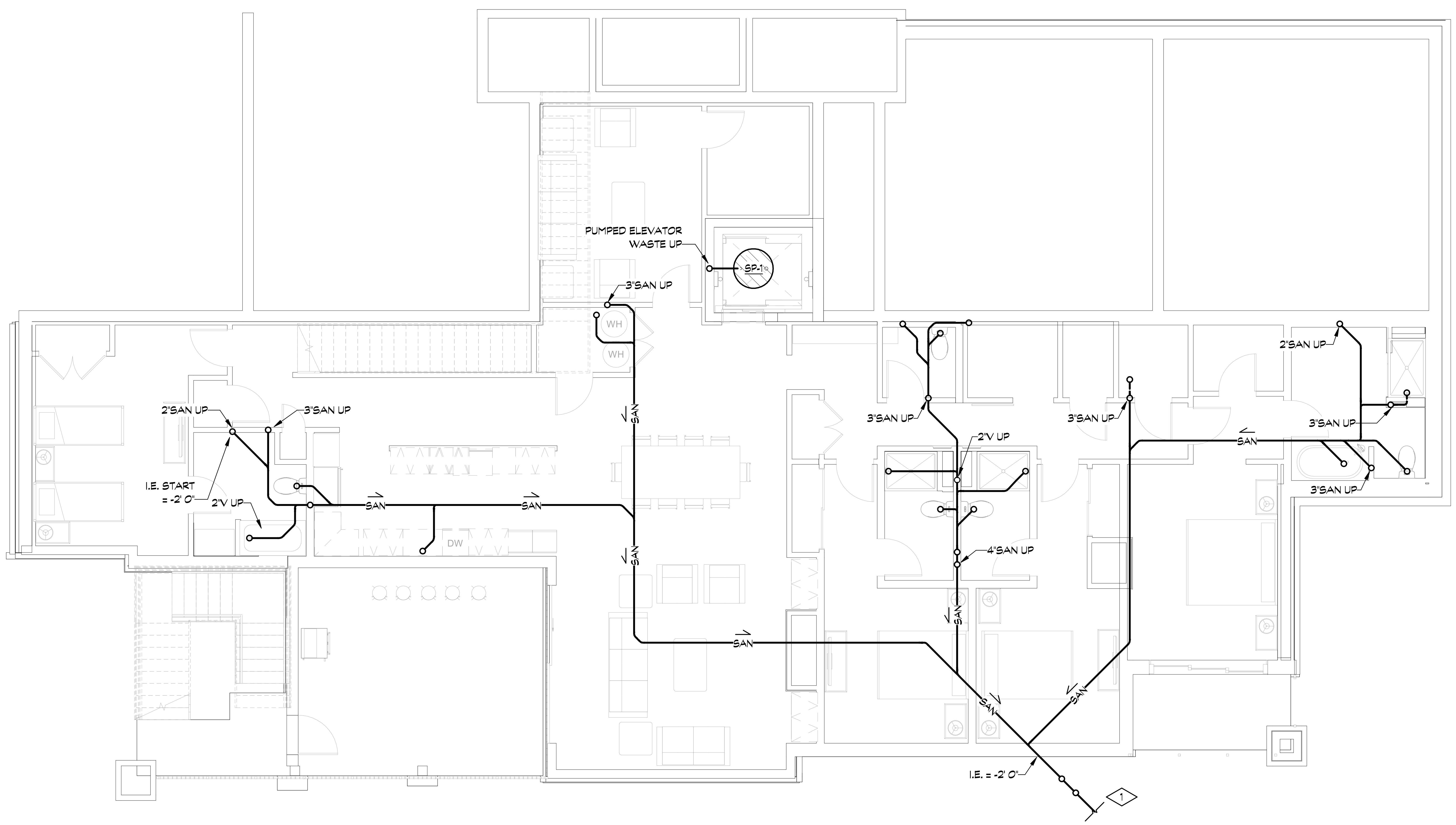

UNDERGROUND SEWER PLAN
3/16" = 1'-0"

GENERAL NOTES

A. PLUMBING CONTRACTOR TO COORDINATE SCOPING OF THE EXISTING SANITARY LINES PRIOR TO STARTING WORK.

B. FIELD VERIFY ALL PLUMBING SYSTEMS, PIPE SIZES, LOCATIONS, ROUTING AND SERVICE IN THE AREA OF WORK PRIOR TO THE START OF ANY WORK.

C. REFER TO SCHEDULES, DIAGRAMS AND ISOMETRIC DIAGRAMS FOR ALL PIPE SIZES NOT SHOWN ON PLAN. PIPE SIZES OF EXISTING PIPING SHOWN ON PLAN ARE TO BE FIELD VERIFIED, NOTIFY ENGINEER OF ANY DISCREPANCIES.

D. FIELD COORDINATE ALL EQUIPMENT LOCATIONS AND PIPE ROUTINGS WITH ALL NEW AND EXISTING STRUCTURAL, HVAC, LIGHTS AND ALL OTHER DISCIPLINES PRIOR TO BEGINNING WORK.

E. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY AND ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE THIER WORK, COORDINATE LOCATIONS WITH GENERAL CONTRACTOR.

F. PLUMBING CONTRACTOR TO COORDINATE ROUGH-IN DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.

G. WATER, SEWER, GAS AND ELECTRICAL CONDUITS MUST FIT WITHIN WALLS. CONFLICTS WITH OTHER TRADES MUST BE COORDINATED OR WORK WILL BE REDONE.

H. COORDINATE ALL ACCESS PANEL LOCATIONS FOR VALVES, SHOCK ARRESTORS, AIR ADMITTANCE VALVES AND ALL OTHER PLUMBING COMPONENTS INVOLVING ACCESS WITH ARCHITECT.

I. NOT ALL ISOLATION VALVES SHOWN ON PLANS. PROVIDE ISOLATION VALVES ON ALL DOMESTIC WATER BRANCH PIPING. COORDINATE ANY AND ALL ACCESS PANELS WITH ARCHITECT.

J. EQUIPMENT GAS CONNECTION SIZE PER PLANS OR SAME AS APPLIANCE SIZE, WHICHEVER IS LARGER. TRANSITION DOWNSTREAM OF ALL SHUTOFFS AND REGULATORS AS CLOSE TO APPLIANCE AS POSSIBLE WHEN PLANS CALL FOR LARGER THAN APPLIANCE.

K. EXPOSED SEWER PIPING (TRAPS & INDIRECT DRAINS) MUST BE COPPER. RE: PROJECT SPECS.

L. CW AND HW PIPING WILL BE ROUTED IN THE CEILING OF THE FLOOR BELOW EXCEPT FOR IN LOWER LEVEL 1. REFER TO THE PIPING SHEETS FOR ADDITIONAL INFORMATION.

DETAIL NOTES THIS SHEET

1. EXTEND AND CONNECT NEW SANITARY WASTE TO CIVIL POINT OF CONNECTION (POC) IN AREA SHOWN, PROVIDE 2-WAY CLEANOUT AT SANITARY WASTE/SEWER JUNCTION AT EXTERIOR OF BUILDING. FIELD VERIFY EXACT LOCATION AND INVERT ELEVATION AT POINT OF CONNECTION.

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NOTICE: DUTY OF COOPERATION

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REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
Drawn By:	CK
Checked By:	MV

Project Phase
PERMIT

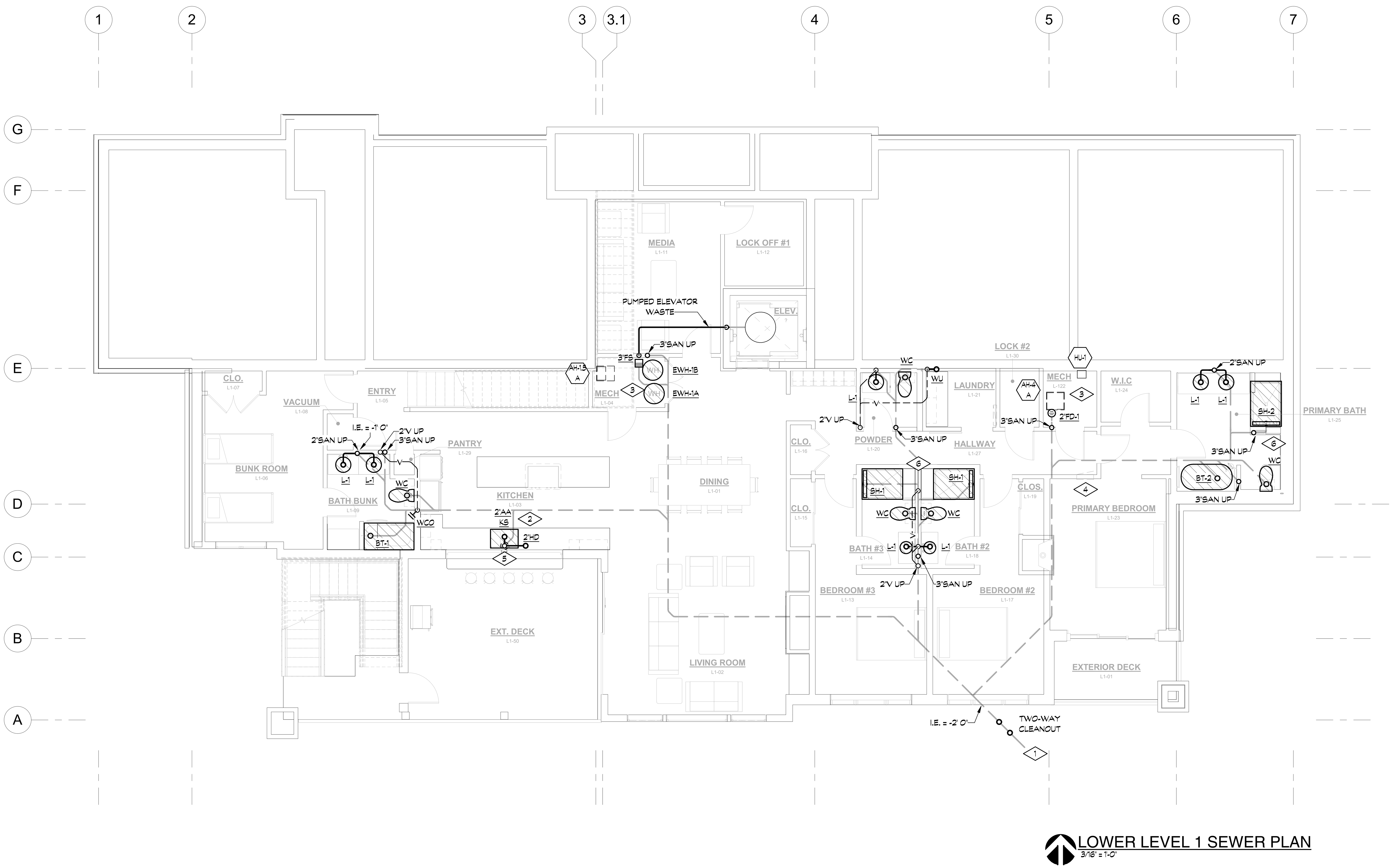
Sheet Title
UNDERGROUND SEWER PLAN

Sheet Number
P0.1

5/2/2024 2:50:06 PM

DETAIL NOTES THIS SHEET

1. EXTEND AND CONNECT NEW SANITARY WASTE TO CIVIL POINT OF CONNECTION (POC) IN AREA SHOWN. PROVIDE 2-WAY CLEANOUT AT SANITARY WASTE/SEWER JUNCTION AT EXTERIOR OF BUILDING. FIELD VERIFY EXACT LOCATION AND INVERT ELEVATION AT POINT OF CONNECTION.
2. ROUTE WASTE PIPING FROM DISHWASEHR TO 2"HD IN CASEWORK, CONNECT VIA 1" AIRGAP AND SECURE DISHWASHER DISCHARGE HOSE TO HUB DRAIN. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT VIA DISHWASHER KNOCK OUT ON GARBAGE DISPOSAL; COORDIANTE ACEPTANCE WITH OWNER. INSTALLATION OF DISHWASHER SHALL BE PER IPC 409.4.
3. ROUTE WASTE FROM MECHANICAL UNIT(S) AND/OR WATER HEATERS TO FLOOR DRAIN/SINK IN MECHANICAL CLOSET.
4. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
5. PROVIDE AIR ADMITTANCE VALVE UNDER SINK, SHOWN OFFSET IN WALL FOR CLARITY, RE: DIAGRAM FOR ADDITIONAL INFORMATION.
6. ROUTE STEAMER DRAIN TO HUB DRAIN IN WALL.



LOWER LEVEL 1 SEWER PLAN
3/16" = 1'-0"

5/2/2024 2:50:11 PM

COLORADO LICENSED PROFESSIONAL ENGINEER 38983 05/02/2024

REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
Drawn By:	CK&SS
Checked By:	MV

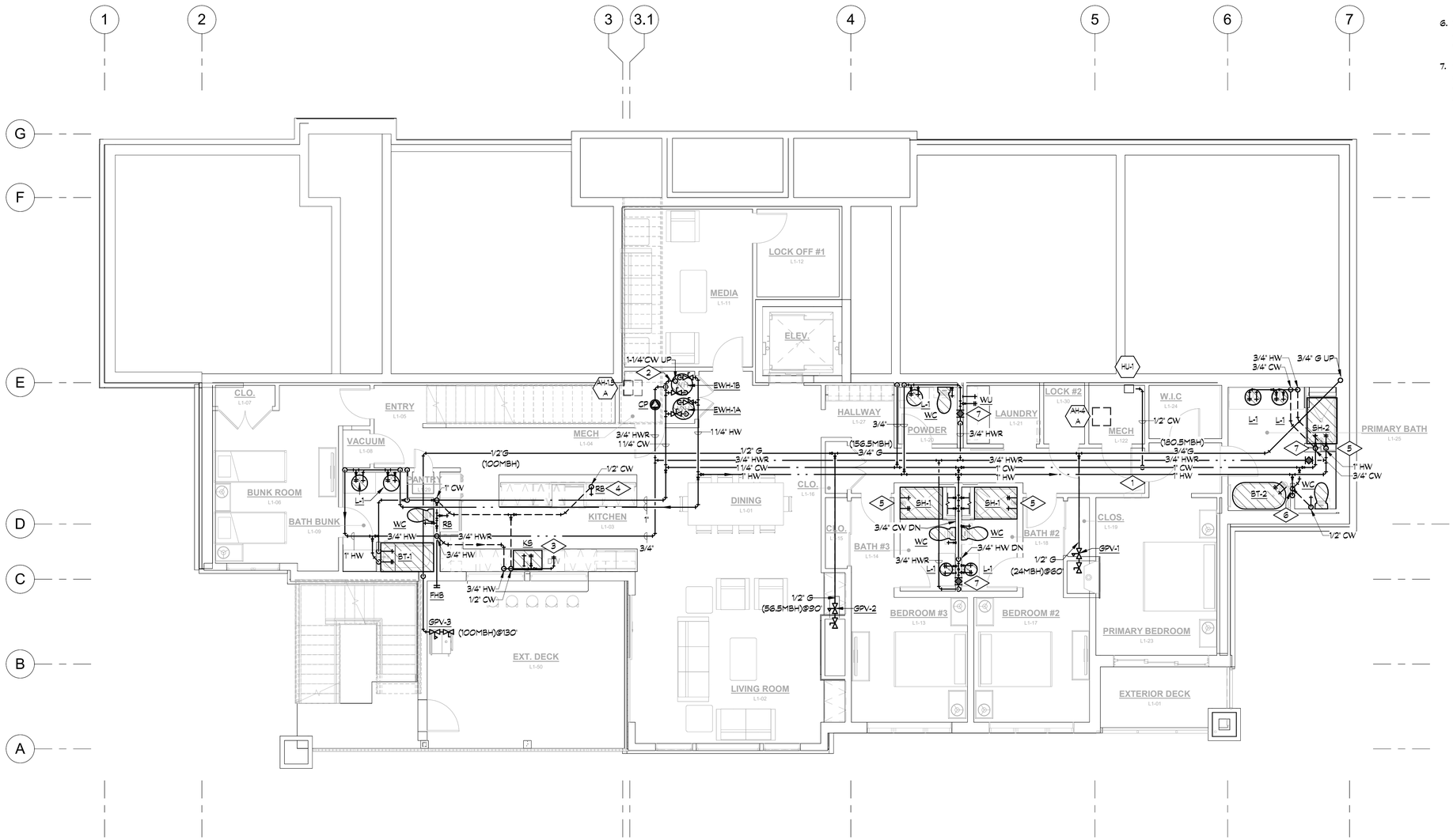
Project Phase
PERMIT

Sheet Title
LOWER LEVEL 1 SEWER PLAN

Sheet Number
P1.1

DETAIL NOTES THIS SHEET

1. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
2. PROVIDE UNIT SHUTOFF IN APPROXIMATE LOCATION SHOWN PRIOR TO SUPPLY ANY FIXTURES ON THIS LEVEL; COORDINATE EXACT INSTALLATION LOCATION AND ACCESS WITH G.C. AND ARCH.
3. OFFSET 1/2" HW LINE FOR DISHWASHER CONNECTION, PROVIDE WITH DEDICATED ISOLATION VALVE W/SHOCK ARRESTOR. ROUTE INDIRECT WASTE FROM DISHWASHER TO 1-1/2" HUB DRAIN IN CASEWORK. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT TO FOOD WASTE DISPOSAL PER IPC 409.4, WHERE APPLICABLE.
4. WALLBOX FOR REFRIGERATOR ICE MAKER CONNECTIONS, PROVIDE WITH SHUTOFF VALVE AND SHOCK ARRESTOR. PROVIDE FIRE RATED ICE MAKER BOX WHERE LOCATED WITHIN FIRE RATED WALL; COORDINATE WITH ARCH. MAKE CONNECTION TO REFRIGERATOR PER MANUFACTURER'S INSTRUCTIONS.
5. ROUTE 1/2" CW LINE TO STEAMER IN APPROXIMATE LOCATION SHOWN; COORDINATE ALL PIPE ROUTING IN WALL WITH G.C. AND ARCH. RE: MANUFACTURERS INSRUCTIONS FOR CONNECTION DETAILS.
6. ROUTE 1/2" HW AND 3/4" CW DOWN IN WALL; ROUTE 1/2" HW AND CW IN FLOOR TO BT-2 AND 1/2" CW IN FLOOR TO WC; COORDINATE ROUTING WITH G.C. AND ARCH.
7. PROVIDE THERMOSTATIC BALANCING VALVE (CIRCUIT SOLVER CS-3/4-120) IN APPROXIMATE LOCATION SHOWN; COORDINATE ACCESS PANEL AS REQUIRED WITH G.C. AND ARCH.



LOWER LEVEL 1 PIPING PLAN
3/16" = 1'-0"

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ERIC SMITH
38983
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ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
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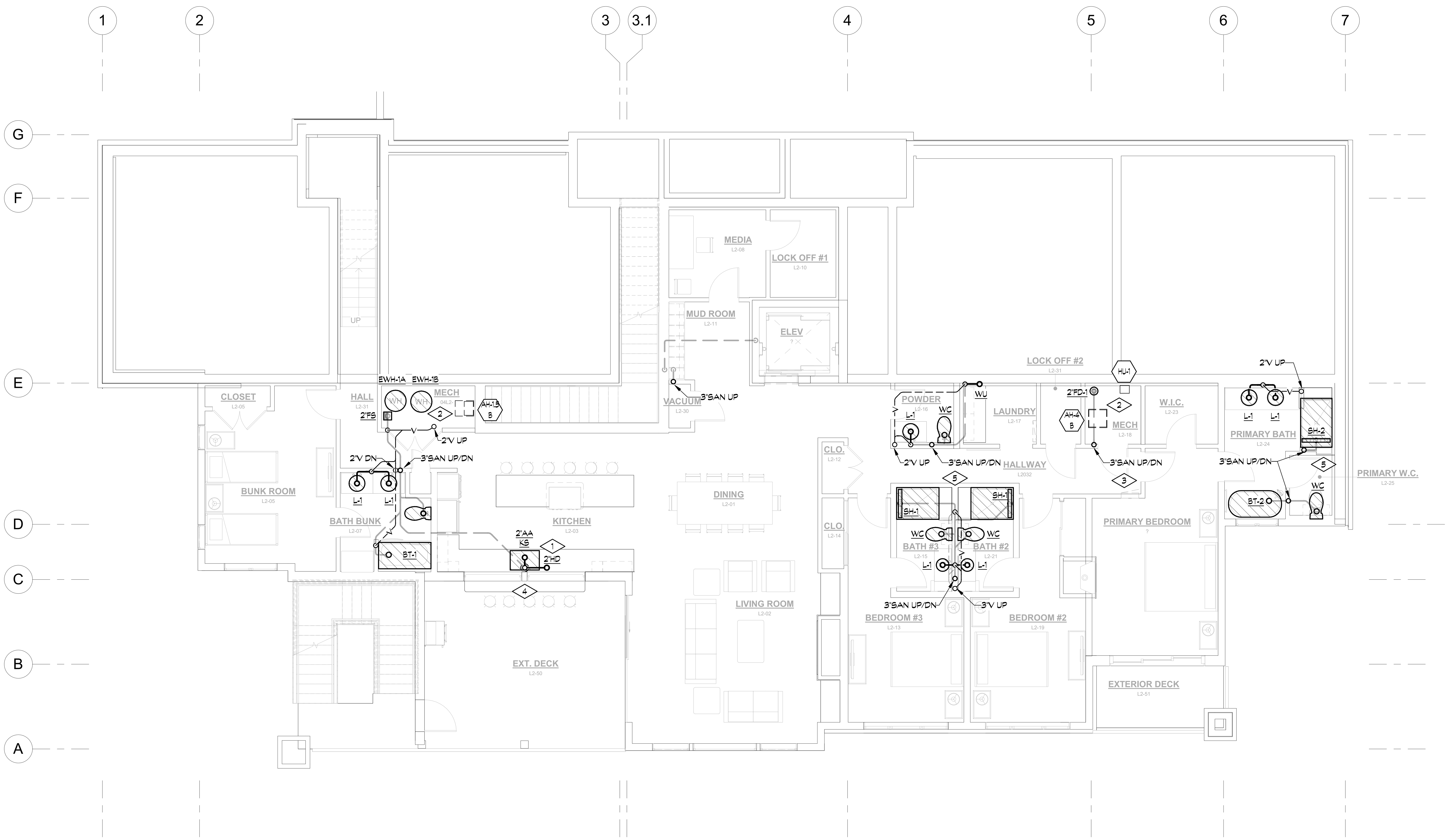
Sheet Title
LOWER LEVEL 1 PIPING PLAN

Sheet Number
P1.2

DETAIL NOTES THIS SHEET

1. ROUTE WASTE PIPING FROM DISHWASEHR TO 2"HD IN CASEWORK, CONNECT VIA 1" AIRGAP AND SECURE DISHWASHER DISCHARGE HOSE TO HUB DRAIN. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT VIA DISHWASHER KNOCK OUT ON GARBAGE DISPOSAL; COORDIANTE ACEPTANCE WITH OWNER. INSTALLATION OF DISHWASHER SHALL BE PER IPC 409.4.
2. ROUTE WASTE FROM MECHANICAL UNIT(S) AND/OR WATER HEATERS TO FLOOR DRAIN/SINK IN MECHANICAL CLOSET.
3. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
4. PROVIDE AIR ADMITTANCE VALVE UNDER SINK, SHOWN OFFSET IN WALL FOR CLARITY. RE: DIAGRAM FOR ADDITIONAL INFORMATION.
5. ROUTE STEAMER DRAIN TO HUB DRAIN IN WALL.



LOWER LEVEL 2 SEWER PLAN
3/16" = 1'-0"

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38983
05/02/2024

NOTICE: DUTY OF COOPERATION

REVISIONS

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ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/ 21/ 24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
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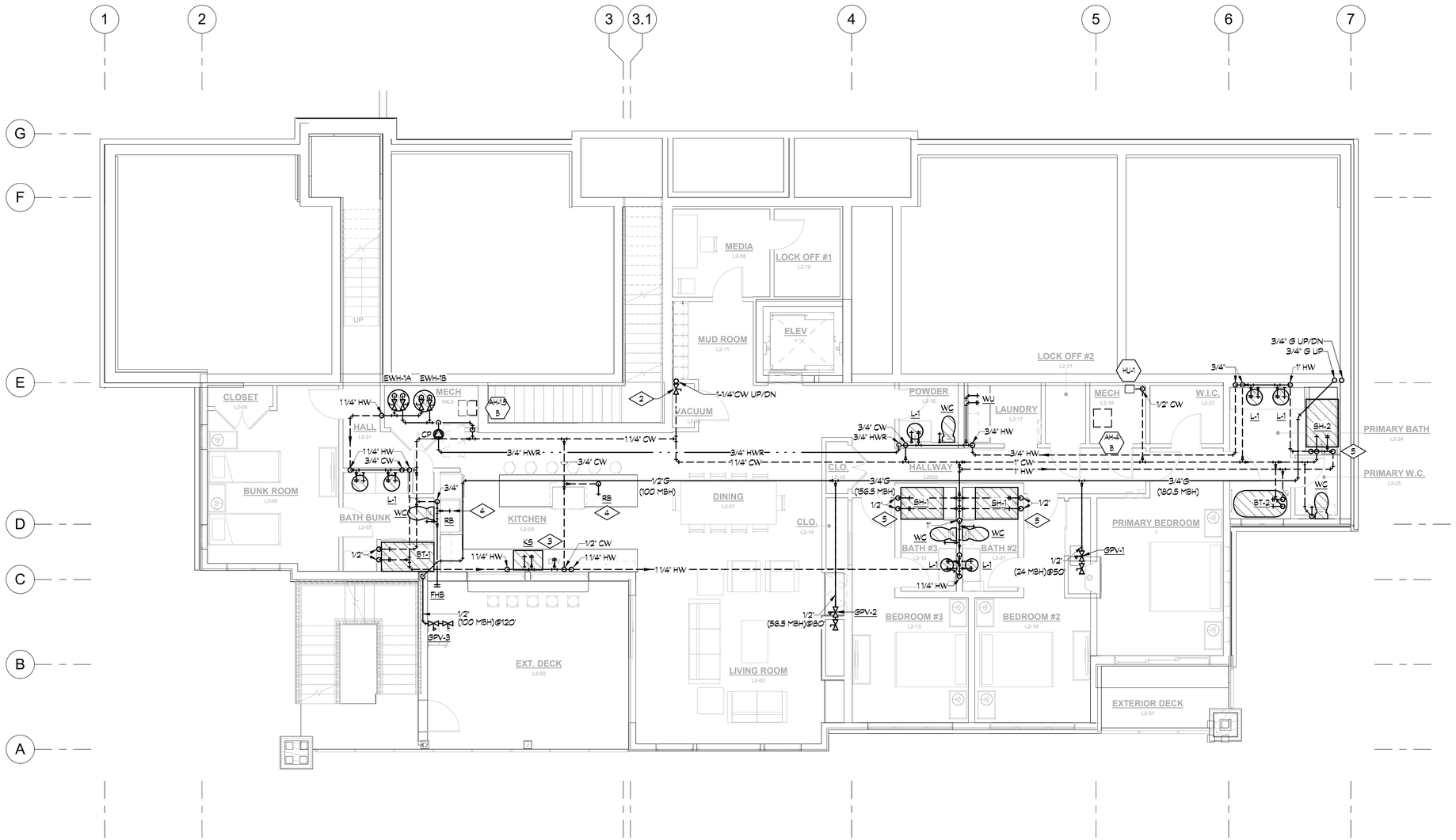
Sheet Title
LOWER LEVEL 2 SEWER PLAN

Sheet Number
P2.1

5/2/2024 2:50:21 PM

DETAIL NOTES THIS SHEET

1. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
2. PROVIDE ACCESS TO UNIT SHUT-OFF IN FLOOR.
3. OFFSET 1/2" HW LINE FOR DISHWASHER CONNECTION, PROVIDE WITH DEDICATED ISOLATION VALVE W/SHOCK ARRESTOR. ROUTE INDIRECT WASTE FROM DISHWASHER TO 1-1/2" HUB DRAIN IN CASEWORK. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT TO FOOD WASTE DISPOSAL PER IPC 409.4, WHERE APPLICABLE.
4. WALLBOX FOR REFRIGERATOR ICE MAKER CONNECTIONS, PROVIDE WITH SHUTOFF VALVE AND SHOCK ARRESTOR. PROVIDE FIRE RATED ICE MAKER BOX WHERE LOCATED WITHIN FIRE RATED WALL; COORDINATE WITH ARCH. MAKE CONNECTION TO REFRIGERATOR PER MANUFACTURERS INSTRUCTIONS.
5. ROUTE 1/2" CW LINE TO STEAMER IN APPROXIMATE LOCATION SHOWN; COORDINATE ROUTING WITH G.C. AND ARCH. RE: MANUFACTURERS INSTRUCTIONS FOR CONNECTION DETAILS.



