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Job Number	207092-001	
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		TITLE

**LEVEL 16 - ROOF PIPING PLAN**

SHEET NUMBER

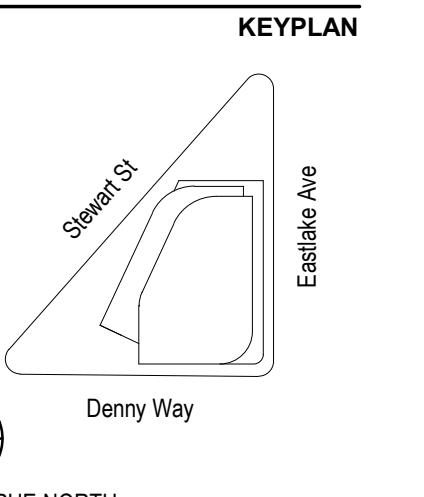
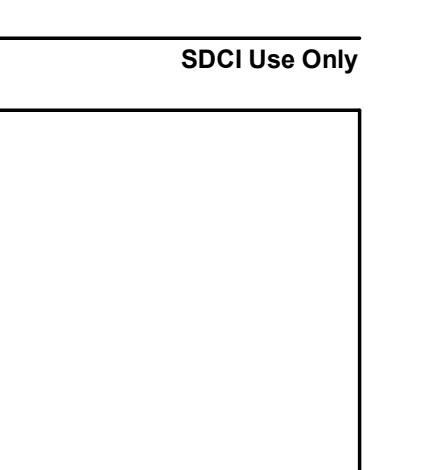
**MP126**





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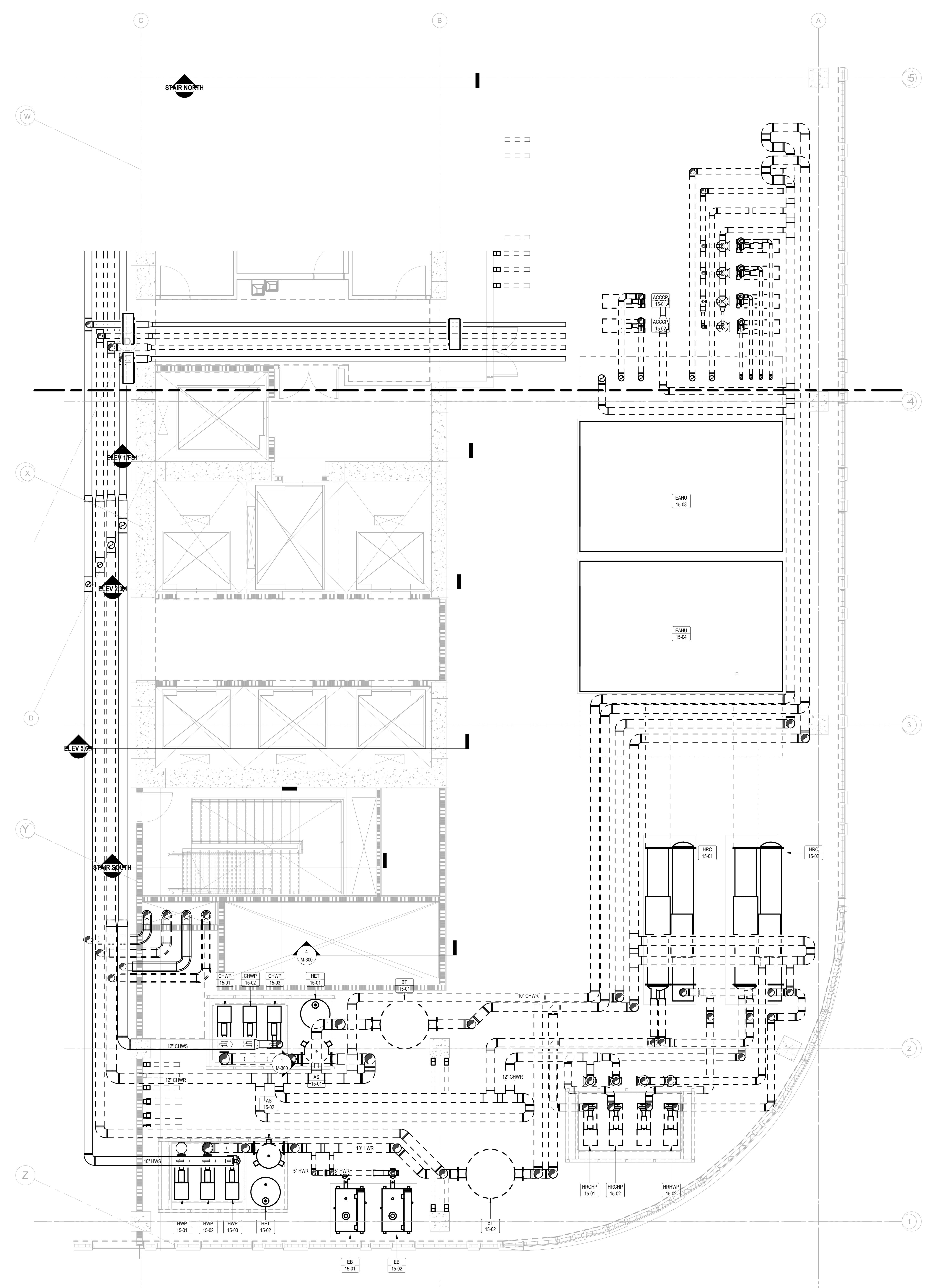
ISSUE CHART

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Job Number 207092-001  
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**ENLARGED MECHANICAL PLANS**

SHEET NUMBER

**M-400**



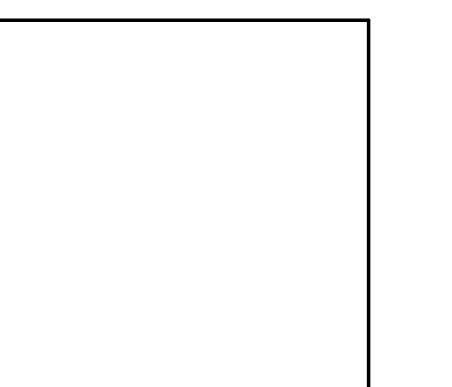




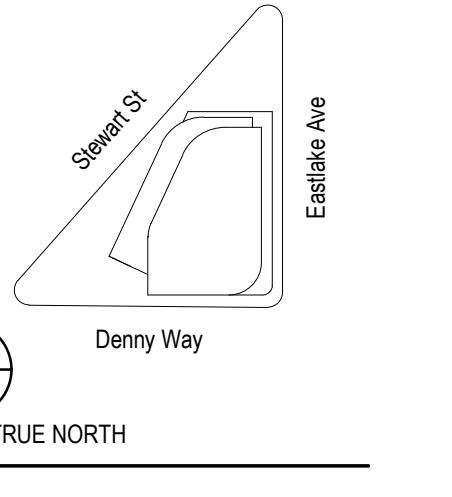
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**MECHANICAL DETAILS**

SHEET NUMBER

**M-501**