LOWER LEVEL 2 PIPING PLAN

3/16" = 1'-0"

5/2/2024 2:50:27 PM

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38983
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ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

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Job Number:	23055-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
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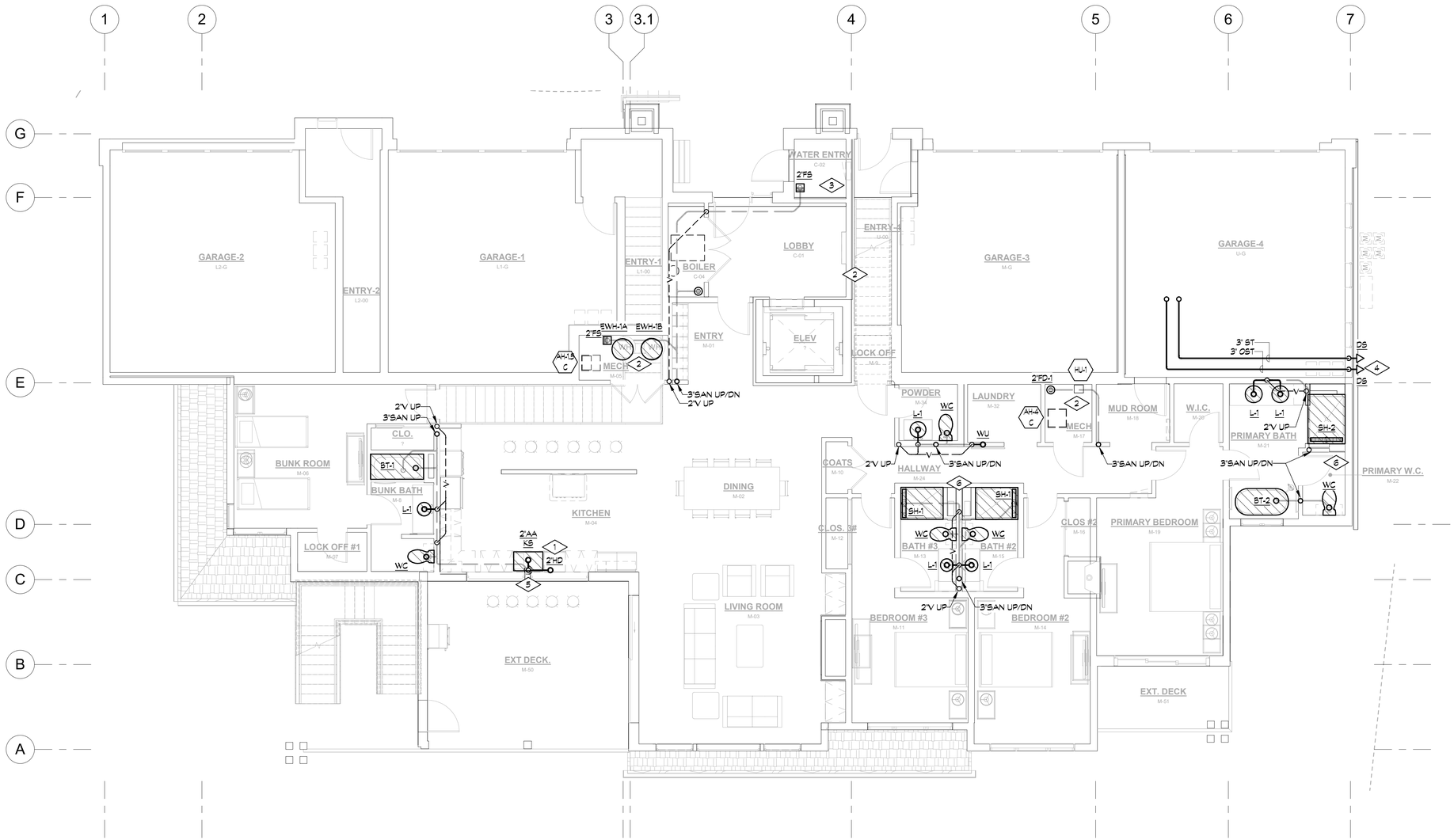
Sheet Title
LOWER LEVEL 2 PIPING PLAN

Sheet Number
P2.2

DETAIL NOTES THIS SHEET

1. ROUTE WASTE PIPING FROM DISHWASEHR TO 2"HD IN CASEWORK, CONNECT VIA 1" AIRGAP AND SECURE DISHWASHER DISCHARGE HOSE TO HUB DRAIN. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT VIA DISHWASHER KNOCK OUT ON GARBAGE DISPOSAL; COORDIANTE ACEPTANCE WITH OWNER. INSTALLATION OF DISHWASHER SHALL BE PER IPC 403.4.
2. ROUTE WASTE FROM MECHANICAL UNIT(S) AND/OR WATER HEATERS TO FLOOR DRAIN/SINK IN MECHANICAL CLOSET.
3. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
4. TERMINATE PRIMARY AND OVERFLOW ROOF DRAIN VIA ARCHITECTURAL LAMB'S TONGUE DOWNSPOUT IN APPROXIMATE AREA SHOWN; OVERFLOW TERMINATION TO BE HIGH ON BUILDING FOR IDENTIFICATION OF BLOCKED PRIMARY ROOF DRAIN. COORDINATE MOUNTING HEIGHT WITH G.C. AND ARCHITECT.
5. PROVIDE AIR ADMITTANCE VALVE UNDER SINK, SHOWN OFFSET IN WALL FOR CLARITY. RE: DIAGRAM FOR ADDITIONAL INFORMATION.
6. ROUTE STEAMER DRAIN TO HUB DRAIN IN WALL.



MAIN LEVEL SEWER PLAN
3/16" = 1'-0"

5/2/2024 2:50:31 PM

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PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-3456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
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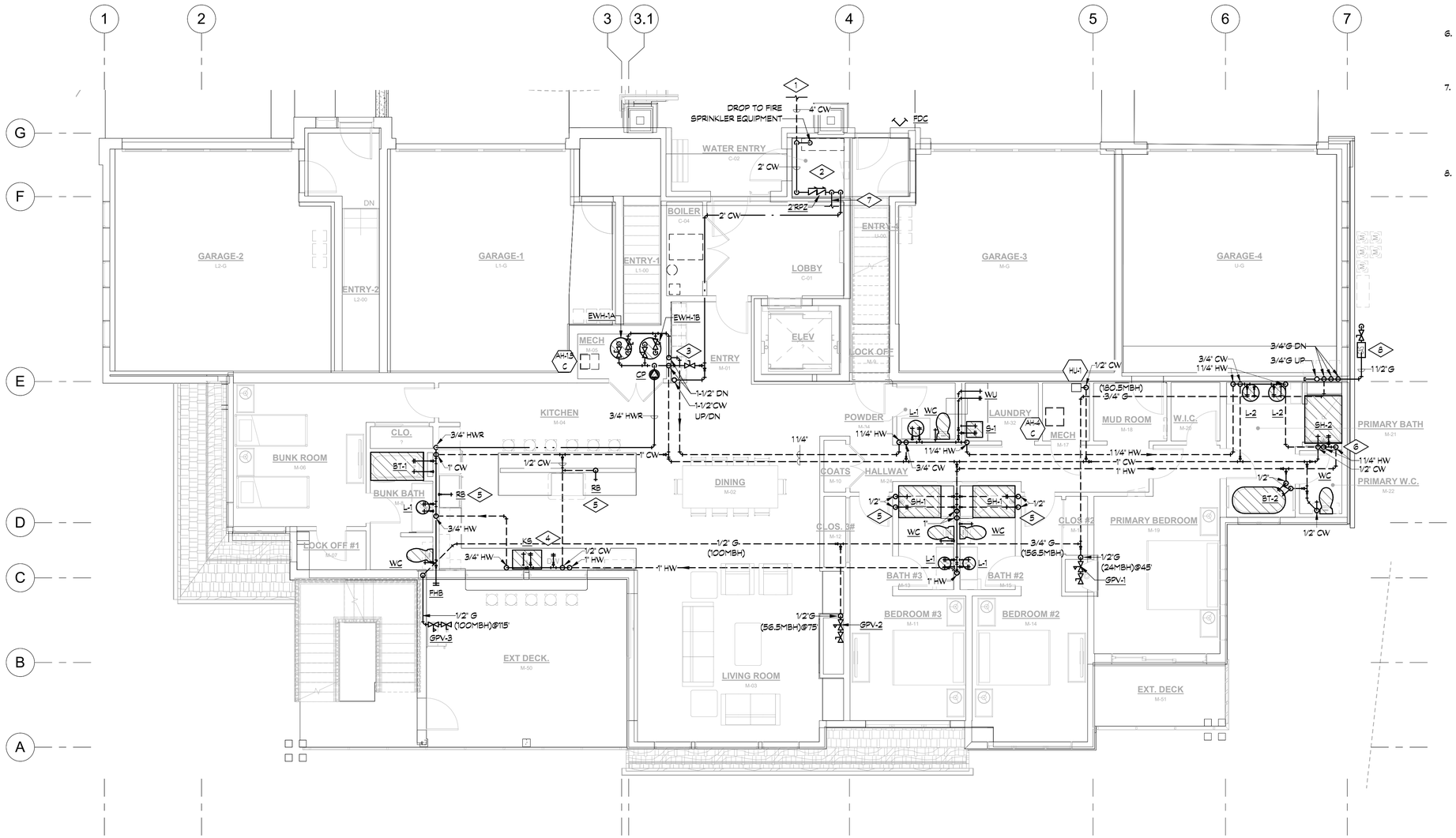
Sheet Title
MAIN LEVEL SEWER PLAN

Sheet Number
P3.1

DETAIL NOTES THIS SHEET

1. EXTEND AND CONNECT NEW COMBINED FIRE SPRINKLER AND DOMESTIC COLD WATER PIPING TO CIVIL POC. FIELD VERIFY EXACT LOCATION AND CONNECTION. BASIS OF DESIGN IS EXTERIOR METER PIT WITH 4" TAP/METER ASSEMBLY. RE: DIAGRAM FOR ADDITIONAL INFORMATION.
2. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
3. PROVIDE UNIT SHUTOFF IN APPROXIMATE LOCATION SHOWN PRIOR TO SUPPLY ANY FIXTURES ON THIS LEVEL; COORDINATE EXACT INSTALLATION LOCATION AND ACCESS WITH G.C. AND ARCH.
4. OFFSET 1/2" HW LINE FOR DISHWASHER CONNECTION, PROVIDE WITH DEDICATED ISOLATION VALVE W/SHOCK ARRESTOR. ROUTE INDIRECT WASTE FROM DISHWASHER TO 1-1/2" HUB DRAIN IN CASEWORK. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT TO FOOD WASTE DISPOSAL PER IPC 403.4, WHERE APPLICABLE.
5. WALLBOX FOR REFRIGERATOR ICE MAKER CONNECTIONS, PROVIDE WITH SHUTOFF VALVE AND SHOCK ARRESTOR. PROVIDE FIRE RATED ICE MAKER BOX WHERE LOCATED WITHIN FIRE RATED WALL; COORDINATE WITH ARCH. MAKE CONNECTION TO REFRIGERATOR PER MANUFACTURERS INSTRUCTIONS.
6. ROUTE 1/2" CW LINE TO STEAMER IN APPROXIMATE LOCATION SHOWN; COORDINATE ROUTING WITH G.C. AND ARCH. RE: MANUFACTURER'S INSRUCTIONS FOR CONNECTION DETAILS.
7. STUB OUT DOMESTIC COLD WATER LINE FOR IRRIGATION POINT OF CONNECTION. IRRIGATION CONTRACTOR TO PROVIDE CROSS CONNECTION DEVICE SUCH AS BACKFLOW ON EXTERIOR OF BUILDING. FIELD VERIFY AND COORDINATE EXACT LOCATION OF IRRIGATION STUB-OUT WITH CIVIL AND LANDSCAPE DESIGN. RE: DIAGRAM FOR ADDITIONAL INFORMATION.
8. COORDINATE WITH LOCAL UTILITY COMPANY FOR 14" WC GAS SERVICE. FIELD VERIFY EXACT METER BANK PLACEMENT WITH UTILITY PROVIDER; NOTIFY ENGINEER IF METER BANK IS RELOCATED FROM LOCATION SHOWN. REGULATORS MUST BE INSTALLED AT APPLIANCES PRIOR TO GAS BEING TURNED ON.



MAIN LEVEL PIPING PLAN
3/16" = 1'-0"

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-3456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
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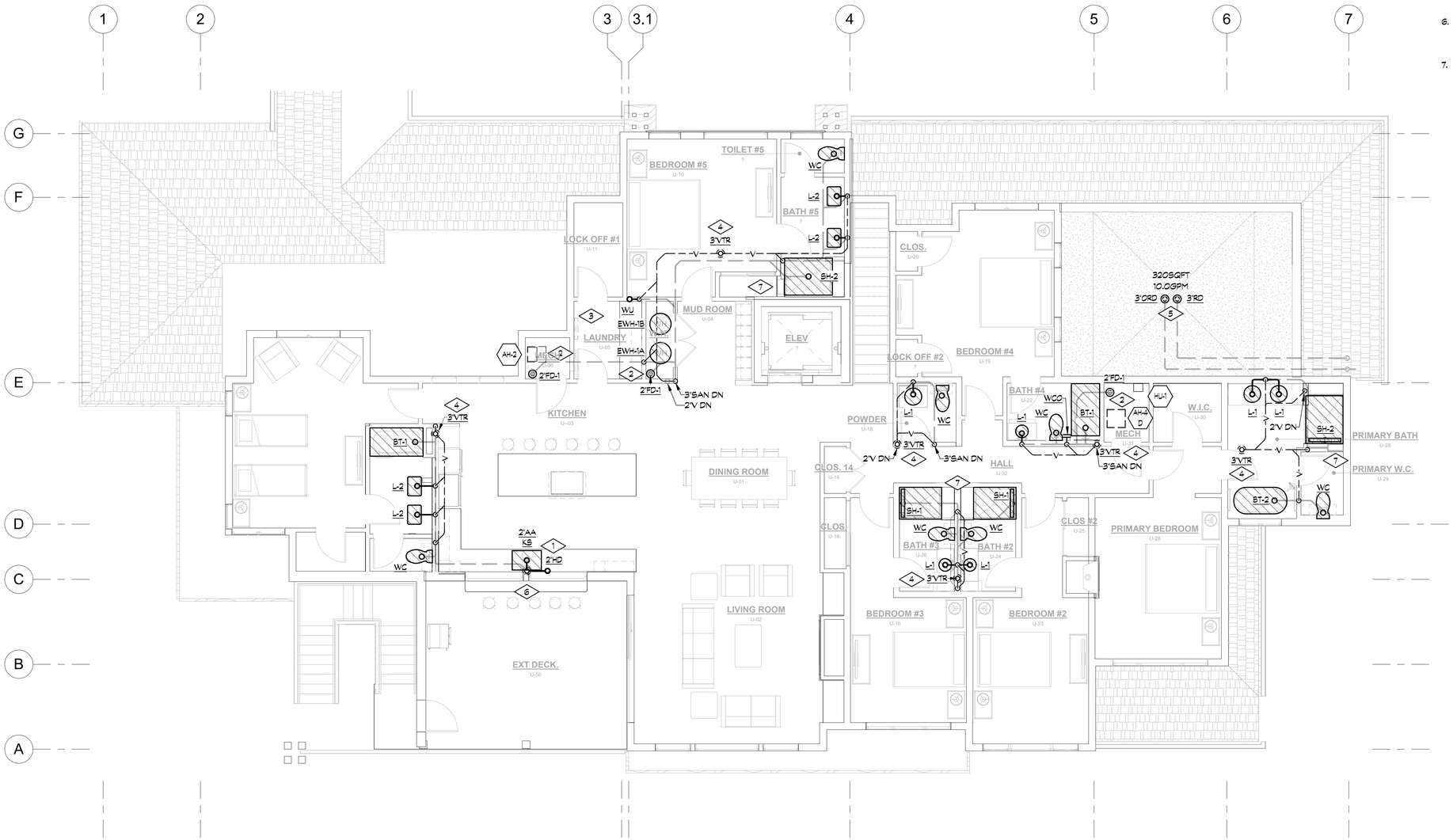
Sheet Title
MAIN LEVEL PIPING PLAN

Sheet Number
P3.2

5/2/2024 2:50:37 PM

DETAIL NOTES THIS SHEET

1. ROUTE WASTE PIPING FROM DISHWASEHR TO 2"HD IN CASEWORK, CONNECT VIA 1" AIRGAP AND SECURE DISHWASHER DISCHARGE HOSE TO HUB DRAIN. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT VIA DISHWASHER KNOCK OUT ON GARBAGE DISPOSAL; COORDIANTE ACEPTANCE WITH OWNER. INSTALLATION OF DISHWASHER SHALL BE PER IPC 409.4.
2. ROUTE WASTE FROM MECHANICAL UNIT(S) AND/OR WATER HEATERS TO FLOOR DRAIN/SINK IN MECHANICAL CLOSET.
3. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL. COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
4. 3" VTR IN APPROXIMATE LOCATION SHOWN, VTR TERMINATION TO BE A MINIMUM OF 10'0" FROM ANY BUILDING OPENING OR MECHANICAL EQUIPMENT AIR INTAKE. COORDINATE EXACT LOCATION AND ROOF PENETRATION WITH G.C.
5. TERMINATE OVERFLOW ROOF DRAIN VIA ARCHITECTURAL LAMB'S TONGUE DOWNSPOUT IN APPROXIMATE AREA SHOWN. COORDINATE MOUNTING HEIGHT WITH G.C. AND ARCHITECT. PROVIDE HEAT TRACE EXTENDING IN OVERFLOW VERTICAL STORM DRAIN RISER, COORDINATE DESIGN OF HEAT TRACE WITH E.C.
6. PROVIDE AIR ADMITTANCE VALVE UNDER SINK, SHOWN OFFSET IN WALL FOR CLARITY. RE: DIAGRAM FOR ADDITIONAL INFORMATION.
7. ROUTE STEAMER DRAIN TO HUB DRAIN IN WALL.



UPPER LEVEL SEWER PLAN
3/16" = 1'-0"

5/2/2024 2:50:42 PM

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PROFESSIONAL ENGINEER

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No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5455, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
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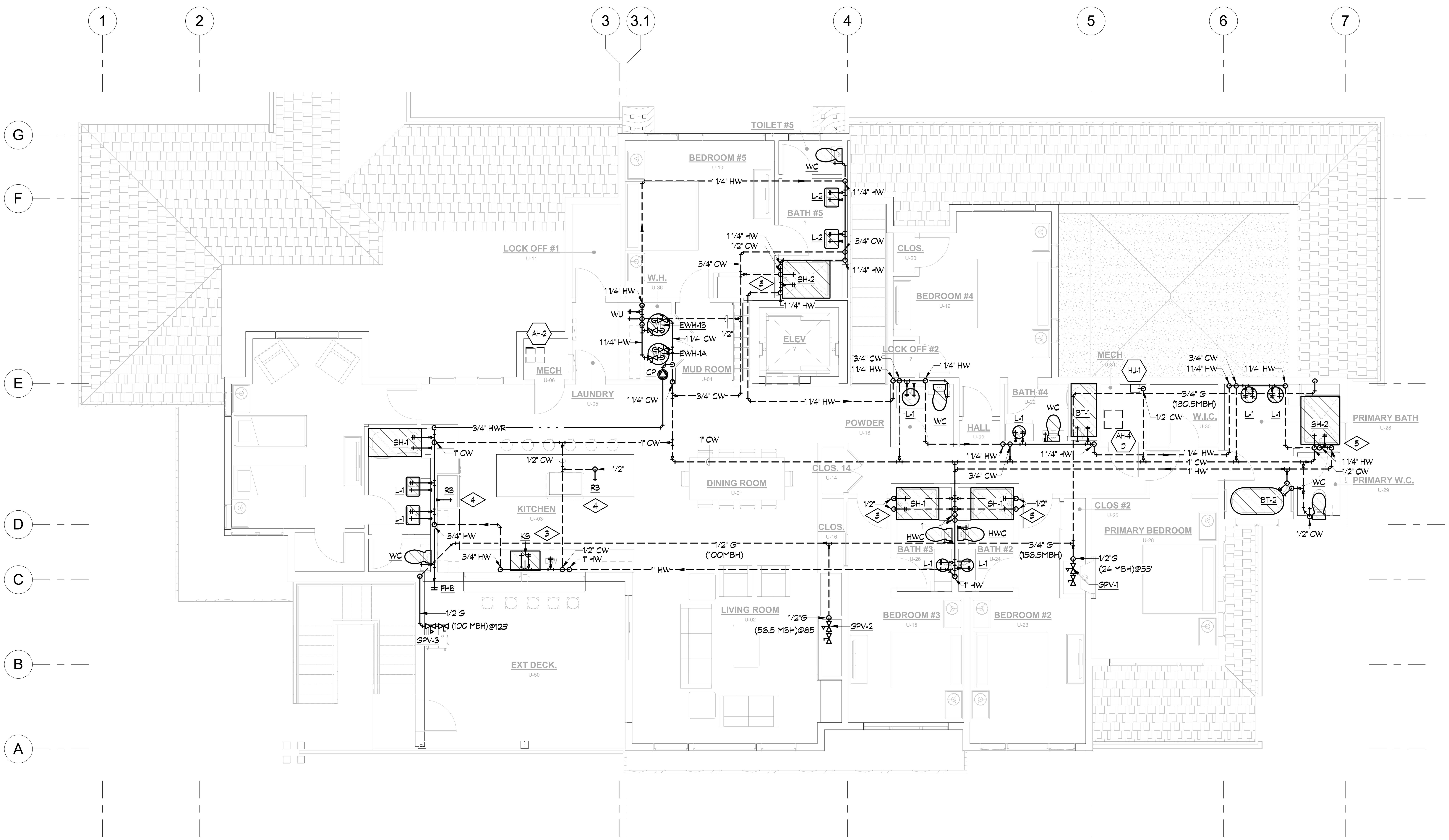
Sheet Title
UPPER LEVEL SEWER PLAN

Sheet Number
P4.1

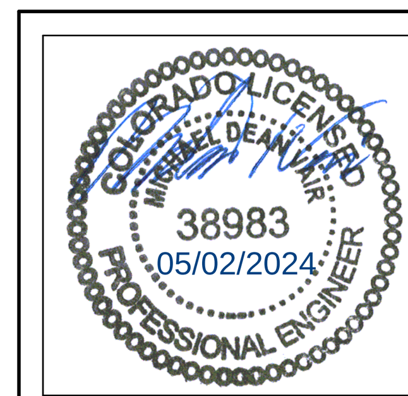
DETAIL NOTES THIS SHEET

1. NO PIPING SHALL BE ROUTED OVER ELECTRICAL PANEL, COORDINATE ALL PIPING ROUTING IN THIS AREA TO AVOID ELECTRICAL PANEL.
2. PROVIDE THERMOSTATIC BALANCING VALVE (CIRCUIT SOLVER CS-3/4-120) IN WALL UNDER SINK IN APPROXIMATE LOCATION SHOWN. COORDINATE ACCESS PANEL LOCATION WITH G.C. AND ARCHITECT. RE: DIAGRAM FOR ADDITIONAL INFORMATION.
3. OFFSET 1/2" HW LINE FOR DISHWASHER CONNECTION, PROVIDE WITH DEDICATED ISOLATION VALVE W/SHOCK ARRESTOR. ROUTE INDIRECT WASTE FROM DISHWASHER TO 1-1/2" HUB DRAIN IN CASEWORK. PROVIDE DEDUCT ALTERNATE PRICING TO CONNECT TO FOOD WASTE DISPOSAL PER IPC 409.4, WHERE APPLICABLE.
4. WALLBOX FOR REFRIGERATOR ICE MAKER CONNECTIONS, PROVIDE WITH SHUTOFF VALVE AND SHOCK ARRESTOR. PROVIDE FIRE RATED ICE MAKER BOX WHERE LOCATED WITHIN FIRE RATED WALL; COORDINATE WITH ARCH. MAKE CONNECTION TO REFRIGERATOR PER MANUFACTURER'S INSTRUCTIONS.
5. ROUTE 1/2" CW LINE TO STEAMER IN APPROXIMATE LOCATION SHOWN; COORDINATE ROUTING WITH G.C. AND ARCH. RE: MANUFACTURER'S INSRUCTIONS FOR CONNECTION DETAILS.



UPPER LEVEL PIPING PLAN

3/16" = 1'-0"



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Job Number:	23035-7
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Drawn By:	CK&SS
Checked By:	MV

Project Phase

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Sheet Title

UPPER LEVEL PIPING PLAN

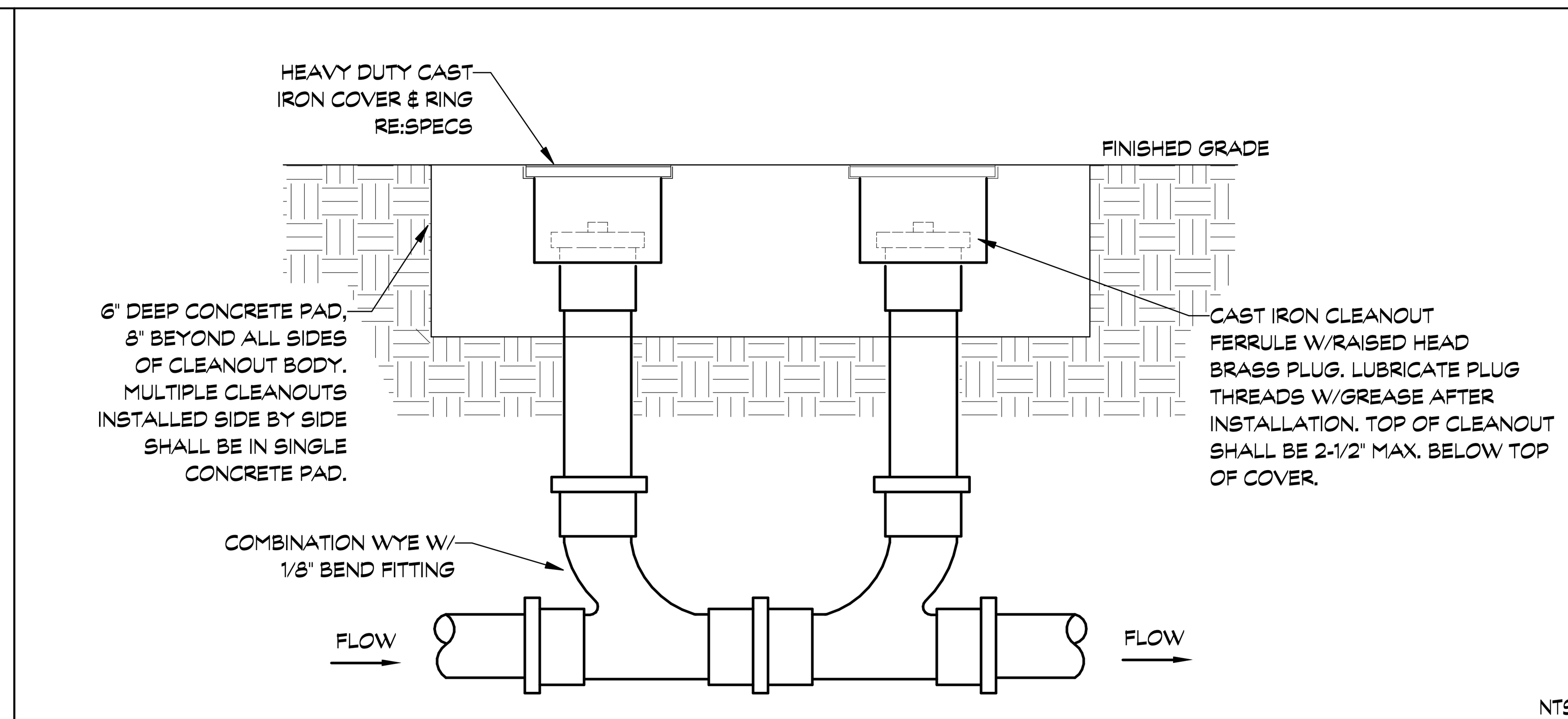
Sheet Number

P4.2

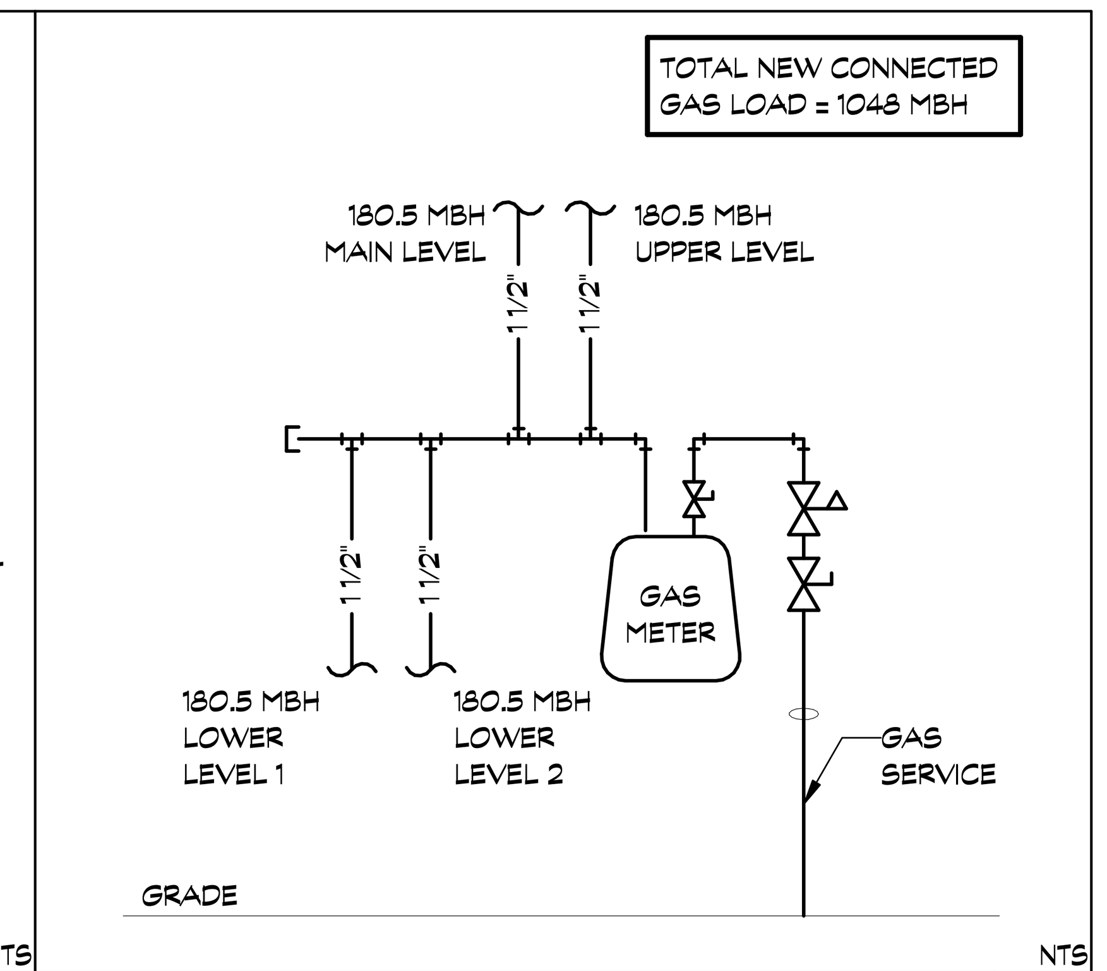
5/2/2024 2:50:47 PM

LEGEND

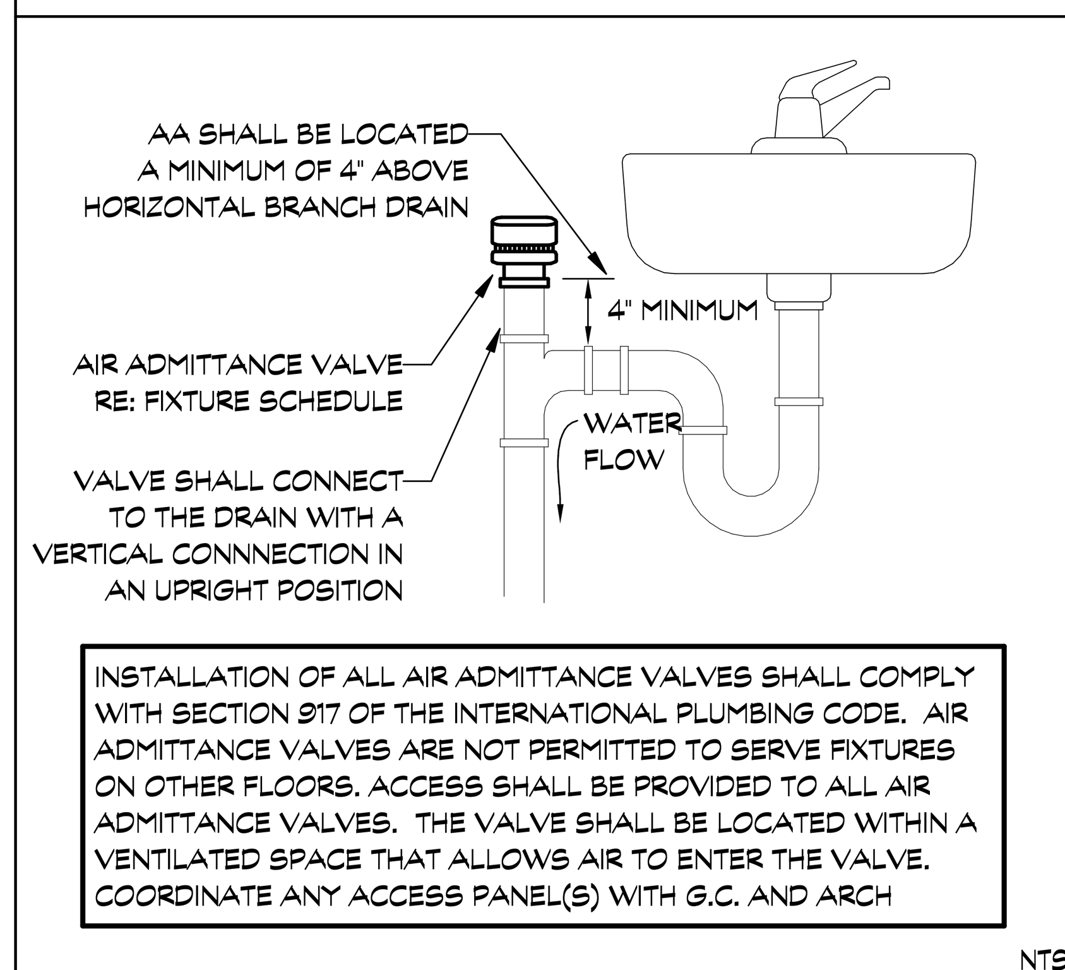
Symbol	Description
	STORM - ABOVE FLOOR
	STORM - BELOW FLOOR
	SANITARY - ABOVE FLOOR
	SANITARY - BELOW FLOOR
—GI—	SANITARY TO GREASE
—CV—	CIRCUIT VENT
—CW&V—	COMBINATION WASTE AND VENT
—WV—	WET VENT
—V—	SANITARY VENT
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOM. HOT WATER, RECIRCULATING
—G—	GAS
—FS—	FIRE SPRINKLER
—HWS—	HOT WATER SUPPLY
—HWR—	HOT WATER RETURN
—CWS—	CHILLED WATER SUPPLY
—CWR—	CHILLED WATER RETURN
—C—	CONDENSATE
—S—	STEAM
	PLUMBING POINT OF CONNECTION
	RISER UP
	RISER DOWN
	BALL VALVE
	BUTTERFLY VALVE
	GATE VALVE
	GAS COCK (GAS ONLY)
	BALANCING COCK
	CIRCUIT SETTER
	CHECK VALVE
	PRESSURE REDUCING VALVE
	HOSE BIBB/SILL COCK
	FLOOR DRAIN
	FLOOR SINK
	ROOF DRAIN
	UNION
	FLEXIBLE CONNECTOR
	THERMOMETER
	PRESSURE GAUGE
	STRAINER
	FIRE DEPARTMENT CONNECTION
	WATER METER
GAS	GAS METER
	MECHANICAL EQUIPMENT
	DETAIL NOTE
	KITCHEN / MEDICAL EQUIPMENT
—A—	COMPRESSED AIR
—VAC—	VACUUM
—O2—	OXYGEN
—N2—	NITROUS OXIDE
(E)	EXISTING TO REMAIN
(ER)	EXISTING TO BE REPLACED
(ED)	EXISTING TO BE DEMOLISHED
NC	NORMALLY CLOSED



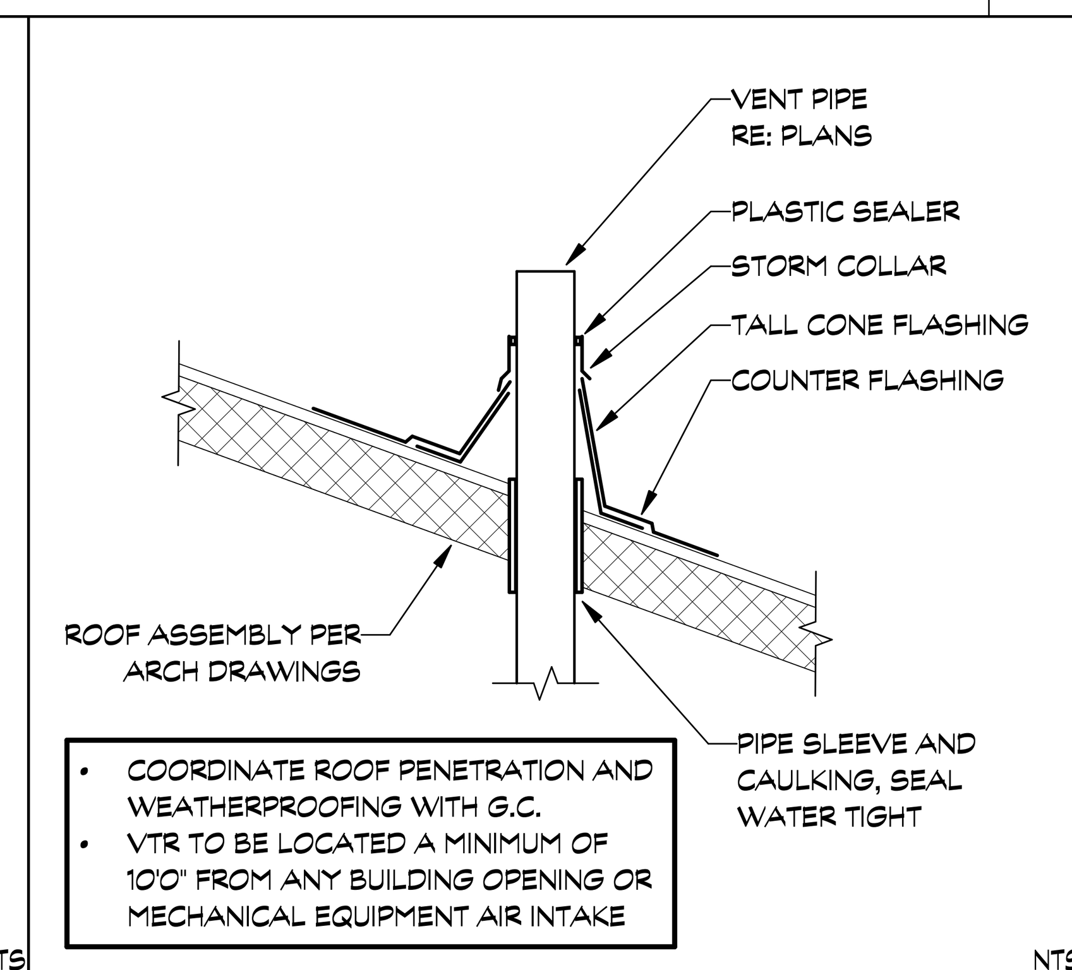
TWO-WAY CLEANOUT DIAGRAM 10



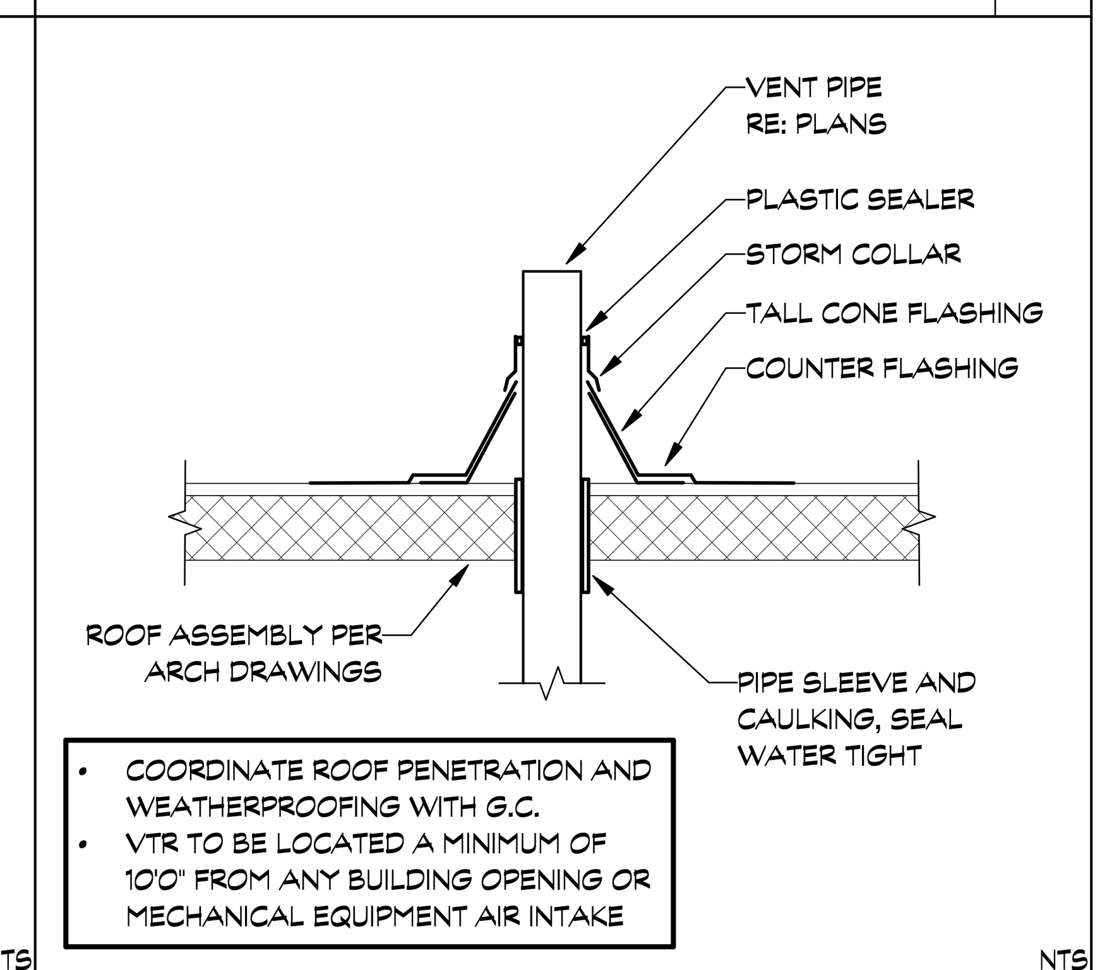
GAS MANIFOLD AND METER DIAGRAM 9



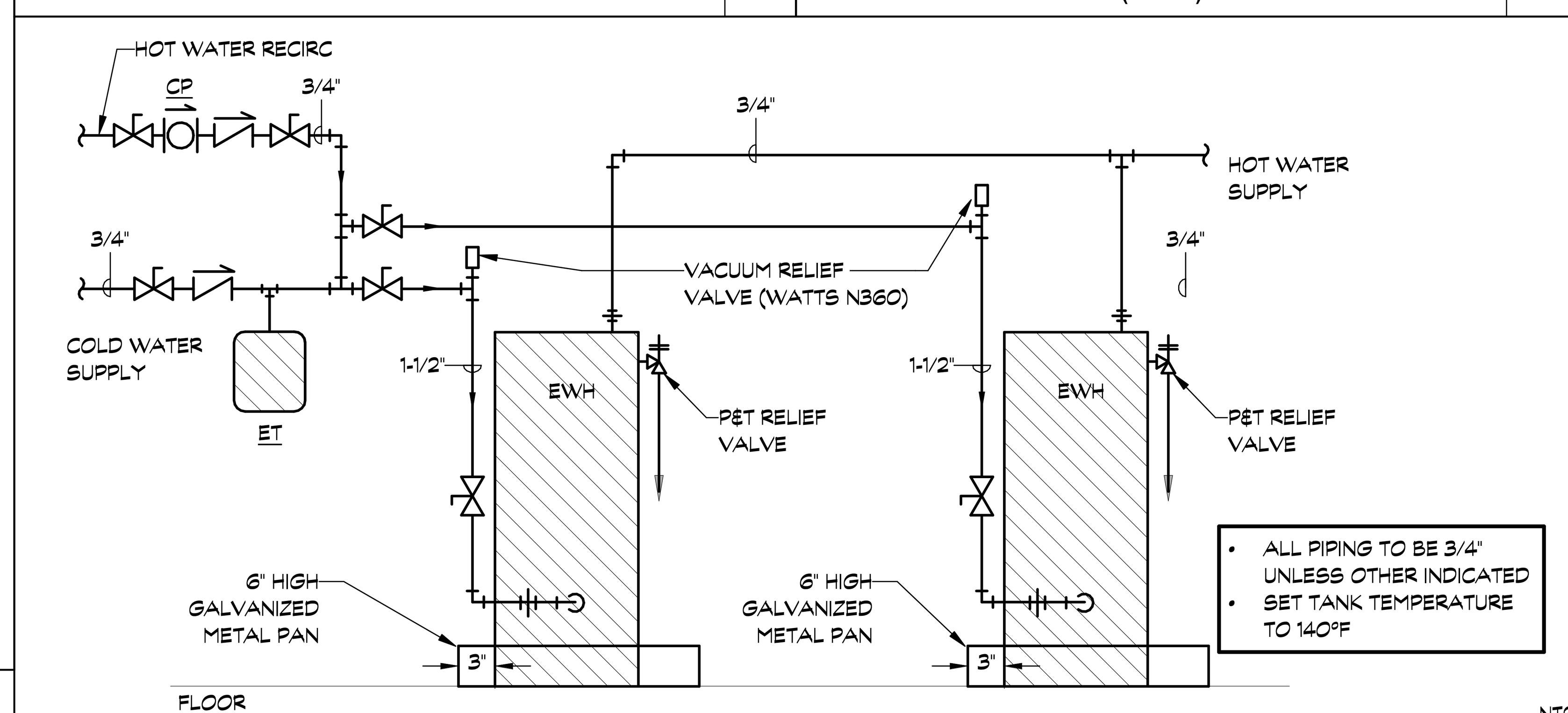
AIR ADMITTANCE VALVE DIAGRAM 8



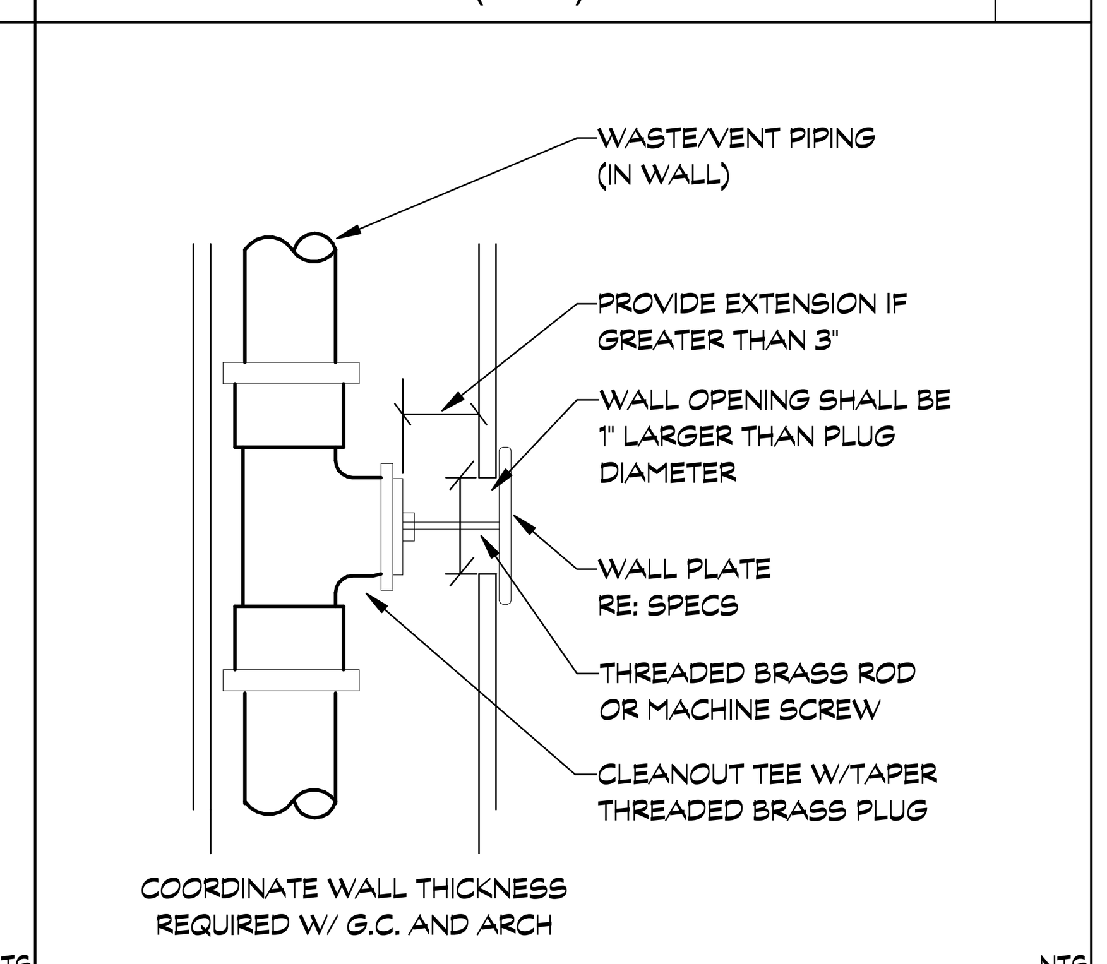
VENT THRU ROOF (VTR) DIAGRAM 7



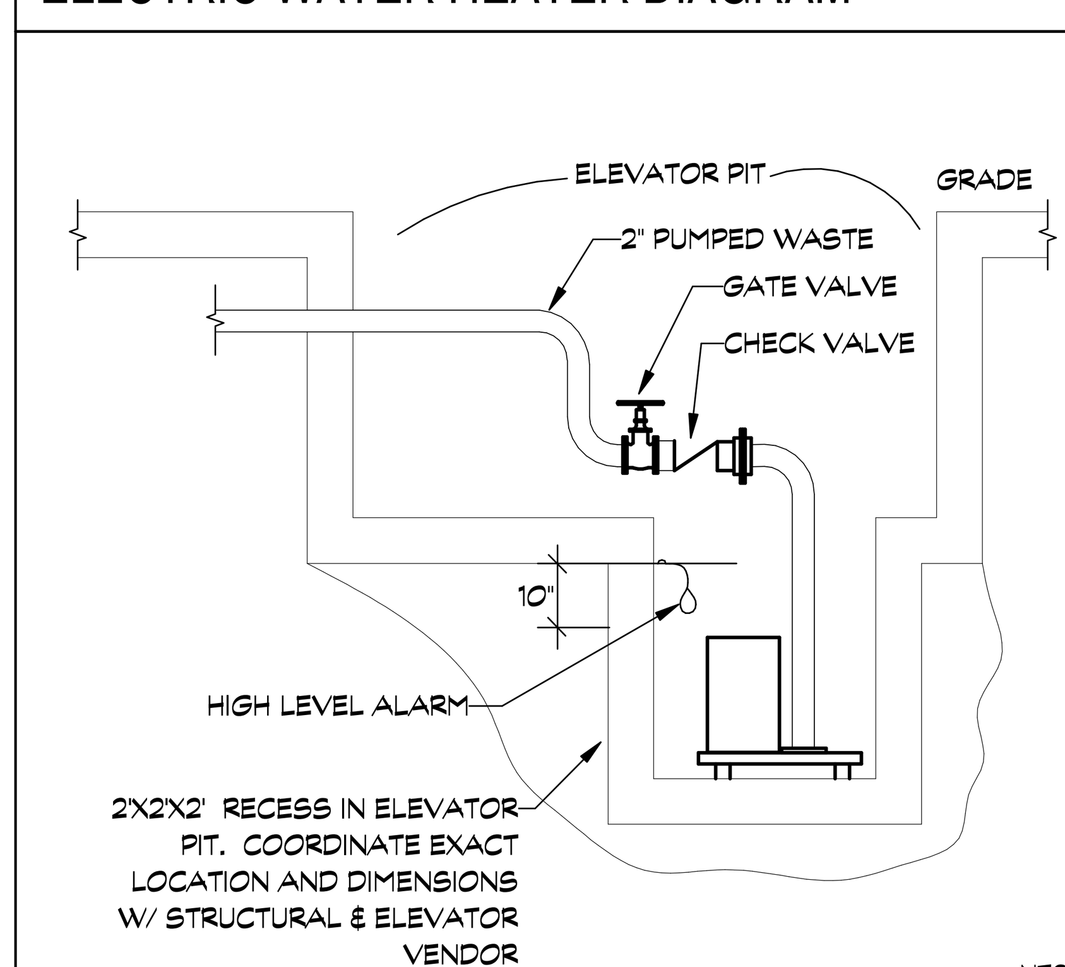
VENT THRU ROOF (VTR) DIAGRAM 6



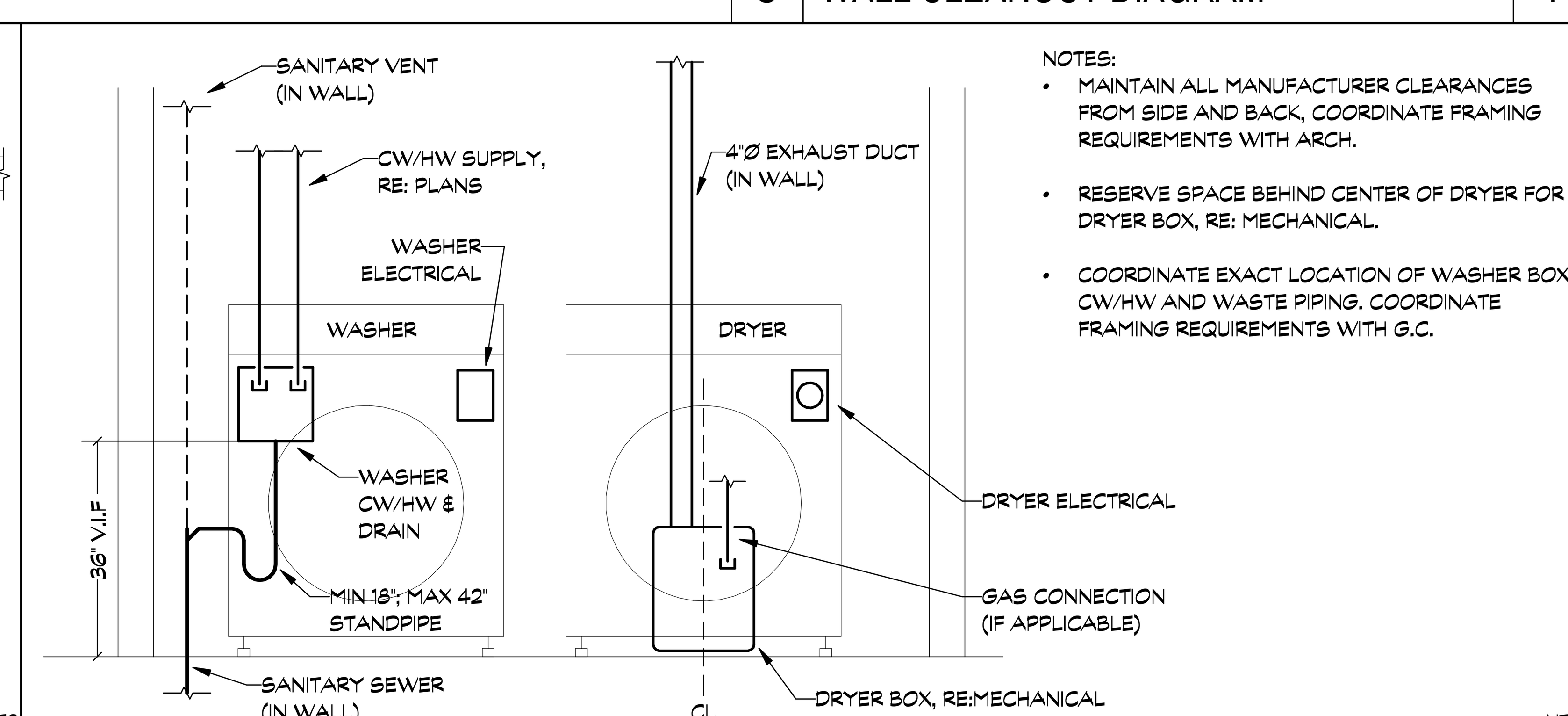
ELECTRIC WATER HEATER DIAGRAM 5



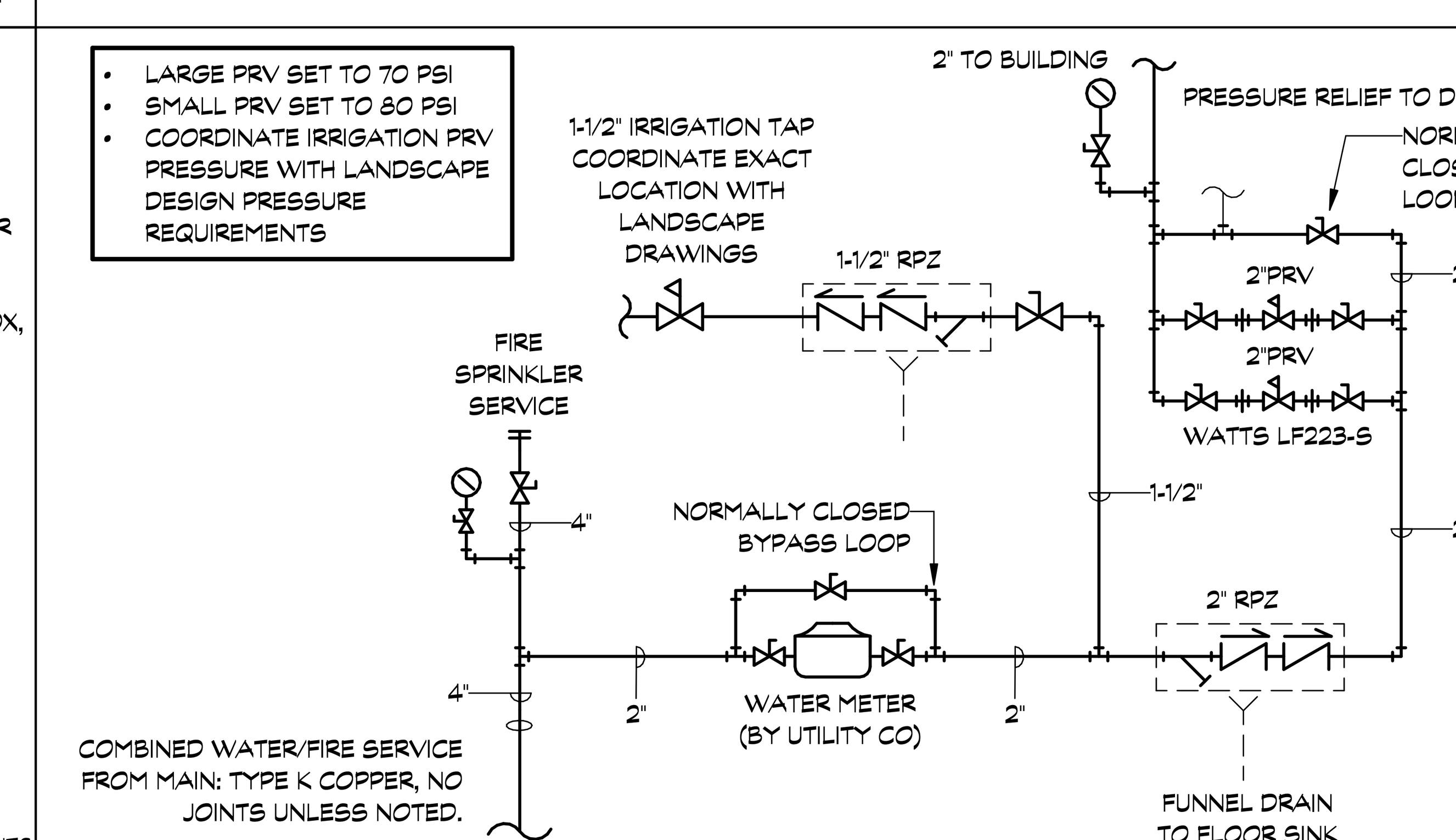
WALL CLEANOUT DIAGRAM 4



ELEVATOR SUMP PUMP DIAGRAM 3



WASHER/DRYER DIAGRAM (SIDE BY SIDE) 2

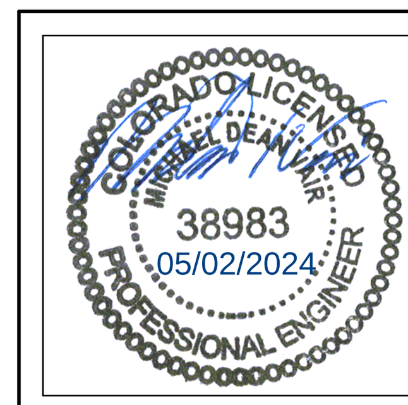


RPZ SIZE	RELIEF GPM	FD SIZE	CAP. GPM
3/4"	31	2"	55
1"	35	3"	112
1-1/2"	75	4"	170
2"	155	5"	350
3"	230	6"	450

COLD WATER PIPING DIAGRAM (COMBINED FIRE/WATER SERVICE)] 1

PLUMBING FIXTURE SCHEDULE

KEY	DESCRIPTION	FITTINGS/ACCESSORIES	MANUFACTURER/CATALOG #
WC	WATER CLOSET, TANK TYPE, FLOOR MOUNTED, TORNADO FLUSH, ELONGATED BOWL, 12" ROUGH-IN , 1.28 GPF, 16-1/8" RIM HEIGHT	ELONGATED FRONT BOWL AND SEAT	TOTO MS642124CEFG#01 VERIFY WITH INTERIOR DESIGNER
L-1	COUNTERTOP LAVATORY, OVAL, VITREOUS CHINA, 4" O.C. WHITE, SELF RIMMING	PERFORATED DRAIN, SINGLE-HANDLE FAUCET, POP-UP DRAIN ASSEMBLY WITH OVERFLOW, OFFSET TAILPIECE, INSULATED DRAIN PIPING	TOTO LT501.4 BRIZO 65175LF-GL BRIZO RO72313GL VERIFY WITH INTERIOR DESIGNER
L-2	UNDERMOUNT LAVATORY, RECTANGULAR, VITREOUS CHINA, 4" O.C. WHITE	PERFORATED DRAIN, SINGLE-HANDLE FAUCET, POP-UP DRAIN ASSEMBLY WITH OVERFLOW, OFFSET TAILPIECE, INSULATED DRAIN PIPING	SIGNATURE HARDWARE 447961 BRIZO 65175LF-GL BRIZO RO72313GL VERIFY WITH INTERIOR DESIGNER
KS	SINGLE COMPARTMENT KITCHEN SINK, UNDERMOUNT, 18 GA SST, 33" X 17-3/4" X 10-15/16"D, 3-1/2" DRAIN, 1/2 HP DISPOSAL, DISH MACH. AIR GAP ADA	8" SWIVEL GOOSENECK W/ WRIST BLADE LEVER, SINGLE DECK FAUCET, 1.8 GPM AERATOR, INSULATED DRAIN PIPING	KOHLER K-5540-NA ROHL R7520APC INSINKERATOR 333/SS VERIFY WITH INTERIOR DESIGNER
SH-1	SHOWER, CONTROLS LOCATED PER PLANS, WALLS AND CEILING BY G.C.; COORDINATE FINISH WITH OWNER/ARCHITECT, 1.5 GPM	ROUND MULTI-FUNCTION SHOWERHEAD, SINGLE LEVER HANDLE CONTROL, HANDLE KIT FOR THERMOSTATIC VALVE TRIM WITH INTEGRATED VOLUME CONTROL, 48" SITE SIZEABLE LINEAR DRAIN, 1-1/2" PERFORATED OFFSELT SLOT GRATE	BRIZO BSS-LITZE-T60235-02-GL BRIZO HL933-GL BRIZO HL6022-GL INFINITY DRAIN S-LT 3848 SB VERIFY WITH INTERIOR DESIGNER
SH-2	SHOWER, CONTROLS LOCATED PER PLANS, WALLS AND CEILING BY G.C.; COORDINATE FINISH WITH OWNER/ARCHITECT, 1.5 GPM	ROUND MULTI-FUNCTION SHOWERHEAD, SINGLE LEVER HANDLE CONTROL, HANDLE KIT FOR THERMOSTATIC VALVE TRIM WITH INTEGRATED VOLUME CONTROL, 48" SITE SIZEABLE LINEAR DRAIN, 1-1/2" PERFORATED OFFSELT SLOT GRATE	BRIZO BSS-LITZE-T60235-02-GL BRIZO HL933-GL BRIZO HL6022-GL INFINITY DRAIN S-LT 3848 SB VERIFY WITH INTERIOR DESIGNER
BT-1	BATHTUB, 60" X 32", THREE WALL ALVOCE SOAKING TUB, ACRYLIC, DRAIN SIDE PER PLANS, 1.75 GPM	ROUND MULTI-FUNCTION SHOWERHEAD, SINGLE LEVER HANDLE CONTROL, HANDLE KIT FOR THERMOSTATIC VALVE TRIM WITH INTEGRATED VOLUME CONTROL, 7-9/16" DIVERTER TUB SPOUT, PVC CABLE DRAIN AND OVERFLOW	SIGNATURE HARDWARE 447042 SIGNATURE HARDWARE 478497 BRIZO BSS-LITZE-T60235-02-GL BRIZO HL6022-GL BRIZ RP81437GL VERIFY WITH INTERIOR DESIGNER
BT-2	CORVARA 59" FREESTAND BATHTUB, VOLCANIC LIMESTONE, CENTER DRAIN, CONTROLS LOCATED PER PLANS, 1.75 GPM	FLOOR MOUNTED FUB FILLER W/ BUILT-IN DIVERTER, HAND-SHOWER HANDLE	VICTORIA AND ALBERT CORM-N-SM-NO BRIZO T70135-GLLHP VERIFY WITH INTERIOR DESIGNER
EWH-1A	ELECTRIC WATER HEATER, HYBRID HEAT PUMP, 5KW, 50 GAL CAPACITY, 27 GPH @ 90F, 3.88 UEF, FOAM INSULATION, 208/1	P&T RELIEF	RHEEM PROPH50 T2 RH375-SO
EWH-1B	ELECTRIC WATER HEATER, HYBRID HEAT PUMP, 5KW, 50 GAL CAPACITY, 27 GPH @ 90F, 3.88 UEF, FOAM INSULATION, 208/1	P&T RELIEF	RHEEM PROPH50 T2 RH375-SO
CP	DOMESTIC RECIRC PUMP, IN-LINE, BRONZE, 1/2" UNION CONNECTION, INTEGRAL CHECK VALVE, 25W, 120V/1; 0.5 GPM @ 4.25'H	AUTO TIMER KIT, LINE CORD, AQUASTAT	GRUNDFOS UP 10-16 BU/ATLC (COMFORT SERIES)
ET	DIAPHRAGM EXPANSION TANK, 3.2 GALLONS		AMTROL ST-8
WU	SUPPLY & DRAIN UNIT FOR AUTOMATIC WASHER TOP OR BOTTOM SUPPLY AS REQUIRED	INLINE HOSE WATER HAMMER ARRESTOR	SIOUX CHIEF 696-2313WF
FD-1	FLOOR DRAIN, ADJUSTABLE CAST IRON SUMP	ROUND NIKALOY STRAINER, INLINE TRAP SEAL	JOSAM 30000A SURE SEAL
FS	FLOOR SINK, PORCELAIN ENAMELLED, 12"x12"x8"	HALF GRATE, CHLORALLOY MEMBRANE (EXCEPT IN SLAB ON GRADE)	JOSAM 49340A SURE SEAL
AA	AIR ADMITANCE VALVE	LOCATE UNDER SINK	STUDOR VENT MINI-VENT
HD	HUB DRAIN, FUNNEL INLET, CAST IRON	CAST IRON P TRAP	
WCO	WALL CLEANOUT	STAINLESS STEEL ACCESS COVER (JOSAM 58600)	JOSAM 58910-19
FHB	FREEZE PROOF HOSE BIBB, METAL HANDLE	VACUUM BREAKER	WOODFORD MODEL 25
SP-1	SUBMERSIBLE SUMP PUMP BASIN, DIAPHRAGM SWITCH, 50 GPM @ 20' HEAD, SIMPLEX 0.5 HP, 120V, 1 PH, 3450 RPM	PANEL & HIGH LEVEL ALARM, GATE & CHECK VALVES	WEIL A432-0S9-SNNN (ELEVATOR)
GPV-1	GAS PRESSURE REDUCING VALVE, 14" W.C.I INLET, SET TO 10" W.C. MAX SINGLE APPLIANCE - 30MBH	VENT LIMITER(INTEGRAL "L") IF INSTALED INDOORS.	MAXITROL RV-12
GPV-2	GAS PRESSURE REDUCING VALVE, 14" W.C.I INLET, SET TO 10" W.C. MAX SINGLE APPLIANCE - 65MBH	VENT LIMITER(INTEGRAL "L") IF INSTALED INDOORS.	MAXITROL RV-20
GPV-3	GAS PRESSURE REDUCING VALVE, 14" W.C.I INLET, SET TO 10" W.C. MAX SINGLE APPLIANCE - 125MBH	VENT LIMITER(INTEGRAL "L") IF INSTALED INDOORS.	MAXITROL RV-47
GPV-4	GAS PRESSURE REDUCING VALVE, 14" W.C.I INLET, SET TO 10" W.C. MAX SINGLE APPLIANCE - 400MBH	VENT LIMITER(12A04) IF INSTALED INDOORS.	MAXITROL RV-48C
NOTES:	PC IS RESPONSIBLE FOR ALL ANCILLARY EQUIPMENT AND FITTINGS (STOPS, FLEXIBLE TUBING, ESCUCHEONS, ETC.) NEEDED TO CONNECT FIXTURES		



NOTICE: DUTY OF COOPERATION

REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
PERMIT

Sheet Title
PLUMBING DETAILS & SCHEDULES

Sheet Number
P6.1

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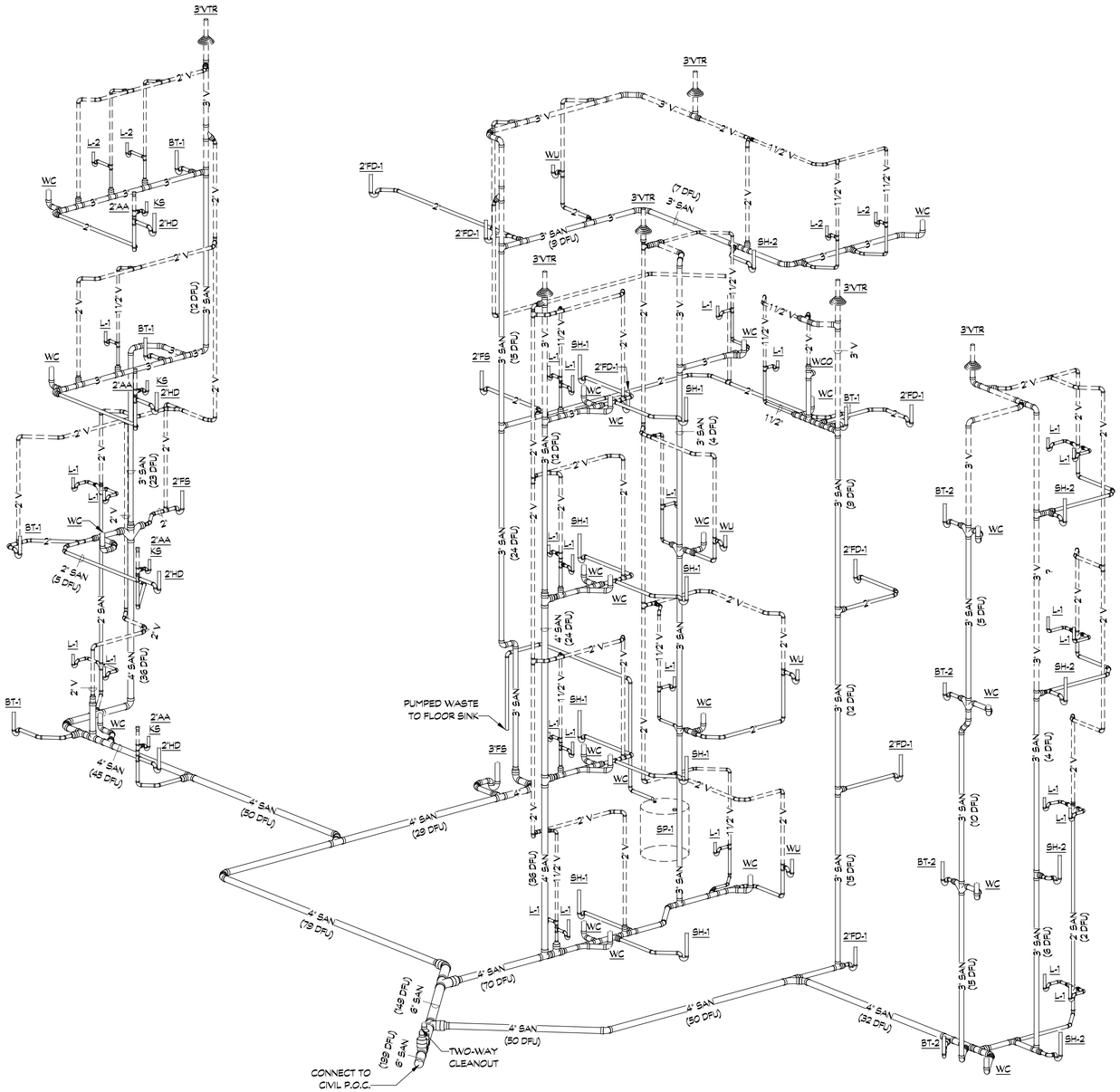

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OVERALL DWV DIAGRAM | 1

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COLORADO LICENSED
MICHAEL DEAN VIVIAN
38983
05/02/2024
PROFESSIONAL ENGINEER

NOTICE: DUTY OF COOPERATION

Release of these plans contemplates further cooperation among the owner, his contractor and the architect. Design and construction are complex. Although the architect and his consultants have performed their services with due care and diligence, they cannot guarantee perfection. Communication is imperfect and every contingency cannot be anticipated. Any ambiguity or discrepancy discovered by the use of these plans shall be reported immediately to the architect. Failure to notify the architect compounds misunderstanding and increases construction costs. A failure to cooperate by a simple notice to the architect shall relieve the architect from responsibility for the consequences. Changes made from the plans without consent of the architect are unauthorized and shall relieve the architect of responsibility for all consequences arriving out of such changes.

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
PERMIT

Sheet Title
OVERALL DWV ISOMETRIC

Sheet Number
P6.2

DIVISION 21 - FIRE SUPPRESSION

SECTION 21 00 00 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

1.01 WORK INCLUDED

A. The work included by this division of the specifications includes furnishing all labor, materials, equipment, and services, including minor items omitted but necessary to construct and install the complete systems described by the Contract Documents and specified below. "Contractor" refers to the Fire Sprinkler Contractor. The general conditions of the specifications apply and are included in this part of this section.
   1. Fire sprinkler systems

1.02 SEE SECTION 22 05 00 FOR BASIC MATERIALS AND METHODS

SECTION 21 13 00 - FIRE SUPPRESSION SPRINKLER SYSTEM

2.01 WORK INCLUDED

A. Provide complete automatic fire protection systems, including but not limited to inside piping, sprinkler heads, valves, hangers and supports, sleeves, fire department connections and accessories, fire hose cabinets, valves. Entire installation shall be as required by the local authorities. Consult with local authorities to determine all local requirements before submitting a bid.
   1. The sprinkler system(s) shall be as follows: Wet system throughout. Type 13R
B. Secure and pay for all necessary permits and certificates of inspection, and present to Owner with the signed certificates of final inspection.
C. Coordinate this work with all other trades so as to have a minimum of interference. INSTALLATION SHALL NOT BEGIN UNTIL DUCTWORK IS INSTALLED OR WRITTEN AUTHORIZATION IS MADE BY THE OWNER.
D. Accomplish all necessary cutting and patching for installation of piping and equipment, and provide all cutting as directed by Architect. Where necessary to cut chases in walls, reinforce walls as directed. After work is installed, patch holes to match original finish.
E. The system design including pipe sizing and location, configuration of branches and head connections, shall accommodate the installation of up/down heads in all areas which may or may not have a dropped ceiling.
F. RELATED WORK: Basic materials and methods: Section 22 05 00.

2.02 QUALITY ASSURANCE

A. Sprinkler equipment and installation to be approved by local fire authority.
B. Provide a complete automatic fire protection system as required. System shall be complete in all respects and in accordance with all applicable codes, ordinances, International Building Code, and NFPA Volume 2, Section 13 and NFPA Volume 2, Section 14.
C. The system shall be installed by a firm regularly engaged in the design and installation of automatic sprinkler systems in accordance with the requirements of the National Board of Fire Underwriters. Architect may require evidence to support the above qualifications and may reject any proposed installer who cannot show suitable experience.
D. All materials and equipment used in the installation of the sprinkler system shall be as approved in the Underwriters' Laboratories' list of inspected fire protection equipment and materials, or the Factory Mutual Laboratories' list of approved equipment and fire protection devices involving fire hazard, and shall be the latest product of the manufacturer.

2.03 SUBMITTALS

A. Submit shop drawings showing proposed layout of Fire Protection System, showing actual equipment to be used, complete with such dimensions as are required to accurately install the system, drawn to a minimum scale of 1/8" equals 1'0". Drawings shall be approved by Underwriters and local authority before submission to Architect and Engineer (four copies).
B. Shop drawings shall show all proposed routing of piping. Piping shall be installed to clear all other items of equipment and Architectural and Structural components within the building. Show all details required to make a complete installation from the shop drawings. After approval of drawings has been obtained, install the system exactly as shown. Obtain approval from Architect/Engineer to make any changes from shop drawings.
C. Shop drawings shall clearly show any piping that will not be concealed in the building structure

3.01 ACCEPTABLE MANUFACTURER'S

A. Equipment shall be by Grinnell, Viking, Star, Reliable, Globe, Crocker-Standards, Central, Potter-Roemer, or approved substitute.

3.02 INTERIOR FIRE SERVICE PLUMBING

A. Pipe shall be schedule 40, black seamless steel, ASTM A120, ASTM 53. Pipe 2" or larger may be schedule 10, grooved black steel pipe. Fittings may be style 74 or 75 "Victaulic" mechanical coupling system for 300 PSI working pressure.
B. Fittings and joints shall be as follows:
   1. 2" and larger : Welded with standard weight fittings or "Victaulic" fittings.
   2. 1-1/2" and smaller : Screwed with 150 lb. malleable iron fittings.

3.03 FIRE DEPARTMENT SIAMESE CONNECTION

A. Provide a cast brass flush wall mounted fire department connection, adequately sized for the application with threads, fittings, etc acceptable to the local fire department. Connection shall include drop clapper, pin lug hose thread swivels, pin lug plugs and chain. The connection shall be labelled as directed by the local Fire Department. All components shall be chrome-plated.

3.04 WATER FLOW ALARMS

A. Water flow indicator shall be electric, vane-type detector with two sets of normally open contacts and a time retard to prevent false alarms.

3.05 AUTOMATIC SPRINKLERS

A. Sprinklers shall have temperature ratings as required by NFPA Standard No. 13 for the sprinkler location. Verify exact head types in finished areas with Architect. Provide specific head types as follows. The following are catalog numbers of Grinnell.
   1. Finished areas (ceiling): Semi-recessed, polished chrome pendant heads. Heads shall be Model A with recessed closure.
   2. Finished areas (wall):Exposed sidewall (Universal Model A).
   3. Unfinished areas (ceiling): Exposed pendant or upright head, as required by the application (Universal Model A).
   4. Areas exposed to freezing temperatures: Dry pendant (Model F 960).
B. Provide steel sprinkler guards on heads, which are exposed to physical damage.

3.06 TAMPER SWITCH

A. Provide an electric supervisory monitor switch at the required valves. Grinnell Model F640 or as required.

3.07 HORN/LIGHT

A. Provide an electric combination horn/light, suitable for exterior application, rated for the appropriate voltage.

3.08 PIPING INSTALLATION

A. All piping shall be concealed wherever possible. Exceptions must be clearly marked on shop drawings and shall not be installed until approved by Architect.
B. If exposed, piping shall be installed in the most direct, straight, and least obtrusive manner possible, and as close to walls and ceilings as is consistent with good workmanship.
C. Install piping graded to low points and in manner to make it possible to test and empty entire system.
D. Pipe and fittings shall be inspected for soundness and cleaned of all dirt and other foreign matter prior to being installed. All damaged pipe and fittings shall be rejected. Heads shall be covered, and system shall be ready for painting.
E. Protect open pipe ends whenever work is suspended during construction, to prevent foreign bodies entering and lodging therein. Use cast iron or malleable iron caps, or other methods as approved by the Architect

3.09 VALVE IDENTIFICATION

A. Drain valves, test valves, and control valves shall be identified with a stamped metal tag indicating their use.

3.10 TESTING

A. A 1" inspector's test connection shall be installed at the farthest and most remote location in the system with discharge running to the exterior of the building.
B. All piping and equipment shall be tested and proved tight under a hydrostatic pressure of 150% of the main pressure or 200 psig, whichever is larger. The test shall be conducted for a six-hour continuous period, with not be more than 2 pounds of pressure loss during this period in any part of the system. Any leaks found shall be repaired and the pressure test repeated.
C. All tests shall be performed in the presence of the Architect or authorized representative of the Owner.

3.11 FLUSHING

A. Flush piping system thoroughly with clear water to placing automatic sprinkler system in operation.

3.12 SPRINKLER CABINET

A. Provide a reserve sprinkler cabinet with at least six spare sprinkler heads or a minimum of two of each type used for systems with less than 300 heads total. Cabinet shall be equipped with two special sprinkler wrenches. Cabinet shall be a labeled, metal, wall-mounted type with red enamel finish and a rigid hinged and locked door. Two keys shall be provided.

DIVISION 22 - PLUMBING

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

1.01 WORK INCLUDED

A. The work included by this division of the specifications includes furnishing all labor, materials, equipment, and services, including minor items omitted but necessary to construct and install the complete systems described by the Contract Documents and specified below. "Contractor" refers to the Mechanical Contractor. The general conditions of the specifications apply and are included in this part of this section.
   1. Gas piping system
   2. Domestic hot and cold water systems
   3. Interior sanitary sewer system
   4. Interior storm sewer system and discharge

1.02 CODES AND REGULATIONS

A. Comply with state and local codes, and utility company regulations. Final interpretations will be made by the local inspection authority. The Contractor to verify the governance of the following Codes, including any local amendments and supplementary codes such as the Codes of the National Fire Protection Association:
   1. Building Code: 2021 International Building Code
   2. Plumbing Code: 2021 International Plumbing Code
   3. Mechanical Code: 2021 International Mechanical Code
   4. Fire Code: 2021 International Fire Code
   5. Gas Code: 2021 International Fuel Gas Code
   6. Energy Code: 2021 International Energy Conservation Code
   7. Electrical Code 2023 National Electrical Code

1.03 EQUIPMENT AND MATERIALS STANDARDS

A. Equipment and materials shall be new, UL-listed for the use intended, and free from damage or defect. They shall comply with the latest industry standards.

1.04 CONTRACT DRAWINGS

A. Illustrate the general design and extent of performance required. All dimensions and locations shall be taken from the Architectural drawings. Consult with Architectural plans and locate all ceiling equipment where indicated on reflected ceiling plans

1.05 SHOP DRAWINGS

A. Submit products data and/or shop drawings as required by the Architect for the following:
   1. Insulation
   2. Valves
   3. Plumbing fixtures and appurtenances.
   4. Pumps
B. Quality of specific equipment is established by manufacturer's catalog number. Alterations caused by any Substitution shall be accomplished at no additional expense to the Owner.
C. Manufacturers not listed may submit for acceptance as an "approved equivalent." Requests for an "equivalent" means "approved equivalent". Four copies of such submittal must be received by the Engineer seven (7) working days prior to bid date.

1.06 WARRANTY

A. The Contractor shall be responsible for the successful operation of mechanical systems, equipment, and materials installed under this Contract for a period of one year from the date of final acceptance. Defective equipment or materials shall be repaired or replaced at no expense to the Owner. Provide four complete service and maintenance calls spaced at equal intervals during the warranty period.

1.07 PRODUCT HANDLING AND CLEAN UP

A. Equipment shall be left clean and undamaged, to the satisfaction of the Owner. The General Conditions take precedence.

1.08 CUTTING AND REPAIRING

A. The contractor shall be responsible for all cutting, drilling, welding, and repair required for his portion of the work. Coordinate with the Architect. The General Conditions take precedence.

1.09 OPERATING AND MAINTENANCE DATA

A. Provide the Owner with operating and maintenance instructions (four copies) required for operation of all mechanical systems. Bind the written instructions in a notebook. The General Conditions take precedence. The manuals shall include the following items:
   1. Operating manual and spare parts list for each piece of equipment.
   2. Preventive maintenance schedule for lubricating and checking each piece of equipment.
   3. Instructions on who to call for service during the warranty period.

1.10 PERMITS

A. The contractor shall pay for all fees, taxes, secure permits, licenses, and inspections required for the project.

1.11 TEMPORARY SERVICES

A. Provide temporary water service for construction, as required by the General Contractor.

1.12 COORDINATION

A. Coordinate outlet device and equipment locations with the Architectural Plans and work of other trades. Locate on horizontal and vertical lines to avoid interference and to provide functional use of all equipment. Verify electrical power characteristics before ordering equipment.
B. Electrical work performed by this contractor will conform to the standards of Division 26-28. Mechanical equipment motors and controls shall be furnished, set in place, and wired according with the following schedule unless otherwise noted or specified. MC = Division 21-23 EC = Division 26-28

Item	Furn By	Set By	Power Wiring	Control Wiring
Combination starters	MC	EC	EC	MC
Equipment motors	MC	MC	EC	--
Motor starters & O.L. relays	MC	EC	EC	MC
Disconnect switches	EC	EC	EC	MC
Thermal overload heaters (1)	EC	EC	EC	--
Variable Speed Drives	MC	EC	EC	MC
Control relays/transformers	MC	MC	EC	MC
Temperature control panels	MC	MC	EC	MC
Temp. Controls conduit/wiring	MC	MC	--	MC
Actuator and solenoid wiring	MC	MC	--	MC
Pushbuttons & pilot lights	MC	MC	--	MC
Room thermostats	MC	MC	--	MC
Thermostats: line voltage	EC	EC	EC	--

C. The general guideline for the division between control (by MC) wiring and power wiring (by EC) is that power wiring carries the current which energizes a motor, control wiring does not. Control wiring may be 120V, which would be the responsibility of the MC. Control motors are wired by the MC.
D. Examine the site and become aware of existing conditions, utilities, and other issues affecting the satisfactory completion of the project.

1.13 DELIVERY, STORAGE, HANDLING

A. Provide necessary hauling and hoisting equipment. Protect the materials of this Division before, during, and after installation.

1.14 AS-BUILT DRAWINGS

A. Keep a current set of "as-built" drawings on site. Upon completion of the work, furnish engineer with a reproducible prints showing the "as-built" installation.

1.15 PROJECT/SITE CONDITIONS

A. Visit the site to become familiar with location and the various conditions affecting the work, including existing utilities.

1.16 PLAN VERIFICATION

A. After completion of the bidding and selection process, prior to awarding the contract, the contractor must review and verify the contract documents in their entirety, including those of other trades. At this time, discrepancies, conflicts, omissions, etc in the contract documents must be documented. Alterations to the contract will be made at that time to include such items, as well other modifications which might be made by the Owner. After award of the contract, change orders caused by discrepancies, conflicts, omissions in the contract documents will not be allowed.

2.01 EXPANSION JOINTS, GUIDES, AND ANCHORS

A. Provide expansion joints or loops, guides, and anchors in piping to allow for expansion and contractions. Expansion joints shall be bellows type.

2.02 VALVES

A. Gate valves 2" and smaller shall be cast bronze, rising stem, solid disc, 200 PSI WOG
B. Ball valves 2" and smaller shall be cast bronze, full port, stainless steel ball, teflon sets, 400 PSI WOG.
C. Butterfly valves 2" and smaller shall be cast bronze, stainless steel disc, surrounding fluorelastomer seal, 350 PSI WOG.
D. Check valves shall be horizontal, swing-cast bronze, bronze disc, 200 PSI WOG.
E. Valves shall be domestically manufactured by Milwaukee, Powell, Nibco, or equivalent.

2.03 RELIEF VALVES

A. Relief valves shall be all-bronze A.S.M.E. rated valves with external test levers, sized in accordance with the instructions of the appropriate manufacturer. Pipe discharge outside or to floor drain where possible and per code. Valves shall be manufactured by Watts or equivalent.

2.04 FLEXIBLE CONNECTORS

A. Connectors in piping shall be made with molded teflon or neoprene and nylon bellows, metal reinforcing rings, flanged ends and control rods, suitable for 40F to 200F temperature range and 125 lbs. pressure. Alternative shall be stainless steel inner hose with braided exterior sleeve for steel pipe or bronze inner hose with braided exterior sleeve for copper piping. Metra-flex Company, or equivalent.

2.05 SPECIALTIES

A. P/T Plugs: 1/4" diameter, brass with Nordel core, Sisco or equivalent.
B. Pressure Gauges: 4 1/2" dial type, aluminum housing. Ashcroft 1010 or equivalent.
C. Thermometers: 7" red reading mercury type. Palmer Instruments or equivalent.

2.06 ELECTRICAL

A. Lugs: Lugs for wiring connections shall be rated for copper and aluminum, and shall have a minimum rating of 75C.
B. Electric motors shall be rated for the appropriate application: wet location (TEFC); submersible; explosion proof, VFD's, etc.

2.07 ACCESS PANELS

A. The Mechanical Contractor shall furnish and install access panels where required for access to equipment. Access panels shall be adequately sized, of a type approved by the Architect and shall be fire or smoke-rated as required.

2.08 EXCAVATION AND BACKFILLING

A. Provide excavating and backfilling for Mechanical Work. Backfill in 12" layers, mechanically tamp to 95% proctor standards. Protect according to OSHA standards. The General Conditions take precedence. Verify the location of underground utilities before excavation; the contractor is responsible for any damage to underground utilities. Restore existing paving, curbs, sod, bushes, etc to match surroundings.

2.09 START-UP PROCEDURES

A. Follow manufacturer's recommended procedures in starting up the equipment; damage caused during start-up shall be replaced at no expense to the owner.

2.10 PIPING INSTALLATION

A. Install piping plumb and straight, parallel with walls and partitions. Conceal piping within structure whenever practical. Provide drain valves at all low points, vents at all high points, to allow complete drainage.
B. Material and methods per ASME, ASTM, ASA, AWS, and National Plumbing Code Handbook
C. Provide unions or flanges in piping connections to each valve, device, or item of equipment. Install each union or flange to permit the removal of parts and equipment for inspection or cleaning, without disconnecting any piping, except unions or flanges. Provide dielectric unions at locations with dissimilar materials.
D. Piping on the roof will be supported above the roof on roof pads. The pads shall be approximately 6"Wide by 6" high by the length as required. They shall be made of recycled rubber, rated for 500lbs/ft loading each. The pads will have galvanized steel "C" channel attached to the top, which can accommodate pipe clamps to secure the piping. This configuration of individual piping pads may be expanded to include two pads supporting a trapeze style support where multiple pipes are racked together. The pads are C-series manufactured by Cooper B-line, Erico, or approved equivalent.

2.11 HANGERS AND SUPPORTS

A. Support piping and equipment from the structure to prevent sagging, pocketing, swaying, and vibrations, and arranged to provide for expansion and contraction. Brackets, clamps, and hangers shall be steel, except copper hangers will be used with copper piping. Hangers supporting vibrating equipment shall be provided with spring isolators. Chain, perforated iron or wire hangers are not permitted. Hangers will be of a type acceptable to the Engineer, and shall have a capacity and spacing as required by code.

2.12 SLEEVES AND PLATES

A. Provide sleeves and inserts for all mechanical piping. The contractor shall be responsible for the cost of cutting and patching required for piping where sleeves and inserts were not installed or where incorrectly located. Sheetrock joint compound may be used to seal openings in non-rated walls(insulation to be continuous through walls.
B. Drill holes as required for the installation of hangers required for the mechanical work.
C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be made completely water-tight.
D. Seal all piping passing through fire-rated construction with approved material to maintain air-tight, fire-rated integrity, with a U.L. listed assembly compatible with the wall or floor assembly being penetrated.

2.13 PIPING TESTING

A. All piping systems shall be tested and witnessed by the Owner prior to concealment. Protect equipment and fixtures or equipment, isolating them during the test. DWV system shall be sealed and hold water without leaks for 24 hours. Domestic water and hydronic piping shall be air tested at 150 PSIG; natural gas piping shall be air tested at 30 PSIG. Air tests shall be held for one hour without loss of pressure.

2.14 CLEANING AND STERILIZATION

A. After testing, water piping systems shall be filled, operated for a sufficient length of time to completely remove all foreign material, and flushed.
B. Sterilize the domestic hot and cold water piping in accordance with the local health authority standards. Flush the systems with clear water until the residual chlorine content is equal to that of clear water.
C. Where there is no water treatment contractor sterilize piping system with chlorine for 24 hours to 50 PPM. Completely flush to less than 1 PPM. Local health authority standards take precedence.

2.15 FLEXIBLE PIPE CONNECTIONS

A. Provide flexible pipe connection suitable to connect to adjoining piping as specified for pipe joints. Use sized pipe units. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation.

2.16 PIPE IDENTIFICATION

A. After completion of the piping or insulation, paint stenciled descriptive abbreviations, including directional arrows, on piping at equipment and approximately every 25'.

SECTION 22 07 00 - PLUMBING INSULATION

1.01 QUALITY ASSURANCE

A. All insulation shall have a composite rating (insulation, jacket and adhesives) not exceeding flame spread 25 and smoke developed 50.

2.01 PIPE INSULATION FOR PIPING ABOVE GRADE

A. Insulation shall be closed-cell, elastomeric pipe insulation having a conductivity of 0.27 at 75 °F mean, with thicknesses as follows:

Pipe Sizes	<1"	1" to 1¼"	> 1½"
Dom. cold piping	1/2"	1/2"	1"
Roof drain sumps, & horiz. leaders	1/2"	1/2"	1"
Dom. hot & recire. Piping	1-1/2"	1-1/2"	1-1/2"

B. Insulation shall be Armacell "Armaflex" or equivalent by Johns-Mansville, Owens-Corning.
C. Buried piping insulation will be sleeved with PVC or HDPE pipe sleeve or encased in concrete. Sleeve and insulation will be sealed weathertight and installed per manufacturers instructions.
D. Exterior piping insulation will be painted with a white solvent based alkyd finish (Armaflex AB or equivalent), including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions. Where exposed to physical damage, exterior piping insulation will be covered with aluminum jacket, including all fittings, valves, etc.
E. All interior underground water (domestic and hydronic) piping shall be insulated with 1" Armaflex, except where noted.

2.02 PIPE INSULATION FOR PIPING BELOW GRADE

A. Insulation shall be closed-cell, elastomeric pipe insulation having a conductivity of 0.27 at 75F mean, with thicknesses as follows:

Pipe Sizes	<1"	1" to 1¼"	> 1½"
Dom. cold piping	1/2"	1/2"	1"
Dom. hot & recire. Piping	1"	1"	1"

B. Insulation shall be Armacell "Armaflex" or equivalent by Johns-Mansville, Owens-Corning.
C. Exterior piping insulation will be painted with a white solvent based alkyd finish (Armaflex AB or equivalent), including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions. Where exposed to physical damage, exterior piping insulation will be covered with aluminum jacket, including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions.
D. All interior underground water (domestic and hydronic) piping shall be insulated with 1" Armaflex, except where noted.

3.01 PIPE/ELASTOMERIC)

A. Insulation shall be solid slip-on installed prior to connection. Butt joints shall be sealed with manufacturer's adhesive. Where slit seams must be installed, seal the seam with manufacturer's adhesive. Fittings shall be insulated with meter-cut pieces of insulation according to manufacturer's instructions, or insulated with similar sheet insulation installed according to manufacturer's instructions.
B. Provide wood blocks and metal hanger shields at support strap locations on horizontal pipe runs. Insulation will not be interrupted for supports, etc.

SECTION 22 10 00 - PLUMBING

1.01 WATER SERVICE

A. Consult with local authorities to provide water service. Provide meter pit, meter yokes, valves, RPZ valves, PRV valves, etc. for complete installation. Connect to a point 5' from building. Coordinate exact point of connection with site contractor before bidding.

1.02 SANITARY SEWER CONNECTION

A. Consult with local authorities and connect to sewer main as required. Connect to a point 5' from building. Coordinate exact point of connection with site contractor before bidding.

2.01 DOMESTIC WATER SYSTEM PIPING

A. Domestic cold, hot, and recirculating hot water piping may be either copper, or PEX, as noted below:
   1. Copper piping:
      a. Above grade, piping shall be Type L, hard-drawn copper tubing with wrought copper fittings. Solder shall be lead-free.
      b. Below grade, piping shall be Type K, soft-drawn copper tubing with fittings only where specifically allowed by the architect. Where required, the fittings will be wrought copper. Solder shall be 95/5 tin/antimony, except underground, where it will be silver solder.
   2. PEX Tubing:
      a. Tubing shall be cross-linked polyethylene using the Engel method of cross-linking. The tubing shall be rated for 80PSI at 200F, and shall be manufactured according to ASTM F 876 and ASTM F 877.
      b. Fittings shall be APR(brass) "Pro-pex" style or equivalent. Manifolds may be copper, brass, or plastic, with balancing controls.
      c. Stub outs to be copper with brass shutoff valves. Stub outs to be properly secured to wall.
      d. Tubing in return air plenums, or other areas designed as air handling plenums, shall be installed to a flame rating of 25/50 according to ASTM E84, whether by spacing, insulation or other approved method.
      e. Tubing shall be as manufactured by Wirsbo or equivalent.

2.02 SOIL, WASTE, AND STORM PIPING

A. Soil, waste, and vent piping, and storm piping shall be schedule 40 solid core PVC conforming to ASTM D2665 and ASTM D1785 with solvent joints conforming to ASTMD2855, except as noted below. PVC buried below slab shall be installed in conformance with ASTM D2321:
   1. Hubless(No Hub), cast iron soil pipe conforming to CISPI 301 with stainless steel no-hub couplings conforming to CISPI 310 shall be used in return air plenums and other areas designed as air handling plenums, or where specifically required by local code. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and be listed by the NSF International.
B. Soil, waste, and storm piping below grade 5' beyond the building may be PVC SDR 35, installed in conformance with ASTM 3034 and utilizing push-on joints.
C. Storm water piping shall be same as soil and waste piping when concealed and galvanized schedule 40 steel pipe when exposed to physical damage. Fittings shall be cast iron, drainage type.

2.03 PLUMBING FIXTURES AND TRIM

A. Provide plumbing fixtures as specified on the plans. Provide carriers, trim, bolts, caps, etc according to the manufacturer's instructions and as required for a complete installation. All fittings and appurtenances (p-traps, connections, etc) shall be brass; chrome plated brass where visible.
B. Provide carriers for wall hung or mounted fixtures such as water closets, lavatories, urinals, sinks, etc. The carriers shall be designed to fit in the wall structure available, and shall transmit the load to the floor. Fixtures will not be supported by the wall structure unless specifically indicated.

2.04 GAS PIPING

A. Above grade in accessible locations, gas piping shall be schedule 40, black iron pipe with threaded fittings. Fittings shall be made of malleable iron. Gas piping run in return plenums, where allowed by local code, shall have welded joints.
B. Regulators shall be Maxitrol, or equivalent, of size and capacity as required.

2.05 ELECTRIC WATER HEATER

A. Water heaters shall be as specified on the plans. Heaters shall be U.L. listed. The tank shall be heavy-gauge, welded steel, glass-lined, insulated to conform to ASHRAE 90b-1992. The heater shall be rated for 150 PSI and shall have a five-year warranty. The heater shall use two immersion heating elements. The controls shall be completely factory-assembled and shall include immersion thermostats and high-temperature cut off. The heater shall include two (2) magnesium anodes and a pressure and temperature relief valve. The heater will be furnished with integral heat traps. Where required by local code, provide ASME certification.
B. Water heater shall be provided with R 14 insulation. Where factory insulation does not meet insulation requirements, provide aftermarket insulated jacket as required to meet requirements.
C. The water heaters shall be manufactured by State, Ruud, A.O. Smith, Jackson, or American Appliance.

2.06 DOMESTIC RECIRCULATING PUMP

A. Pump shall be 2800 rpm, in-line, centrifugal oil-lubricated, sleeve-bearing pump with flanged piping connections, bronze body, plastic impeller, and having mechanical seals. Motors shall be non-overloading, open drip-proof type.
B. The pump shall be furnished with an automatic timer kit.
C. Manufacturer shall be Bell and Gossett, Paco, Taco, or approved equivalent.

3.01 DOMESTIC WATER SYSTEM

A. Provide drip cocks so that the entire system may be drained. Provide manual air vents at high points in the system where air may be trapped. Provide stops for all fixtures and appliances. Provide a full size ball valve on each branch serving a hose bib.
B. Provide swing or swivel joints on connections as required to prevent noise or vibration of the piping. Provide fixture stops at all fixtures, hose bibbs, wall hydrants, and Owner-furnished fixtures. Run all piping on warm side of building insulation. Pipe insulation is not considered freeze protection. Provide water hammer arrestors where required. Locate to be accessible or provide access panel.

3.02 SOIL, WASTE, AND STORM WATER PIPING

A. Lay piping true to line and grade so that sewer will have smooth and uniform invert throughout its length. Verify elevations of existing sewer before starting work.
B. Install a clean-out at the base of each soil stack, at the base of each interior rain-water conductor, at each change in direction, at intervals not over 50 feet interior of building, and every 100 feet exterior to building and elsewhere as shown on the drawings or required by Code. Make clean-outs same size as pipe service, except they need be no larger than 4". Set tops and covers flush with floors and walls. Wall covers shall be round polished stainless steel with centered stainless steel securing screw (Josam 58710). Floor cleanouts shall be flush, cast iron, ABS plug with Nikalloy cover(Josam 56000). Provide floor clamps at each floor for uniform support of stacks.
C. The entire drain waste and vent, and storm sewer systems shall be watertight and odorproof, including sealing of floor drains and sinks, closet rings, etc.

3.03 WATER HEATER INSTALLATION

A. Install water heaters per manufacturer's instructions. Provide 24 gauge, galvanized steel drain pan, piped with minimum ¾" drain, piped to an approved receptor with indirect waste connection per code.
B. Route the P/T relief valve full sized to approved receptor and discharge per code. Provide expansion device, tank or valve, as required by code, and allowed by the local jurisdiction.
C. Flue and combustion air ducts shall be provided by the mechanical contractor, unless otherwise noted. Where sealed combustion water heaters are used, the Plumbing Contractor shall install PVC flue and combustion air piping. This piping will be of the size and type recommended by the manufacturer, and use factory recommended discharge/intake fittings as shown on the plans.

3.04 PLUMBING FIXTURES AND TRIM

A. Furnish and install a vacuum breaker at each hot and cold water service outlet to which a hose can be attached, including janitor's faucets.
B. Provide chrome-plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons. Insulate stops and supplies at handicapped sinks with Truebro lav guard or equivalent. Bag type covers are not allowed.
C. Provide chrome plated brass P-traps with slip fittings for all exposed drains. Insulate P-traps at handicapped sinks with Truebro lav guard or equivalent. Bag type covers are not allowed.
D. Flush valve handles, and flush tank handles, on handicapped water closets shall be located on the wide side of the stall for convenient access and as required by code.
E. Provide a flexible elastomeric sheet for flashing around all shower drains, roof drains, floor drains, floor sinks, etc except for slabs on grade. The membrane shall be a minimum 0.40 inch thick, made of chlorinated polyethylene, installed per manufacturer's instructions. The flashing membrane for roof drains, floor drains, etc shall be a minimum of 2'x2'. The flashing membrane for shower pans, service sink pans, etc shall have "pigs ear" folds in the corners, extending the membrane up at least 3" above the drain. The membranes shall be manufactured by Chloralloy or equivalent.
F. Mount fixtures the following heights above finished floor:
   1. Water closet : 14"-15" to top of bowl rim;
   2. Lavatory : 31" to top of basin rim;
      Handicapped , 32" to top of basin rim.
   3. Floor drains : In finished areas, ¼" - ½" below finished floor. In mechanical rooms and other unfinished areas, install at least 1" below floor, except where it would be a stumble hazard.
G. Rough-in fixture piping connections in accordance with the following table of minimum sizes or as required for particular fixtures.

	HW	CW	Waste	Vent
Lavatories	1/2"	1/2"	1-1/2"	1-1/4"
Water Closet (tank)	--	1/2"	3"	2"
Floor drains	--	--	2"	1-1/2"
Hose bibs	--	3/4"	--	--
Wash Mach Unit	1/2"	1/2"	2"	1-1/2"
Owner furnished equipment	SEE SCHEDULE & PLANS			

3.05 GAS PIPING

A. Gas distribution system is based on both 14" W.C. and a 6" W.C. natural gas pressure except where noted on plans. Provide all gas-fired equipment with gas pressure regulators or special orifices as required to operate at 5000 ft. elevation. Provide a gas cock and drip leg at each appliance.
B. Gas piping on roof shall be secured to uv resistant Polyethylene foam block; Erico "Pipe Pier". Provide rubberized sheet under pipe support.
C. Piping exposed outside shall be painted with an exterior type latex paint which matches the adjacent roof or wall.
D. Appliance connection piping to be per plans or same as appliance size, whichever is larger. Transition downstream of all shutoffs and regulators as close to appliance as possible when plans call for larger than appliance.

3.06 KITCHEN

A. Provide final connections to all kitchen equipment in accordance with manufacturer's instructions. Provide stops or shut-off valves for hot and cold water connection; plug cocks or quick- connect couplings for gas appliances. Indirect wastes shall be DWV copper, except at soda machines where plastic pipe shall be used.

NOTICE: DUTY OF COOPERATION

Release of these plans contemplates further cooperation among the owner, his contractor and the architect. Design and construction are complex. Although the architect and his consultants have performed their services with due care and diligence, they cannot guarantee perfection. Communication is imperfect and every contingency cannot be anticipated. Any ambiguity or discrepancy discovered by the use of these plans shall be reported immediately to the architect. Failure to notify the architect compounds misunderstanding and increases construction costs. A failure to cooperate by a simple notice to the architect shall relieve the architect from responsibility for the consequences. Changes made from the plans without consent of the architect are unauthorized and shall relieve the architect of responsibility for all consequences arriving out of such changes.

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23035-7
Date:	05/21/24
Drawn By:	CK&SS
Checked By:	MV

Project Phase
PERMIT

Sheet Title
PLUMBING SPECIFICATIONS

Sheet Number
P7.1

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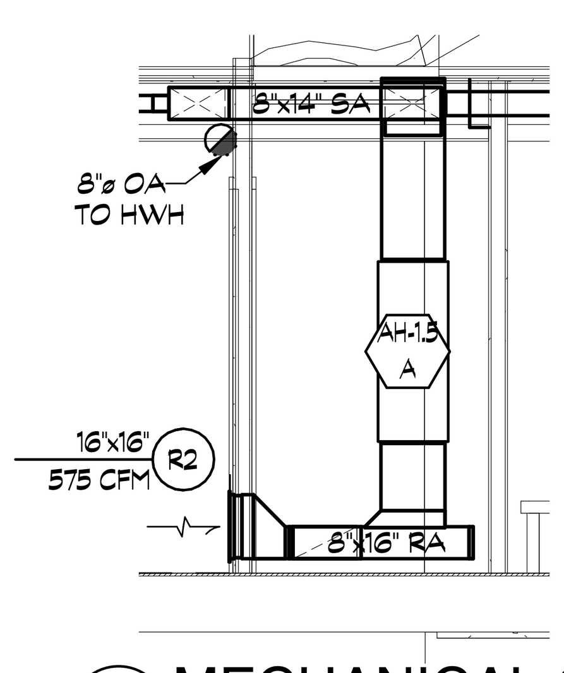
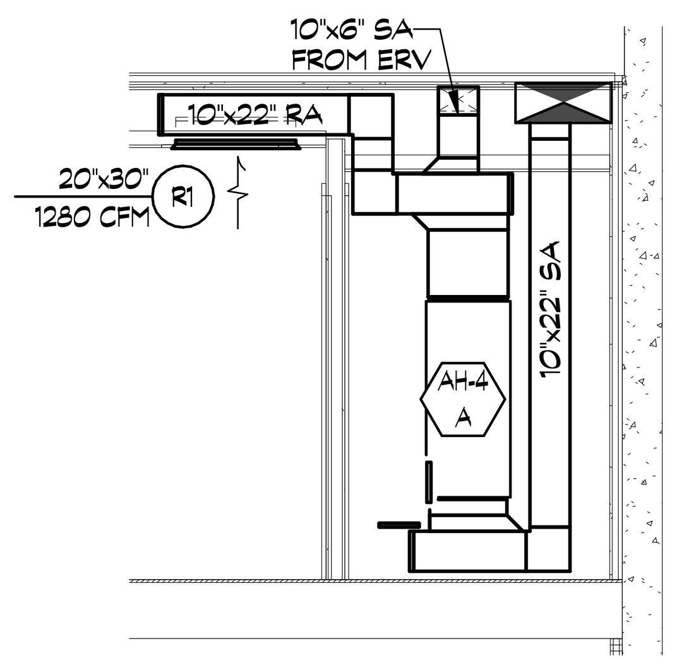
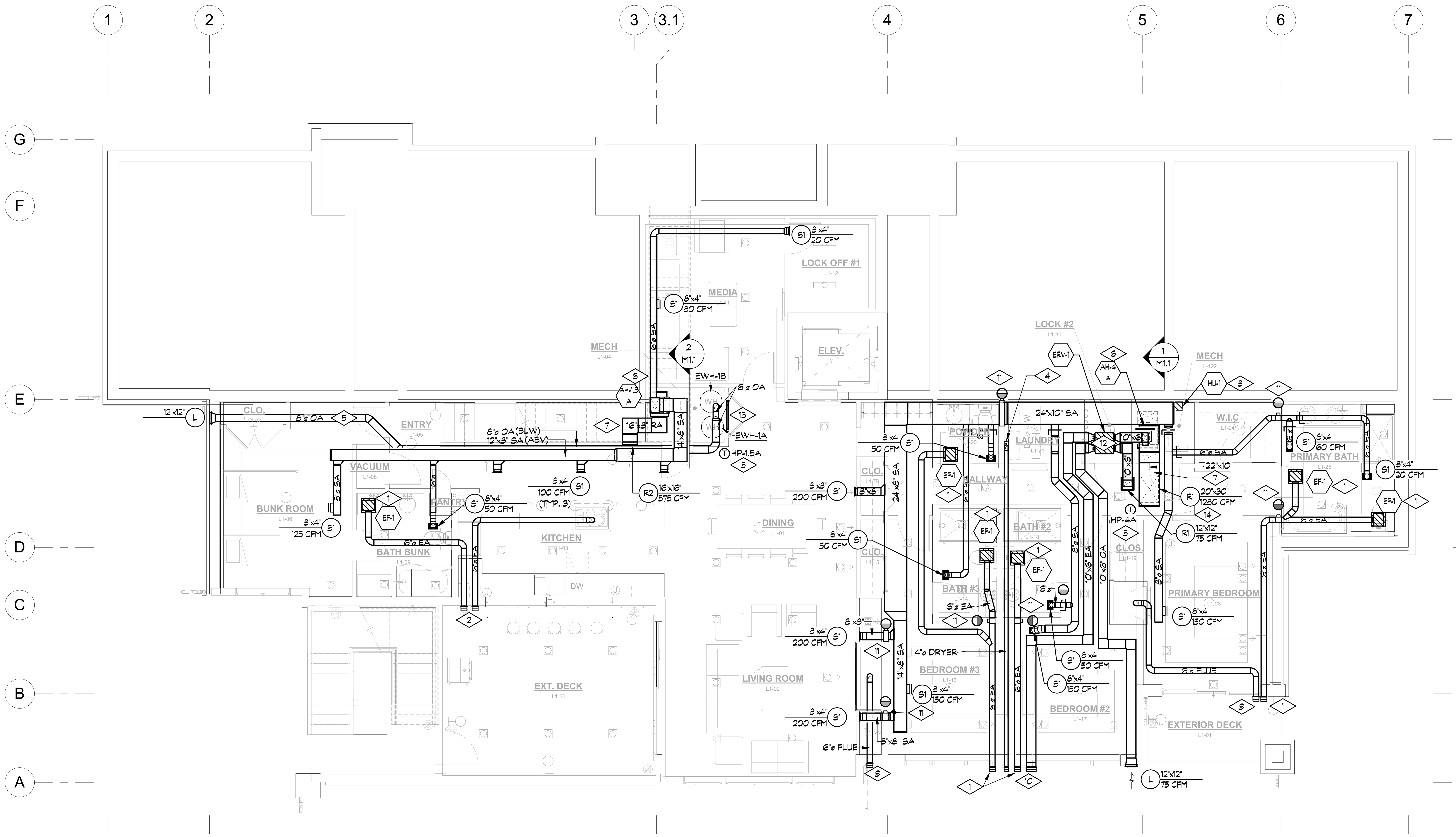


2 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



1 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



LOWER LEVEL 1 HVAC PLAN
3/16" = 1'-0"

MECHANICAL GENERAL NOTES - UNITS

A. FLEX DUCT MAY NOT BE USED IN EXPOSED LOCATIONS. WHERE CONCEALED, FLEX DUCT RUNS NO LONGER THAN 2', REFER TO SPECIFICATIONS.

B. GRILLES, REGISTERS & DIFFUSERS & EXPOSED DUCTWORK TO MATCH ADJACENT CEILING/STRUCTURE COLOR. WHERE CEILING IS LIGHT COLOR, MAINTAIN WHITE GRDS. WHERE CEILING/STRUCTURE IS METAL FINISH OR DARK, PAINT GRDS TO MATCH. REFER TO ARCH PLANS FOR FINISHES.

C. ROUTE ALL SUPPLY DUCTWORK ABOVE FIRE-RATED CEILING BETWEEN AND THRU TRUSSES UNLESS OTHERWISE NOTED. AVOID SOLID STRUCTURAL BEAMS. IN ATTIC SPACE, INSULATE PER SPECIFICATIONS.

D. INSTALL RADIATION DAMPER AT ALL CEILING PENETRATIONS. DAMPER TO BE UL-LISTED FOR RATED ASSEMBLY BEING PENETRATED.

E. VERIFY LOCATIONS AND RATING OF ALL RATED ASSEMBLIES WITH GC AND ARCHITECT DURING CONSTRUCTION. PROTECT PENETRATIONS PER UL INSTRUCTIONS.

F. RANGE HOOD BY ARCHITECT. PROVIDE ACCESSIBLE CONTROLS IN ADA TYPE-A RANGE HOOD. WHERE NEEDED.

G. PROVIDE 1.25" UNDERCUT AT ALL BEDROOM DOORS.

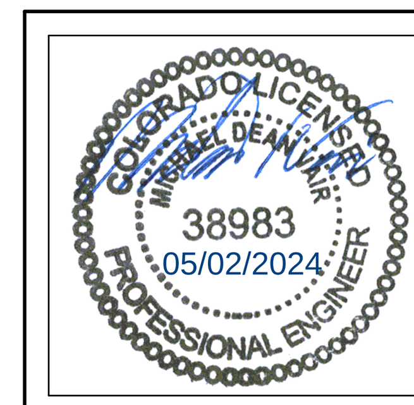
H. EXHAUST DUCTS MUST BE TERMINATED BENEATH SUPPLY TRUNK MAIN TO MAINTAIN 3' SEPARATION BETWEEN EXHAUST VENTS AND OPERABLE WINDOW OPENINGS ABOVE. SEE ARCHITECTURAL ELEVATIONS.

I. EACH UNIT TO BE VENTILATED FOR A MINIMUM OF 72 HOURS PRIOR TO OCCUPANCY. ALL FILTERS TO BE REPLACED AT END OF VENTILATION PERIOD PRIOR TO TENANT OCCUPANCY PER ENERGY CODE REQUIREMENT.

J. MECHANICAL SYSTEM IS LESS THAN 480,000 BTU/H COOLING AND 600,000 BTU/H HEATING AND IS THEREFORE NOT REQUIRED TO BE COMMISSIONED PER IECC C408.2.

DETAIL NOTES THIS SHEET

1. MOUNT BATHROOM EXHAUST FAN IN CEILING. ROUTE EXHAUST DUCT IN SOFFIT/CEILING SPACE TO EXTERIOR WALL. TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. MAINTAIN MINIMUM 3'-0" FROM BUILDING OPENINGS OR MECHANICAL AIR INTAKES. EXHAUST FAN CONTROLLED BY SWITCH ON WALL. COORDINATE WIRING AND LOCATION WITH E.C.
2. ROUTE KITCHEN EXHAUST FROM KITCHEN HOODTO EXTERIOR WALL AND TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. TRANSITION AT HOOD AS REQUIRED.
3. AIR HANDLER THERMOSTAT, COORDINATE FINAL LOCATION WITH OWNER/G.C.
4. 4"Ø DRYER VENT FROM DRYER BOX (IN-O-VATE TECHNOLOGIES OR EQUIV.) ROUTE BEHIND DRYER IN WALL UP THRU TOP PLATE AND THRU CEILING SPACE TO EXTERIOR WALL. INSTALL BACKDRAFT DAMPER AT TERMINATION. ALL HORIZONTAL TURNS TO BE "LONG TURN" ELL'S (IN-O-VATE TECHNOLOGIES OR EQUIV.) DRYER TO BE LONG VENT TYPE. INSTALL VENT PER MANUFACTURER'S REQUIREMENTS. VENT NOT TO EXCEED 40' IN TOTAL LENGTH WITH (2) 90° ELBOWS. PROVIDE PERMANENT LABEL "DRYER MUST BE APPROVED FOR 40' WITH (2) ELBOWS BY MANUFACTURER." RE: DETAIL ON P5.1 FOR DRYER BOX INSTALLATION. SHOWN OFFSET FOR CLARITY. DRYER DUCT CONSTRUCTION TO MEET IBC 603.4 WHEN PENETRATING RATED ASSEMBLIES.
5. HEAT PUMP WATER HEATER OUTSIDE AIR DUCT ROUTED THRU CEILING/SOFFIT TO EXTERIOR WALL. PROVIDE MOTORIZED DAMPER AT LOUVER, INTERLOCK WITH HEAT PUMP WATER HEATER FAN. INSTALL DUCT PER MANUFACTURER'S REQUIREMENTS. 8"Ø DUCT NOT TO EXCEED 295' IN TOTAL LENGTH WITH (8) 90° ELBOWS. REFER TO PLANS FOR LENGTH AND ELBOW QUANTITIES. REFER TO PLUMBING FIXTURE SCHEDULE FOR MORE INFORMATION.
6. REFER TO SECTION VIEW FOR MORE INFORMATION ON RETURN AIR DUCT ROUTING.
7. LINED RA DUCT, REFER TO SECTION THIS SHEET FOR SIZE.
8. LOCATE HUMIDIFIER HIGH ON WALL IN AREA SHOWN. INSTALL PER MANUFACTURER'S REQUIREMENTS. COORDINATE EQUIPMENT CONNECTIONS WITH E.C. AND P.C.
9. TYPE B FLUE FROM FIREPLACE UP TO CEILING AND OUT TO WALL TERMINATION CAP. REFER TO MANUFACTURER'S INSTRUCTIONS FOR MATERIALS & DETAILS.
10. ERV EXHAUST, TERMINATE WITH BACKDRAFT DAMPER IN WALL CAP. MAINTAIN 3'-0" CLEARANCE FROM BUILDING OPENING OR MECHANICAL AIR INTAKE.
11. PROVIDE FIRE DAMPER AT RATED WALL.
12. PROVIDE ACCESS HATCH WITHIN LOCKOUT ROOM. SIZE HATCH TO ACCOMODATE ERV MAINTENANCE ACCESS.
13. LOUVER, WITH MINIMUM 0.25 SF FREE AREA, HIGH ON WALL FOR HEAT PUMP WATER HEATER VENTILATION. REFER TO ARCHITECTURAL PLANS.
14. NO DUCTWORK ROUTED OVER ELECTRICAL PANEL.



REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
Drawn By:	AF
Checked By:	MV

Project Phase
PERMIT

Sheet Title
LOWER LEVEL 1 HVAC PLAN

Sheet Number
M1.1

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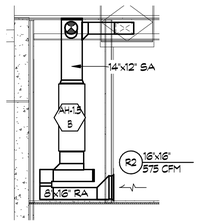
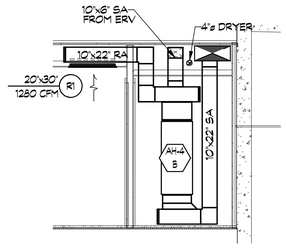
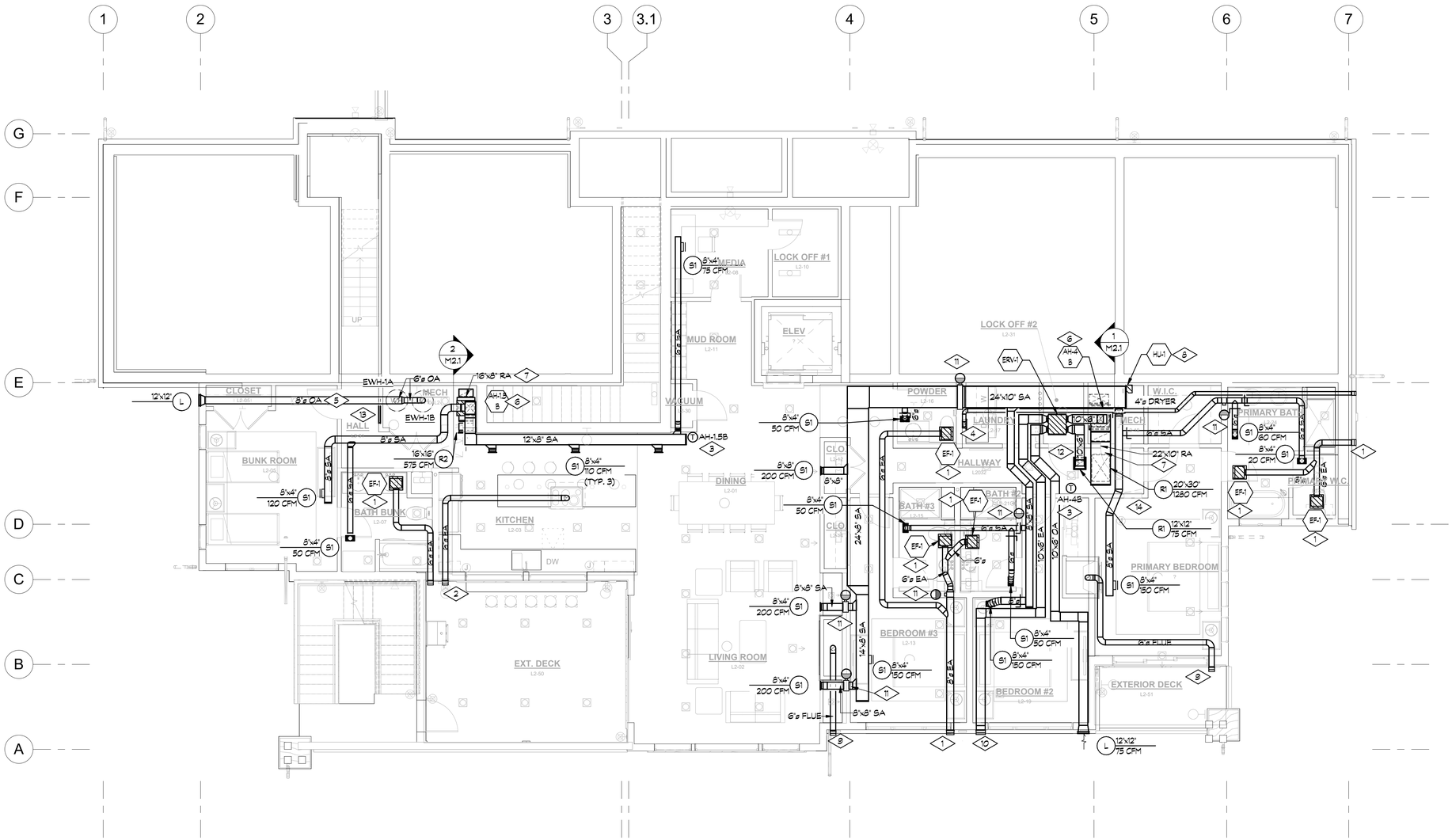


2 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



1 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



LOWER LEVEL 2 HVAC PLAN
3/16" = 1'-0"

DETAIL NOTES THIS SHEET

1. MOUNT BATHROOM EXHAUST FAN IN CEILING. ROUTE EXHAUST DUCT IN SOFFIT/CEILING SPACE TO EXTERIOR WALL. TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. MAINTAIN MINIMUM 3'-0" FROM BUILDING OPENINGS OR MECHANICAL AIR INTAKES. EXHAUST FAN CONTROLLED BY SWITCH ON WALL. COORDINATE WIRING AND LOCATION WITH E.C.
2. ROUTE KITCHEN EXHAUST FROM KITCHEN HOODTO EXTERIOR WALL AND TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. TRANSITION AT HOOD AS REQUIRED.
3. AIR HANDLER THERMOSTAT, COORDINATE FINAL LOCATION WITH OWNER/G.C.
4. 4"Ø DRYER VENT FROM DRYER BOX (IN-O-VATE TECHNOLOGIES OR EQUIV.) ROUTE BEHIND DRYER IN WALL UP THRU TOP PLATE AND THRU CEILING SPACE TO EXTERIOR WALL. INSTALL BACKDRAFT DAMPER AT TERMINATION. ALL HORIZONTAL TURNS TO BE "LONG TURN" ELLS (IN-O-VATE TECHNOLOGIES OR EQUIV.) DRYER TO BE LONG VENT TYPE. INSTALL VENT PER MANUFACTURERS REQUIREMENTS. VENT NOT TO EXCEED 40' IN TOTAL LENGTH WITH (4) 90° ELBOWS. PROVIDE PERMANENT LABEL "DRYER MUST BE APPROVED FOR 40' WITH (4) ELBOWS BY MANUFACTURER." RE: DETAIL ON P5.1 FOR DRYER BOX INSTALLATION. SHOWN OFFSET FOR CLARITY. DRYER DUCT CONSTRUCTION TO MEET IBC 603.4 WHEN PENETRATING RATED ASSEMBLIES.
5. HEAT PUMP WATER HEATER OUTSIDE AIR DUCT ROUTED THRU CEILING/SOFFIT TO EXTERIOR WALL. PROVIDE MOTORIZED DAMPER AT LOUVER, INTERLOCK WITH HEAT PUMP WATER HEATER FAN. INSTALL DUCT PER MANUFACTURER'S REQUIREMENTS. 8'Ø DUCT NOT TO EXCEED 285' IN TOTAL LENGTH WITH (8) 90° ELBOWS. REFER TO PLANS FOR LENGTH AND ELBOW QUANTITIES. REFER TO PLUMBING FIXTURE SCHEDULE FOR MORE INFORMATION.
6. REFER TO SECTION VIEW FOR MORE INFORMATION ON RETURN AIR DUCT ROUTING.
7. LINED RA DUCT, REFER TO SECTION THIS SHEET FOR SIZE.
8. LOCATE HUMIDIFIER HIGH ON WALL IN AREA SHOWN. INSTALL PER MANUFACTURER'S REQUIREMENTS. COORDINATE EQUIPMENT CONNECTIONS WITH E.C. AND P.C.
9. TYPE B FLUE FROM FIREPLACE UP TO CEILING AND OUT TO WALL TERMINATION CAP. REFER TO MANUFACTURER'S INSTRUCTIONS FOR MATERIALS & DETAILS.
10. ERV EXHAUST, TERMINATE WITH BACKDRAFT DAMPER IN WALL CAP. MAINTAIN 3'-0" CLEARANCE FROM BUILDING OPENING OR MECHANICAL AIR INTAKE.
11. PROVIDE FIRE DAMPER AT RATED WALL.
12. PROVIDE ACCESS HATCH WITHIN LOCKOUT ROOM. SIZE HATCH TO ACCOMODATE ERV MAINTENANCE ACCESS.
13. LOUVER, WITH MINIMUM 0.25 SF FREE AREA, HIGH ON WALL FOR HEAT PUMP WATER HEATER VENTILATION. REFER TO ARCHITECTURAL PLANS.
14. NO DUCTWORK ROUTED OVER ELECTRICAL PANEL.

COLORADO LICENSED
DEAN A. MYERS
38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	AF
Checked By:	MV

Project Phase
PERMIT

Sheet Title
LOWER LEVEL 2 HVAC PLAN

Sheet Number
M2.1

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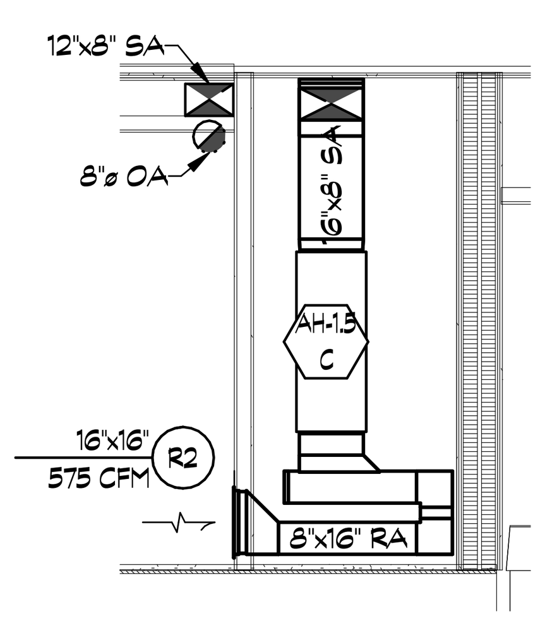
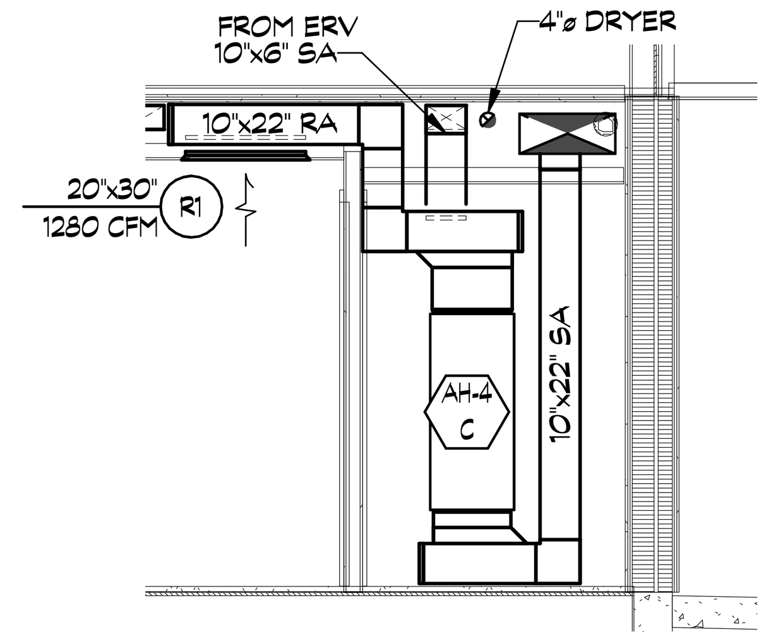
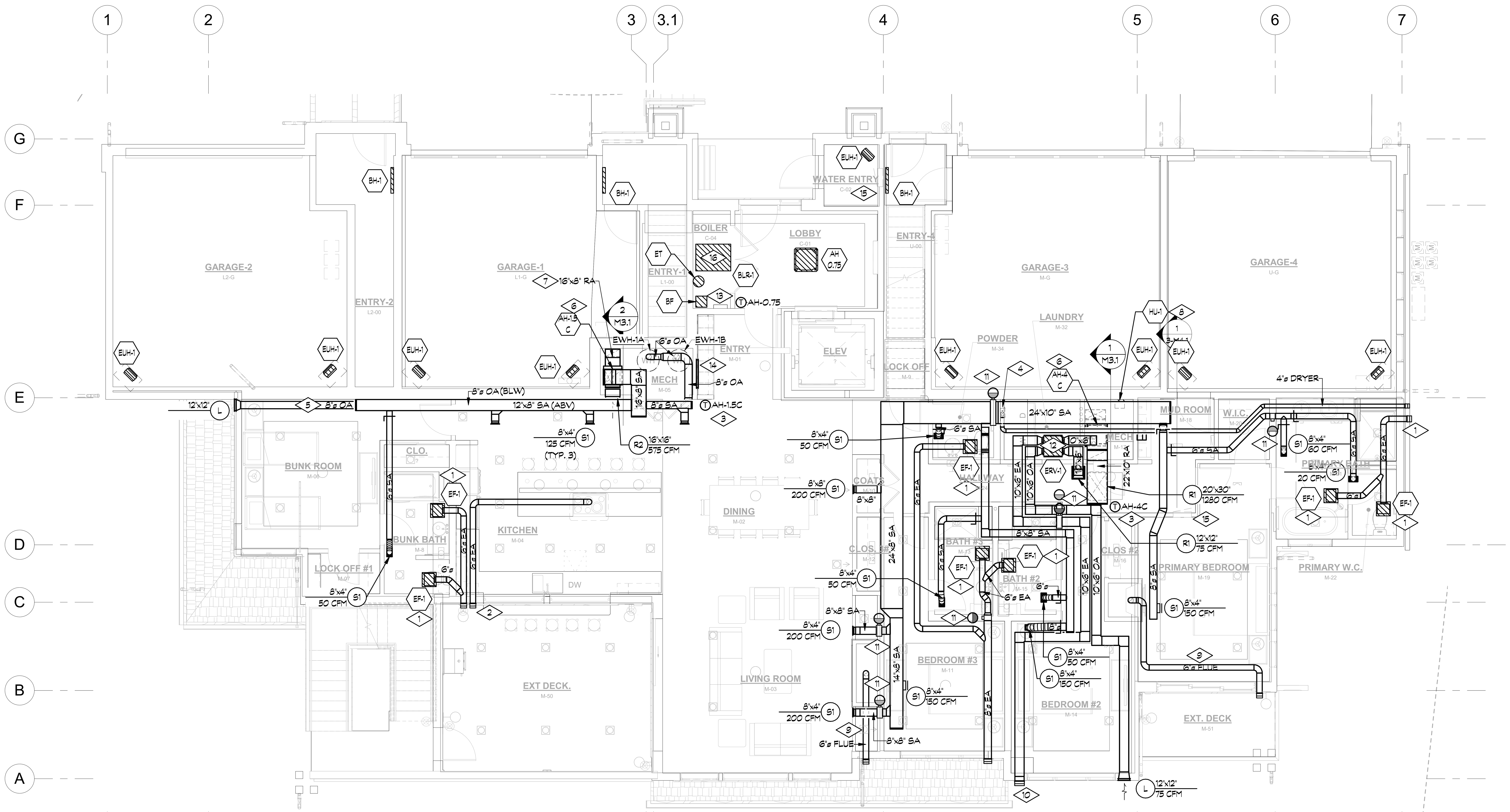


2 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



1 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



MAIN LEVEL HVAC PLAN
3/16" = 1'-0"

DETAIL NOTES THIS SHEET

1. MOUNT BATHROOM EXHAUST FAN IN CEILING. ROUTE EXHAUST DUCT IN SOFFIT/CEILING SPACE TO EXTERIOR WALL. TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. MAINTAIN MINIMUM 3'-0" FROM BUILDING OPENINGS OR MECHANICAL AIR INTAKES. EXHAUST FAN CONTROLLED BY SWITCH ON WALL. COORDINATE WIRING AND LOCATION WITH E.C.
2. ROUTE KITCHEN EXHAUST FROM KITCHEN HOODTO EXTERIOR WALL AND TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. TRANSITION AT HOOD AS REQUIRED.
3. AIR HANDLER THERMOSTAT, COORDINATE FINAL LOCATION WITH OWNER/G.C.
4. 4"Ø DRYER VENT FROM DRYER BOX (IN-O-VATE TECHNOLOGIES OR EQUIV.) ROUTE BEHIND DRYER IN WALL UP THRU TOP PLATE AND THRU CEILING SPACE TO EXTERIOR WALL. INSTALL BACKDRAFT DAMPER AT TERMINATION. ALL HORIZONTAL TURNS TO BE "LONG TURN" ELL'S (IN-O-VATE TECHNOLOGIES OR EQUIV.) DRYER TO BE LONG VENT TYPE. INSTALL VENT PER MANUFACTURER'S REQUIREMENTS. VENT NOT TO EXCEED 40' IN TOTAL LENGTH WITH (4) 90° ELBOWS. PROVIDE PERMANENT LABEL "DRYER MUST BE APPROVED FOR 40' WITH (4) ELBOWS BY MANUFACTURER." RE: DETAIL ON P5.1 FOR DRYER BOX INSTALLATION. SHOWN OFFSET FOR CLARITY. DRYER DUCT CONSTRUCTION TO MEET IBC 603.4 WHEN PENETRATING RATED ASSEMBLIES.
5. HEAT PUMP WATER HEATER OUTSIDE AIR DUCT ROUTED THRU CEILING/SOFFIT TO EXTERIOR WALL. PROVIDE MOTORIZED DAMPER AT LOUVER, INTERLOCK WITH HEAT PUMP WATER HEATER FAN. INSTALL DUCT PER MANUFACTURER'S REQUIREMENTS. 8"Ø DUCT NOT TO EXCEED 295' IN TOTAL LENGTH WITH (8) 90° ELBOWS. REFER TO PLANS FOR LENGTH AND ELBOW QUANTITIES. REFER TO PLUMBING FIXTURE SCHEDULE FOR MORE INFORMATION.
6. REFER TO SECTION VIEW FOR MORE INFORMATION ON RETURN AIR DUCT ROUTING.
7. LINED RA DUCT, REFER TO SECTION THIS SHEET FOR SIZE.
8. LOCATE HUMIDIFIER HIGH ON WALL IN AREA SHOWN. INSTALL PER MANUFACTURER'S REQUIREMENTS. COORDINATE EQUIPMENT CONNECTIONS WITH E.C. AND P.C.
9. TYPE B FLUE FROM FIREPLACE UP TO CEILING AND OUT TO WALL TERMINATION CAP. REFER TO MANUFACTURER'S INSTRUCTIONS FOR MATERIALS & DETAILS.
10. ERV EXHAUST, TERMINATE WITH BACKDRAFT DAMPER IN WALL CAP. MAINTAIN 3'-0" CLEARANCE FROM BUILDING OPENING OR MECHANICAL AIR INTAKE.
11. PROVIDE FIRE DAMPER AT RATED WALL.
12. PROVIDE ACCESS HATCH WITHIN LOCKOUT ROOM. SIZE HATCH TO ACCOMODATE ERV MAINTENANCE ACCESS.
13. REFER TO M3.2 FOR BOILER/SNOWMELT PIPING.
14. LOUVER, WITH MINIMUM 0.25 SF FREE AREA, HIGH ON WALL FOR HEAT PUMP WATER HEATER VENTILATION. REFER TO ARCHITECTURAL PLANS.
15. NO DUCTWORK ROUTED OVER ELECTRICAL PANEL.

38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
Drawn By:	AF
Checked By:	MV

Project Phase
PERMIT

Sheet Title
MAIN LEVEL HVAC PLAN

Sheet Number
M3.1

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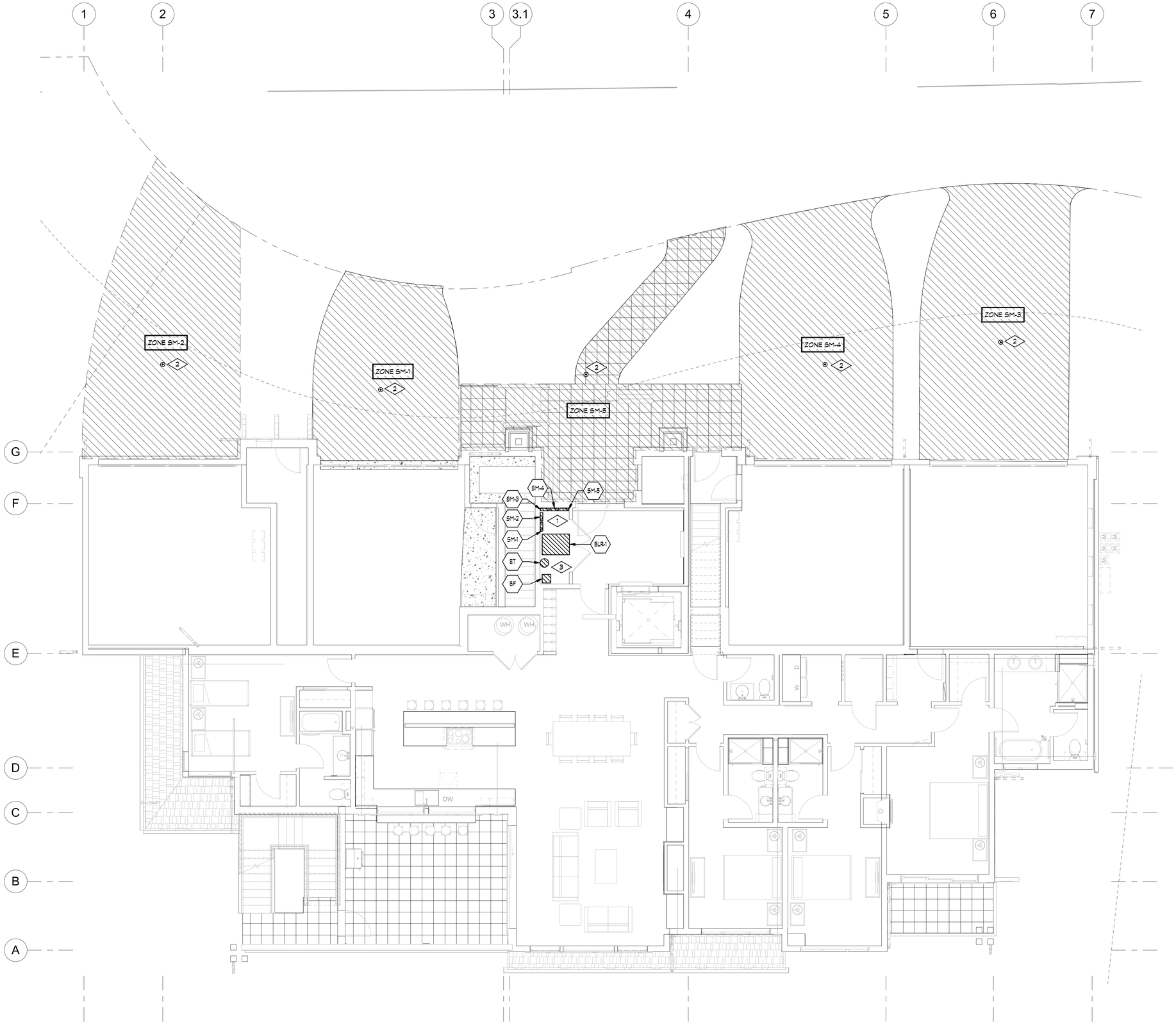

MAIN LEVEL MECHANICAL PIPING PLAN
3/16" = 1'-0"

DETAIL NOTES THIS SHEET

1. SNOWMELT MANIFOLD ON WALL WITHIN BOILER ROOM. REFER TO HYDRONIC/SNOWMELT PIPING DIAGRAM ON M6.2 FOR MORE INFORMATION ADN PIPE SIZING.
2. COORDINATE SNOW/ICE SENSOR WITH LANDSCAPE ARCHITECT & G.C.
3. ELECTRIC SNOWMELT BOILER, INSTALL PER MANUFACTURER'S INSTRUCTIONS.

COLORADO LICENSED
MICHAEL DEAN VALDEZ
38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5455, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
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Checked By:	MV

Project Phase
PERMIT

Sheet Title
MAIN LEVEL MECHANICAL PIPING PLAN

Sheet Number
M3.2

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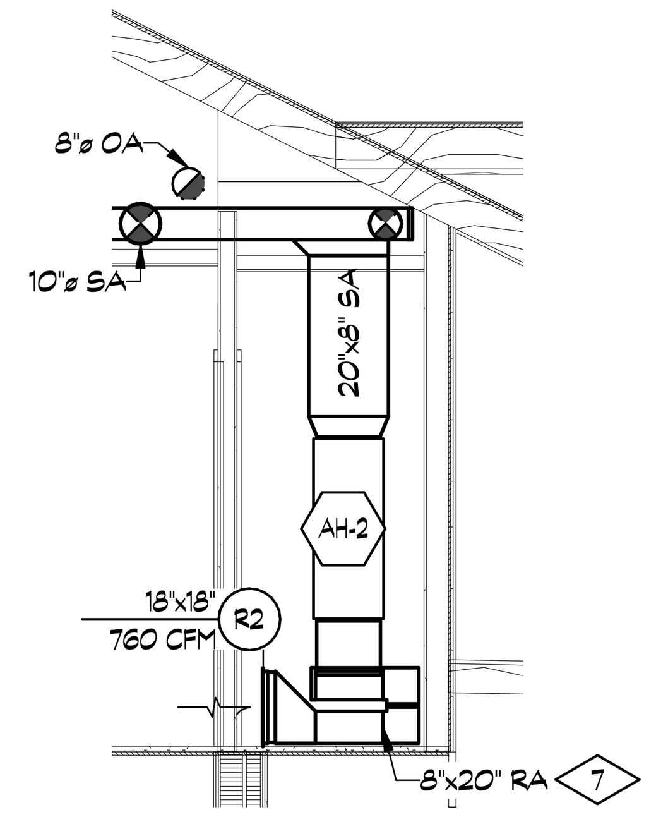
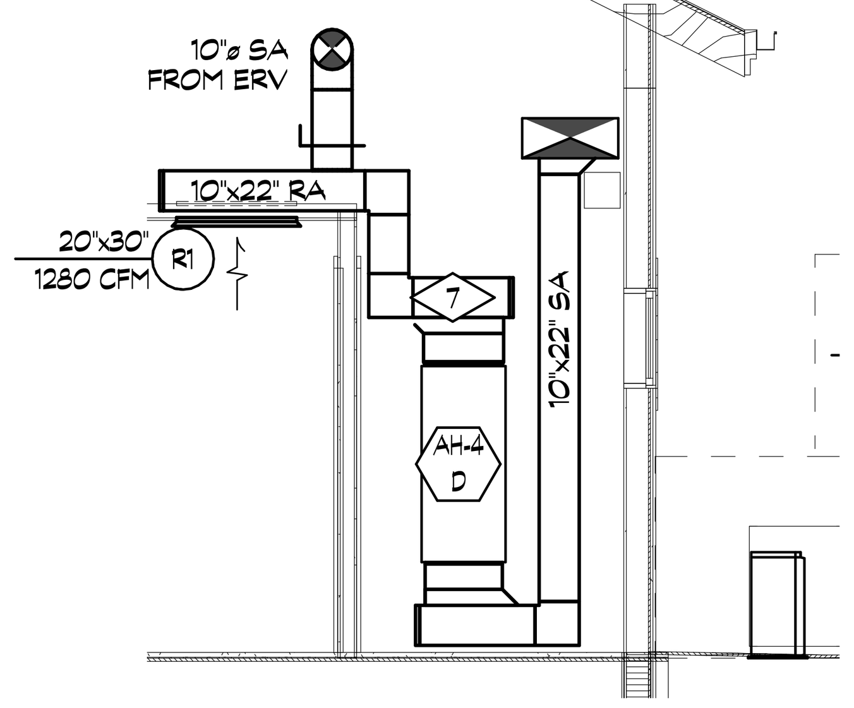


2 MECHANICAL CLOSET SECTION
1/4" = 1'-0"



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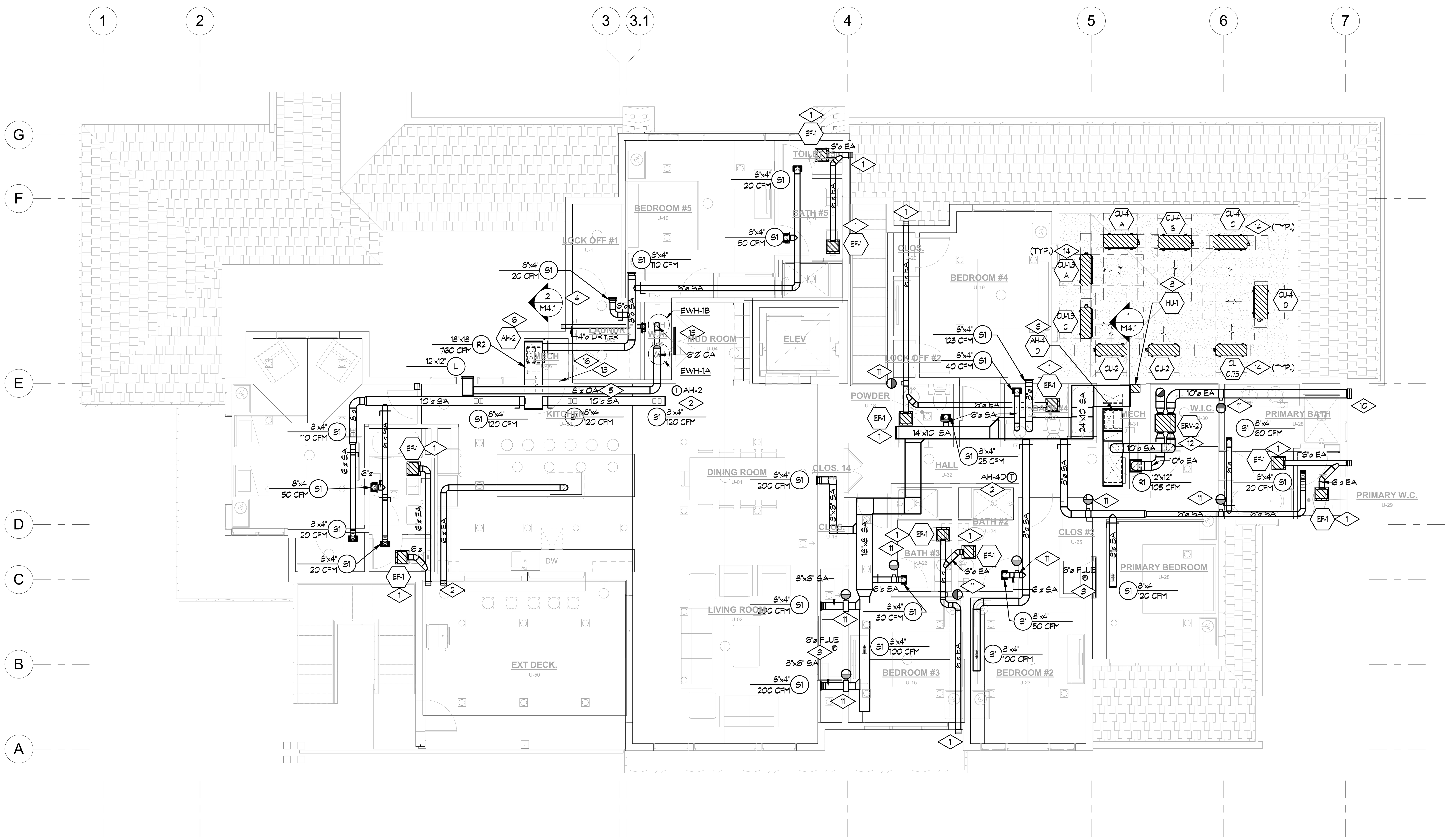
1/4" = 1'-0"



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

DETAIL NOTES THIS SHEET

1. MOUNT BATHROOM EXHAUST FAN IN CEILING. ROUTE EXHAUST DUCT IN SOFFIT/CEILING SPACE TO EXTERIOR WALL. TERMINATE IN WALL CAP WITH BACKDRAFT DAMPER. MAINTAIN MINIMUM 3'-0" FROM BUILDING OPENINGS OR MECHANICAL AIR INTAKES. EXHAUST FAN CONTROLLED BY SWITCH ON WALL. COORDINATE WIRING AND LOCATION WITH E.C.
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10. ERV EXHAUST, TERMINATE WITH BACKDRAFT DAMPER IN WALL CAP. MAINTAIN 3'-0" CLEARANCE FROM BUILDING OPENING OR MECHANICAL AIR INTAKE.
11. PROVIDE FIRE DAMPER AT RATED WALL.
12. PROVIDE ACCESS HATCH WITHIN LOCKOUT ROOM. SIZE HATCH TO ACCOMODATE ERV MAINTENANCE ACCESS.
13. DOOR LOUVER WITH MIN. 1.27 SF FREE AREA. REFER TO ARCHITECTURAL PLANS.
14. OUTDOOR CONDENSING UNIT. REFER TO MANUFACTURE'S INSTALLATION INSTRUCTIONS FOR MORE INFORMATION.
15. LOUVER, WITH MINIMUM 0.25 SF FREE AREA, HIGH ON WALL FOR HEAT PUMP WATER HEATER VENTILATION. REFER TO ARCHITECTURAL PLANS.
16. NO DUCTWORK ROUTED OVER ELECTRICAL PANEL.

38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
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(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
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Project Phase
PERMIT

Sheet Title
UPPER LEVEL HVAC PLAN

Sheet Number
M4.1

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SNOWMELT ZONE SCHEDULE

ZONE	AREA	APPROX. AREA (FT2)	TOTAL PANEL OUTPUT (BTUH)	PANEL MATERIAL	TUBE SPACING (IN)	TUBING REQUIRED (FT)	EST. # OF LOOPS	GPM
SM-1	GARAGE 1 DRIVEWAY	380	54,990	CONCRETE	9	520	2	4.1
SM-2	GARAGE 2 DRIVEWAY	480	67,680	CONCRETE	9	640	3	5.0
SM-3	GARAGE 3 DRIVEWAY	500	70,500	CONCRETE	9	667	3	5.2
SM-4	GARAGE 4 DRIVEWAY	460	64,860	CONCRETE	9	613	3	4.8
SM-5	MAIN ENTRY	410	57,810	CONCRETE	9	547	2	4.3
	TOTAL	2,240	315,840			2987		23.4

DESIGN PARAMETERS:

TUBE SIZE	3/4	in	MAXIMUM LOOP LENGTH:	333 FT
DELTA T	30	oF	MANIFOLD RUN FACTOR:	10%
PANEL SUPPLY WATER TEMP	140	oF	FACTORED LOOP LENGTH:	300 FT
SURFACE DESIGN TEMP	37	oF		
% PROP. GLYCOL (BY VOL.)	50%			

RESIDENTIAL UNIT VENTILATION CALCULATION
(FOR BUILDINGS OVER 3 STORIES)

UNIT TYPE	UNIT AREA (SF)	UNIT BEDRM QTY	CEILING HEIGHT (FT)	VENTILATION RATE (CFM) IMC 403.3.2.1	IMC '15 CFM/P	ERV-1 QTY PER UNIT	ERV-1 RUN TIME PER FAN (MIN)
UNIT 1	2851	4	10.00	67	75	1	60
UNIT 2	2758	4	10.00	66	75	1	60
UNIT 3	2632	4	10.00	64	75	1	60
UNIT 4	3315	6	10.00	86	105	1	63

NOTES:
1. UNITS 1 THRU 3 BASED ON ERV-1 AIRFLOW RATE OF 75 CFM
1. UNIT 4 BASED ON ERV-2 AIRFLOW RATE OF 100 CFM
2. IMC 403.3.2.1 CALCULATION BASED ON EQUATION 4-8 BELOW
   VENTILATION RATE = 0.01 X AREA + 7.5(BEDROOMS +1)

HVAC SCHEDULE

KEY	UNIT TYPE	DESCRIPTION	HEAT'G	COOL'G	HEAT'G DERATE	COOL'G DERATE	FLOW	PRES.	WEIGHT	PWR	VOLT	MANUFACTURER/CAT. #
AH-0.75	VRF INDOOR HEAT PUMP, CASSETTE	VRF HEAT PUMP, CEILING CASSETTE, DX COIL, SETBACK T-STAT. INDOOR UNIT POWERED BY OUTDOOR UNIT	6.65 MBH @ 17°F	0.75 TON (NOM)	-	-	380 CFM	-	41 LBS	0.2 MCA	208/1	CARRIER 40MBCQ09B3
CU-0.75	CONDENSING UNIT	AIR COOLED CONDENSING UNIT, ROTARY INVERTER COMPRESSOR, 24.1 SEER, 10.6 HSPF, TO BE PAIRED WITH AH-0.75	6.65 MBH @ 17°F	0.75 TON (NOM)	-	-	-	-	74 LBS	15 MCA	208/1	CARRIER 38MARBQ09B3
AH-1.5 A-C	DUCTED HEAT PUMP FAN COIL UNIT	VRF DUCTED HEAT PUMP UNIT, R410a, VERTICAL, SETBACK T-STAT (ECOBEE EB-STATESLC-01 OR EQUIVALENT), MERV 13 FILTER, 5kW SUPPLEMENTAL ELECTRIC HEAT	19 MBH	1.5 TON (NOM)	17.1 MBH	14.9 MBH	575 CFM	0.8"	107 LBS	2.5 MCA	208/1	CARRIER 40MUAAQ18XB3
										5 KW	208/1	CARRIER EHKMB05KN
CU-1.5 A-C	HEAT PUMP CONDENSING UNIT	AIR COOLED CONDENSING UNIT, INVERTER ROTARY COMPRESSOR, HIGH HEAT, 18.0 SEER2, 9.3 HSPF2, TO BE PAIRED WITH AH-1.5	19 MBH	1.5 TON (NOM)	17.1 MBH	14.9 MBH	-	-	103 LBS	16 MCA	208/1	CARRIER 38MURAQ18AB3
AH-2	DUCTED HEAT PUMP FAN COIL UNIT	VRF DUCTED HEAT PUMP UNIT, R410a, VERTICAL, SETBACK T-STAT (ECOBEE EB-STATESLC-01 OR EQUIVALENT), MERV 13 FILTER, 5kW SUPPLEMENTAL ELECTRIC HEAT	24 MBH	2 TON (NOM)	21.4 MBH	20 MBH	760 CFM	0.8"	107 LBS	4 MCA	208/1	CARRIER 40MUAAQ24XB3
										5 KW	208/1	CARRIER EHKMB05KN
CU-2	HEAT PUMP CONDENSING UNIT	AIR COOLED CONDENSING UNIT, INVERTER ROTARY COMPRESSOR, HIGH HEAT, 17.4 SEER2, 10 HSPF2, TO BE PAIRED WITH AH-2	24 MBH	2 TON (NOM)	21.4 MBH	20 MBH	-	-	103 LBS	16 MCA	208/1	CARRIER 38MURAQ24AB3
AH-4 A-D	DUCTED HEAT PUMP FAN COIL UNIT	VRF DUCTED HEAT PUMP UNIT, R410a, VERTICAL, SETBACK T-STAT (ECOBEE EB-STATESLC-01 OR EQUIVALENT), MERV 13 FILTER, 8kW SUPPLEMENTAL ELECTRIC HEAT	50 MBH	4 TON (NOM)	39.9 MBH	38.9 MBH	1280 CFM	0.8"	133 LBS	9 MCA	208/1	CARRIER 40MUAAQ48XB3
										8 KW	208/1	CARRIER EHKMB08KN
CU-4 A-D	HEAT PUMP CONDENSING UNIT	AIR COOLED CONDENSING UNIT, INVERTER ROTARY COMPRESSOR, HIGH HEAT, 15.6 SEER2, 9.4 HSPF2, TO BE PAIRED WITH AH-4	50 MBH	4 TON (NOM)	39.9 MBH	38.9 MBH	-	-	249 LBS	16 MCA	208/1	CARRIER 38MURAQ48AB3
EF-1	CEILING EXHAUST FAN	1-SPEED VENTILATION/ EXHAUST FAN, BACKDRAFT DAMPER, INT. CONTROLS, ENERGY STAR, RADIATION DAMPER WHERE INSTALLED IN RATED ASSEMBLY					50 CFM	0.25"	10 LBS	20 W	120/1	PANASONIC FV-0511VK2 (WHISPER GREEN SELECT)
HU-1	HUMIDIFIER	STEAM HUMIDIFIER, SINGLE TUBE DUCTED DISTRIBUTION, 6.1 LB/HR HUMIDIFICATION, WIRED TO AH-4 HUMIDISTAT, CONDESNATE PUMP (MODEL AX315 OR EQUIV), WATER FILTER (MODEL SF KB210 OR EQUIV.), AIR PRESSSURE DETECTOR (MODEL SW APS OR EQUIV.)					-	-	35 LBS	2.5 KW	208/1	NEPTRONIC SKR25-208-N
ERV-1	ENERGY RECOVERY VENTILATOR	3 KW ELECTRIC DUCT HEATER, MERV 8 OUTDOOR FILTER, MERV 8 EXHAUST AIR FILTER, INSULATED LOW LEAKAGE SUPPLY AND EXHAUST DAMPERS, PERCENTAGE TIMER WITH AIR HANDLER INTERLOCK (PM)	-	-			75 CFM OA / 75 CFM EA	0.3" OA/ 0.3" EA	36 LBS	10 MCA	120/1	RENEWAIRE EV PREMIUM MH
										3 KW	208/1	
ERV-2	ENERGY RECOVERY VENTILATOR	3 KW ELECTRIC DUCT HEATER, MERV 8 OUTDOOR FILTER, MERV 8 EXHAUST AIR FILTER, INSULATED LOW LEAKAGE SUPPLY AND EXHAUST DAMPERS, PERCENTAGE TIMER WITH AIR HANDLER INTERLOCK (PM)	-	-			105 CFM OA / 105 CFM EA	0.3" OA/ 0.3" EA	36 LBS	10 MCA	120/1	RENEWAIRE EV PREMIUM MH
										3 KW	208/1	
EUH-1	ELECTRIC UNIT HEATER	ELECTRIC UNIT HEATER W/ INTERGRAL LINE VOLTAGE STAT, CEILING SUSPENDED	2.2 KW				350 CFM		27 LBS	2.2 KW	208/1	QMARK MUH03-21
BH-1	ELECTRIC BASEBOARD HEATER	ELECTRIC BASEBOARD HEATER W/ INTERGRAL LINE VOLTAGE STAT, 28" LENGTH	1.7 MBH	-			-	-	-	500 W	120/1	QMARK HBB500
NOTES:	* M.C. IS RESPONSIBLE FOR ALL ANCILLARY EQUIPMENT AND DUCTWORK NEEDED TO CONNECT EQUIPMENT. IT IS THE CONTRACTORS RESPONSIBILITY TO COORDINATE ELECTRICAL CHANGES DUE TO EQUIPMENT SUBSTITUTIONS WITH EC.											

HYDRONIC SCHEDULE

KEY	UNIT TYPE	DESCRIPTION	HEAT'G	COOL'G	FLOW	PRES.	WEIGHT	PWR	VOLT	MANUFACTURER/CAT. #
BLR-1	HYDRONIC BOILER	ELECTRIC BOILER, STEEL CONSTRUCTION, FLOW SWITCH, FUSED CONTROL TRANSFORMER, FUSED DISCONNECT,	120 kW	-	41 GPM	3.6' HD	700 LBS	291.5 A	208/3	ELECTRO INDUSTRIES EB-N8-120-208
P-1	CIRCULATION PUMP	CAST IRON HOUSING, COMPOSITE IMPELLER, CANNED ROTOR, 50% P.G.			42.4 GPM	3.6' HD	17.9 LBS	115 W	120/1	GRUNDFOS UPS32-40 (BOILER PUMP)
P-2	CIRCULATION PUMP	CAST IRON HOUSING, STAINLESS IMPELLER, CANNED ROTOR, 50% P.G.			25 GPM	12' HD	17.6 LBS	157 W	120/1	GRUNDFOS MAGNA3 32-120 GF (SNOWMELT LOOP)
BF	BOILER FEEDER	17 GALLON TANK, LEAK DETECTION, 50% PROPYLENE GLYCOL, MAX 45 PSI			1 GPM	12' HD	8.2 LBS	50 W	115/1	AXIOM DMF300
ET	EXPANSION TANK	8.6 GALLON TANK COLUME, 3.2 ACCEPTANCE VOLUME, VERTICAL TANK					38 LBS			AMTROL AX-15V-DD
NOTES:	* M.C. IS RESPONSIBLE FOR ALL ANCILLARY EQUIPMENT AND DUCTWORK NEEDED TO CONNECT EQUIPMENT. IT IS THE CONTRACTORS RESPONSIBILITY TO COORDINATE ELECTRICAL CHANGES DUE TO EQUIPMENT SUBSTITUTIONS WITH EC.									

GRILLE REGISTER DIFFUSER SCHEDULE

KEY	DESCRIPTION	CEIL'G	ACCESSORIES	MANUFACTURER/CAT #
S1	DOUBLE DEFLECTION SUPPLY REGISTER, FRONT BLADES PARALLEL TO SHORT DIMENSION, WHITE	GYP	OB DAMPER	HART & COOLEY A718
R1	RETURN GRILLE, 20 DEGREE FIXED BLADE, WHITE PARALLEL TO LONG DIMENSION	GYP		HART & COOLEY 650
R2	FILTERED RETURN GRILLE, 20 DEGREE FIXED BLADE, WHITE PARALLEL TO LONG DIMENSION	GYP		HART & COOLEY 659
R3	RETURN GRILLE, 30 DEGREE FIXED BLADE, FRONT BLADES PARALLEL TO LONG DIMENSION, WHITE	GYP		TITUS 25RL
L	WALL LOUVER, HEAVY GAUGE ALUMINUM, 37.5 DEG DRAINABLE BLADE		1/2" BIRDSCREEN	GREENHECK ESD-435
NOTES:	COORDINATE DIFFUSER LOCATIONS WITH LIGHTS AND OTHER CEILING ELEMENTS			

COLORADO LICENSED
ERIC SMITH
38983
05/02/2024
PROFESSIONAL ENGINEER

NOTICE: DUTY OF COOPERATION

Release of these plans contemplates further cooperation among the owner, his contractor and the architect. Design and construction are complex. Although the architect and his consultants have performed their services with due care and diligence, they cannot guarantee perfection. Communication is imperfect and every contingency cannot be anticipated. Any ambiguity or discrepancy discovered by the use of these plans shall be reported immediately to the architect. Failure to notify the architect compounds misunderstanding and increases construction costs. A failure to cooperate by a simple notice to the architect shall relieve the architect from responsibility for the consequences. Changes made from the plans without consent of the architect are unauthorized and shall relieve the architect of responsibility for all consequences arriving out of such changes.

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5455, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	AF
Checked By:	MV

Project Phase
PERMIT

Sheet Title
MECHANICAL SCHEDULES

Sheet Number
M6.1

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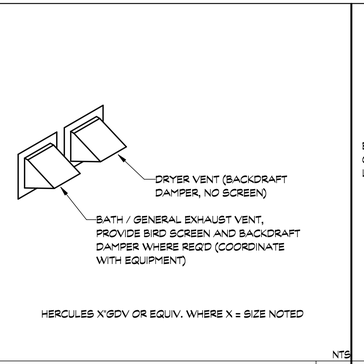
LEGEND

- DUCT (INSIDE DIM. SIDE SHOWN INSIDE DIM. SIDE NOT SHOWN)
- SUPPLY DUCT (SECTION)
- RETURN DUCT (SECTION)
- EXHAUST DUCT (SECTION)
- ROUND DUCT, RIGID
- FLEXIBLE DUCT
- FLEXIBLE CONNECTOR
- TURNING VANES
- SUPPLY DIFFUSER (ARROWS INDICATE DISTRIBUTION)
- RETURN REGISTER / GRILLE
- MECHANICAL POINT OF CONNECTION
- FIRE DAMPER
- SMOKE AND FIRE DAMPER
- THERMOSTAT
- MANUAL BALANCING DAMPER
- MOTORIZED BALANCING DAMPER
- HWS — HOT WATER SUPPLY
- HWR — HOT WATER RETURN
- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- C — CONDENSATE
- S — STEAM
- GRILLE / REGISTER / DIFFUSER
- MECHANICAL EQUIPMENT
- DETAIL NOTE
- KITCHEN / MEDICAL EQUIPMENT

SA	SUPPLY AIR
OA	OUTSIDE AIR
MA	MIXED AIR
RA	RETURN AIR
EA	EXHAUST AIR
AD	ACCESS DOOR
OBD	OPPOSED BLADE DAMPER
RUS	ROUTE IN JOIST SPACE
(E)	EXISTING TO REMAIN
(ER)	EXISTING TO BE REPLACED
(ED)	EXISTING TO BE DEMOLISHED
	DUCT DETECTOR
	REMOTE INDICATING LIGHT



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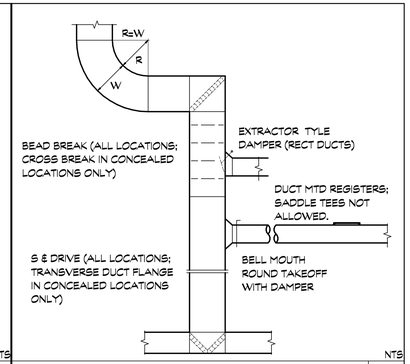
EXHAUST & DRYER VENT DETAIL | 4



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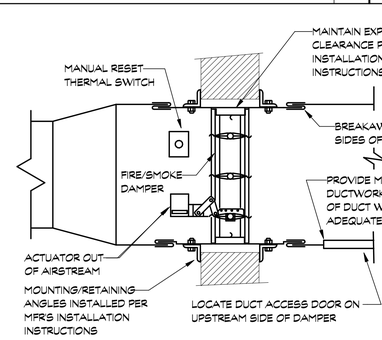
LOW PRESSURE DUCT CONNECTIONS | 3

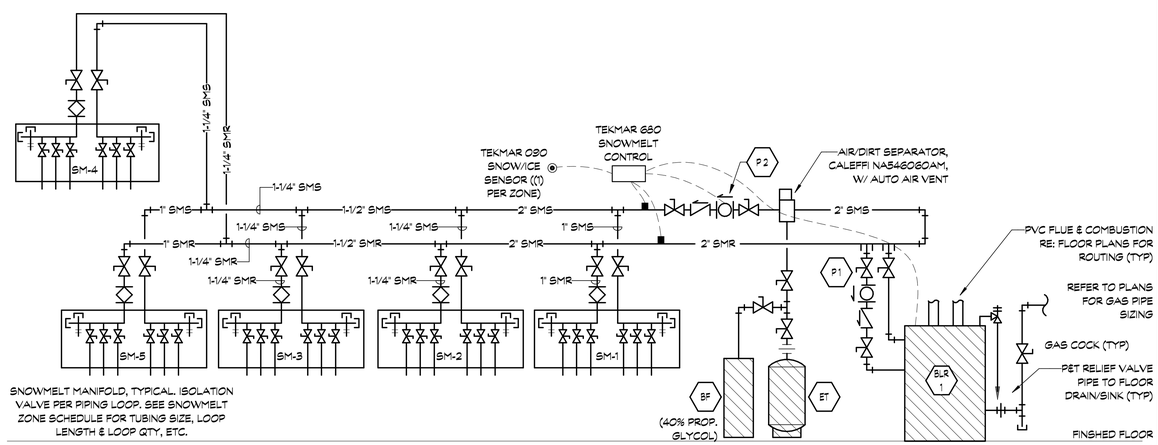


NOTES:

1. INSTALL ASSEMBLY IN STRICT ACCORDANCE WITH MFRS INSTRUCTIONS.
2. PROVIDE AND INSTALL ADDITIONAL STEEL MULLIONS FOR MULTIPLE FIRE/SMOKE DAMPER ASSEMBLIES.
3. PROVIDE DUCT TRANSITIONS BETWEEN DAMPER AND DUCT.
4. PROVIDE RED IDENTIFICATION PAINT ON EXTERIOR OF DAMPER ASSEMBLY.

NTS

FIRE/SMOKE DAMPER INSTALLATION DIAGRAM | 2



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HYDRONIC SNOWMELT PIPING DIAGRAM | 1

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38983
05/02/2024
PROFESSIONAL ENGINEER

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MECHANICAL DETAILS

Sheet Number
M6.2

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

1.01 WORK INCLUDED

A. The work included by this division of the specifications includes furnishing all labor, materials, equipment, and services, including minor items omitted but necessary to construct and install the complete systems described by the Contract Documents and specified below. "Contractor" refers to the Mechanical Contractor. The general conditions of the specifications apply and are included in this part of this section.

1. Heating, ventilating and air conditioning systems
2. Snowmelt
3. Temperature control system

1.02 CODES AND REGULATIONS

A. Comply with state and local codes, and utility company regulations. Final interpretations will be made by the local inspection authority. The Contractor to verify the governance of the following Codes, including any local amendments and supplementary codes such as the Codes of the National Fire Protection Association:

1. Building Code: 2021 International Building Code
2. Plumbing Code: 2021 International Plumbing Code
3. Mechanical Code: 2021 International Mechanical Code
4. Fire Code: 2021 International Fire Code
5. Gas Code: 2021 International Fuel Gas Code
6. Energy Code: 2021 International Energy Conservation Code
7. Electrical Code 2023 National Electrical Code

1.03 EQUIPMENT AND MATERIALS STANDARDS

A. Equipment and materials shall be new, UL-listed for the use intended, and free from damage or defect. They shall comply with the latest industry standards.

1.04 CONTRACT DRAWINGS

A. Illustrate the general design and extent of performance required. All dimensions and locations shall be taken from the Architectural drawings. Consult with Architectural plans and locate all ceiling equipment where indicated on reflected ceiling plans

1.05 SHOP DRAWINGS

A. Submit products data and/or shop drawings as required by the Architect for the following:

1. Insulation
2. Air handling equipment
3. Grilles, registers, diffusers, louvers
4. Fire dampers
5. Temperature controls, systems, and components
6. Valves
7. Boilers
8. Pumps

B. Quality of specific equipment is established by manufacturer's catalog number. Alterations caused by any Substitution shall be accomplished at no additional expense to the Owner.

C. Manufacturers not listed may submit for acceptance as an "approved equivalent." Requests for an "equivalent" means "approved equivalent". Four copies of such submittal must be received by the Engineer seven (7) working days prior to bid date.

1.06 WARRANTY

A. The Contractor shall be responsible for the successful operation of mechanical systems, equipment, and materials installed under this Contract for a period of one year from the date of final acceptance. Defective equipment or materials shall be repaired or replaced at no expense to the Owner. Provide four complete service and maintenance calls spaced at equal intervals during the warranty period.

1.07 PRODUCT HANDLING AND CLEAN UP

A. Equipment shall be left clean and undamaged, to the satisfaction of the Owner. The General Conditions take precedence.

B. HVAC equipment shall not be used during construction as a means to heat or cool the space, unless specific approval is given by the owner. If such equipment is used, it must be completely cleaned and repaired as necessary. Cleaning involves replacing all filters; cleaning all coils and heat exchangers; inspecting fans, plenums, and ductwork and cleaning as directed by the owner.

1.08 CUTTING AND REPAIRING

A. The contractor shall be responsible for all cutting, drilling, welding, and repair required for his portion of the work. Coordinate with the Architect. The General Conditions take precedence.

1.09 OPERATING AND MAINTENANCE DATA

A. Provide the Owner with operating and maintenance instructions (four copies) required for operation of all mechanical systems. Bind the written instructions in a notebook. The General Conditions take precedence. The manuals shall include the following items:

1. Operating manual and spare parts list for each piece of equipment.
2. Preventive maintenance schedule for lubricating and checking each piece of equipment.
3. Instructions on who to call for service during the warranty period.

1.10 PERMITS

A. The contractor shall pay for all fees, taxes, secure permits, licenses, and inspections required for the project.

1.11 TEMPORARY SERVICES

A. Provide temporary water service for construction, as required by the General Contractor.

1.12 COORDINATION

A. Coordinate outlet device and equipment locations with the Architectural Plans and work of other trades. Locate on horizontal and vertical lines to avoid interference and to provide functional use of all equipment. Verify electrical power characteristics before ordering equipment.

B. Electrical work performed by this contractor will conform to the standards of Division 26-28. Mechanical equipment motors and controls shall be furnished, set in place, and wired according with the following schedule unless otherwise noted or specified. MC = Division 21-23 EC = Division 26-28

Item	Furn By	Set By	Power Wiring	Control Wiring
Combination starters	MC	EC	EC	MC
Equipment motors	MC	MC	EC	--
Motor starters & O.L. relays	MC	EC	EC	MC
Disconnect switches	EC	EC	EC	MC
Thermal overload heaters (1)	EC	EC	EC	--
Variable Speed Drives	MC	EC	EC	MC
Control relays/transformers	MC	MC	EC	MC
Temperature control panels	MC	MC	EC	MC
Temp. Controls conduit/wiring	MC	MC	--	MC
Actuator and solenoid wiring	MC	MC	--	MC
Pushbuttons & pilot lights	MC	MC	--	MC
Room thermostats	MC	MC	--	MC
Thermostats: line voltage	EC	EC	EC	--

C. The general guideline for the division between control (by MC) wiring and power wiring (by EC) is that power wiring carries the current which energizes a motor, control wiring does not. Control wiring may be 120V, which would be the responsibility of the MC. Control motors are wired by the MC.

D. Examine the site and become aware of existing conditions, utilities, and other issues affecting the satisfactory completion of the project.

1.13 DELIVERY, STORAGE, HANDLING

A. Provide necessary hauling and hoisting equipment. Protect the materials of this Division before, during, and after installation.

1.14 AS-BUILT DRAWINGS

A. Keep a current set of "as-built" drawings on site. Upon completion of the work, furnish engineer with a reproducible prints showing the "as-built" installation.

1.15 PROJECT/SITE CONDITIONS

A. Visit the site to become familiar with location and the various conditions affecting the work, including existing utilities.

1.16 PLAN VERIFICATION

A. After completion of the bidding and selection process, prior to awarding the contract, the contractor must review and verify the contract documents in their entirety, including those of other trades. At this time, discrepancies, conflicts, omissions, etc in the contract documents must be documented. Alterations to the contract will be made at that time to include such items, as well other modifications which might be made by the Owner. After award of the contract, change orders caused by discrepancies, conflicts, omissions in the contract documents will not be allowed.

2.01 EXPANSION JOINTS, GUIDES, AND ANCHORS

A. Provide expansion joints or loops, guides, and anchors in piping to allow for expansion and contractions. Expansion joints shall be bellows type.

2.02 VALVES

A. Gate valves 2" and smaller shall be cast bronze, rising stem, solid disc, 200 PSI WOG

B. Ball valves 2" and smaller shall be cast bronze, full port, stainless steel ball, teflon sets, 400 PSI WOG.

C. Butterfly valves 2" and smaller shall be cast bronze, stainless steel disc, surrounding fluorelastomer seal, 350 PSI WOG.

D. Check valves shall be horizontal, swing-cast bronze, bronze disc, 200 PSI WOG.

E. Valves shall be domestically manufactured by Milwaukee, Powell, Nibco, or equivalent.

2.03 RELIEF VALVES

A. Relief valves shall be all-bronze A.S.M.E. rated valves with external test levers, sized in accordance with the instructions of the appropriate manufacturer. Pipe discharge outside or to floor drain where possible and per code. Valves shall be manufactured by Watts or equivalent.

2.04 FLEXIBLE CONNECTORS

A. Connectors in piping shall be made with molded teflon or neoprene and nylon bellows, metal reinforcing rings, flanged ends and control rods, suitable for 40F to 200F temperature range and 125 lbs. pressure. Alternative shall be stainless steel inner hose with braided exterior sleeve for steel pipe or bronze inner hose with braided exterior sleeve for copper piping. Metra-flex Company, or equivalent.

2.05 SPECIALTIES

A. P/T Plugs: 1/4" diameter, brass with Nordel core, Sisco or equivalent.

B. Pressure Gauges: 4 1/2" dial type, aluminum housing. Ashcroft 1010 or equivalent.

C. Thermometers: 7" red reading mercury type. Palmer Instruments or equivalent.

2.06 ELECTRICAL

A. Lugs: Lugs for wiring connections shall be rated for copper and aluminum, nad shall have a minimum rating of 75C.

B. Electric motors shall be rated for the appropriate application: wet location (TEFC); submersible; explosion proof, VFD's, etc.

2.07 ACCESS PANELS

A. The Mechanical Contractor shall furnish and General Contractor shall install access panels where required for access to equipment. The Mechanical Contractor shall include the cost of installation in his bid. Access panels shall be adequately sized, of a type approved by the Architect and shall be fire or smoke-rated as required.

3.01 START-UP PROCEDURES

A. Follow manufacturer's recommended procedures in starting up the equipment; damage caused during start-up shall be replaced at no expense to the owner.

3.02 HANGERS AND SUPPORTS

A. Support piping and equipment from the structure to prevent sagging, pocketing, swaying, and vibrations, and arranged to provide for expansion and contraction. Brackets, clamps, and hangers shall be steel, except copper hangers will be used with copper piping. Hangers supporting vibrating equipment shall be provided with spring isolators. Chain, perforated iron or wire hangers are not permitted. Hangers will be of a type acceptable to the Engineer, and shall have a capacity and spacing as required by code.

3.03 EXCAVATION AND BACKFILLING

A. Provide excavating and backfilling for Mechanical Work. Backfill in 12" layers, mechanically tamp to 95% proctor standards. Protect according to OSHA standards. The General Conditions take precedence. Verify the location of underground utilities before excavation; the contractor is responsible for any damage to underground utilities. Restore existing paving, curbs, sod, bushes, etc to match surroundings.

3.04 PIPING INSTALLATION

A. Install piping plumb and straight, parallel with walls and partitions. Conceal piping within structure whenever practical. Provide drain valves at all low points, vents at all high points, to allow complete drainage.

B. Material and methods per ASME, ASTM, ASA, AWS, and National Plumbing Code Handbook

C. Provide unions or flanges in piping connections to each valve, device, or item of equipment. Install each union or flange to permit the removal of parts and equipment for inspection or cleaning, without disconnecting any piping, except unions or flanges.

D. Piping on the roof will be supported above the roof on roof pads. The pads shall be approximately 6”Wide by 6” high by the length as required. They shall be made of recycled rubber, rated for 500lbs/ft loading each. The pads will have galvanized steel “C” channel attached to the top, which can accommodate pipe clamps to secure the piping. This configuration of individual piping pads may be expanded to include two pads supporting a trapeze style support where multiple pipes are racked together. The pads are C-series manufactured by Cooper B-line, Erico, or approved equivalent.

3.05 PIPING TESTING

A. All piping systems shall be tested and witnessed by the Owner prior to concealment. Protect equipment and fixtures or equipment, isolating them during the test. DWV system, including vents and vent stacks shall be sealed and hold water without leaks for 24 hours. Pressure piping shall be tested at the maximum pressure rating of the lesser of piping or fittings. Copper domestic water and hydronic piping may be air tested or hydrostatically tested; PEX or CPVC water piping shall be hydrostatically tested; natural gas piping shall be air tested.

3.06 CLEANING AND STERILIZATION

A. After testing, water piping systems shall be filled, operated for a sufficient length of time to completely remove all foreign material, and flushed.

B. Sterilize the domestic hot and cold water piping in accordance with the local health authority standards. Flush the systems with clear water until the residual chlorine content is equal to that of clear water.

C. Where there is no water treatment contractor sterilize piping system with chlorine for 24 hours to 50 PPM. Completely flush to less than 1 PPM. Local health authority standards take precedence.

3.07 FLEXIBLE PIPE CONNECTIONS

A. Provide flexible pipe connection suitable to connect to adjoining piping as specified for pipe joints. Use sized pipe units. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation.

3.08 PIPE IDENTIFICATION

A. After completion of the piping or insulation, paint stenciled descriptive abbreviations, including directional arrows, on piping at equipment and approximately every 25'.

3.09 SLEEVES AND PLATES

A. Provide sleeves and inserts for all mechanical piping. The contractor shall be responsible for the cost of cutting and patching required for piping where sleeves and inserts were not installed or where incorrectly located. Sheetrock joint compound may be used to seal openings in non-rated walls(insulation to be continuous through walls.

B. Drill holes as required for the installation of hangers required for the mechanical work.

C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be made completely water-tight.

D. Seal all piping passing through fire-rated construction with approved material to maintain air-tight, fire-rated integrity, with a U.L. listed assembly compatible with the wall or floor assembly being penetrated.

3.10 LOW EMITTING MATERIALS

A. All sealants & adhesives required for the installation of mechanical & plumbing system within the building envelope shall meet the requirements for low emitting materials as set for in the South Coast Air Quality Management District (SCAQMD) Rule #1168 (or LEED new construction requirements), which includes but is not limited to:

1. Metal to Metal adhesive: VOC limit of 30g/L.
2. Fiberglass adhesive: VOC limit of 80g/L.
3. Multipurpose construction adhesive: VOC limit of 70 g/L.

SECTION 23 05 93-TESTING, ADJUSTING, AND BALANCING

1.01 GENERAL

A. Balancing shall be done by an independent firm specializing solely in the discipline of balancing air and water systems, and a member of NEBB.. Firms desiring to furnish services for this project shall submit for written approval during bidding. All air and hydronic systems shall be balanced using applicable proportionate procedure.

2.01 TESTING CONDITIONS

A. (Air) Before adjustments are made, check the system for such items as dirty filters, duct and damper leakage, vibrations, etc. All diffusers, duct sections, etc shall be adjusted to deliver design quantities within 5%. Air quantities shall be tested simulating filters being 50% loaded. Adjust/replace sheaves and belts as required to achieve design air quantities. Replace thermal motor overloads as required.

B. (Hydronic) Before adjustments are made, check the system to make water treatment has been completed and glycol added. Also check for leaks, vibrations, etc. All circuit setters shall be adjusted to deliver design fluid flows within 5%. Verify that there is no pump cavitation, and that boilers and coolers are cycling at appropriate temperatures.

2.02 REPORT

A. After all adjustments are made, a detail written report shall be prepared and submitted for approval. Final acceptance of the project will not be made until a satisfactory report is received and field verified. The report shall detail the test equipment and balancing procedures being used; the general status of the system being tested including equipment details; provide data sheets indicating the required and actual CFM of all outlets and inlets.

SECTION 23 07 00 - INSULATION

1.01 QUALITY ASSURANCE

A. All insulation shall have a composite rating (insulation, jacket and adhesives) not exceeding flame spread 25 and smoke developed 50.

2.01 PIPE INSULATION FOR PIPING ABOVE GRADE

A. Insulation shall be closed-cell, elastomeric pipe insulation having a conductivity of 0.27 at 75 °F mean, with thicknesses as follows:

Pipe Sizes	1/2" - 1-1/2”	>1-1/2"
Refrigeration (Suction Lines)	1"	1"

B. Insulation shall be Armacell "Armaflex" or equivalent by Johns-Mansville, Owens-Corning.

C. Exterior piping insulation will be painted with a white solvent based alkyd finish(Armaflex AB or equivalent), including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions. Where exposed to physical damage, exterior piping insulation will be covered with aluminum jacket, including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions.

D. All interior underground water(domestic and hydronic) piping shall be insulated with 1” Armaflex, except where noted.

2.02 PIPE INSULATION FOR PIPING BELOW GRADE

A. Insulation shall be closed-cell, elastomeric pipe insulation having a conductivity of 0.27 at 75 °F mean, with thicknesses as follows:

Pipe Sizes	1/2" - 1-1/2”	>1-1/2"
Refrigeration (Suction Lines)	1"	1"

B. Insulation shall be Armacell "Armaflex" or equivalent by Johns-Mansville, Owens-Corning.

C. Exterior piping insulation will be painted with a white solvent based alkyd finish(Armaflex AB or equivalent), including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions. Where exposed to physical damage, exterior piping insulation will be covered with aluminum jacket, including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions.

D. All interior underground water(domestic and hydronic) piping shall be insulated with 1” Armaflex, except where noted.

2.03 REFRIGERANT PIPE INSULATION

A. Insulation shall be 1” thick, closed-cell, elastomeric pipe insulation having a conductivity of 0.27 at 75 °F mean:

B. Exterior piping insulation will be painted with a white solvent based alkyd finish(Armaflex AB or equivalent), including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions. Where exposed to physical damage, exterior piping insulation will be covered with aluminum jacket, including all fittings, valves, etc. Jacket and insulation will be sealed weathertight and installed per manufacturers instructions.

2.04 DUCT LINER

A. Duct liner shall be 1-1/2 lb density (3.0lb for exterior ducts), constructed of glass fiber liner. The air stream surface is coated with black-coated mat surface. Liner shall have a "K" value of 0.24/inch at 75F mean.

B. Duct liner shall be installed as follows or as shown on the plans:

1. Exterior supply, return, or make up air ducts: 3”
2. Return air ducts(within 15' of fan): 1/2"
3. Outside air intakes within space: 1”
4. Treated make up air within space: (not insulated)

C. Liner shall be Johns-Manville "Linacoustic" or equivalent by Owens-Corning, Certaineed or Knauf.

2.05 EXTERIOR DUCT INSULATION, BOARD

A. Duct insulation shall be ridge polystyrene board insulation. Insulation shall have a K-factor no greater than .23 at 75°F mean.

B. Duct board shall be installed as follows or as shown on the plans:

1. Supply, return, or make up air ducts air ducts(exterior): 2” 3”

C. Cover insulation board with metal jacket, secure with screws or bands. Seal jacket weather tight with silicone caulk.

D. Or at the contractors discretion: cover insulation with a self-adhering weather proof membrane. Polyguard or equiv. Install per manufacturer's recommendations.

3.01 PIPE(ELASTOMERIC)

A. Insulation shall be solid slip-on installed prior to connection. Butt joints shall be sealed with manufacturer's adhesive. Where slit seams must be installed, seal the seam with manufacturer's adhesive. Fittings shall be insulated with meter-cut pieces of insulation according to manufacturer's instructions, or insulated with similar sheet insulation installed according to manufacturer's instructions.

B. Provide wood blocks and metal hanger shields at support strap locations on horizontal pipe runs. Insulation will not be interrupted for supports, etc.

3.02 ACOUSTIC DUCT LINER

A. Liner shall be secured to all duct surfaces by pressing into wet adhesive, applied to 100% of the duct surface. In addition, liner shall be held in place with insulpins welded to duct and with clips slipped over the pins. Insulpins shall be located per SMACNA Standards. Liner shall be lapped and compressed in all four corners of the duct. Both upstream and downstream transverse edges shall be coated with adhesive, coated a minimum of 1" over the edge in all places.

SECTION 23 09 00 - AUTOMATIC TEMPERATURE CONTROLS

1.01 SCOPE

A. Furnish, install, and place in operation a complete system of automatic temperature controls. The temperature control contractor may be the mechanical contractor or approved sub-contractor.

B. Acceptable automatic temperature control equipment manufacturer's shall be Honeywell, Johnson Controls, or controls furnished by the specific equipment manufacturer.

C. The control system shall include all components and appurtenances necessary to provide a complete system. All wiring for automatic temperature controls, regardless of voltage shall be the responsibility of the ATC Contractor. 120VAC work shall be installed in conformance with requirements of Division 16. The Temperature Control Contractor shall coordinate all electrical work associated with his installation with the Electrical Contractor. Power wiring for all equipment, shall be the responsibility of the Electrical Contractor.

1.02 QUALITY ASSURANCE

A. Upon completion of the work, instruct the building operating personnel and provide two (2) complete sets of operating and maintenance instruction booklets.

B. Submit copies of complete temperature control diagrams with written "sequence of control" and factory-printed specification data sheets covering each control device proposed to be used, prior to installation of any equipment or part or system.

1.03 SERVICE AND GUARANTEE

A. The Contractor shall guarantee the control system installed under this section of the specification to be free from defects in workmanship and material under normal use, and agrees to provide service for one (1) year after acceptance by the Engineer or of beneficial occupancy of the building. Any defects in workmanship or material during this time shall be corrected at no charge to the Owner.

2.01 THERMOSTATS

A. HVAC unit thermostats shall be low-voltage, programmable, heating/cooling type with fan on-auto switch. Units shall be Honeywell TH6000 or equivalent .

3.01 SEQUENCE OF OPERATION

A. HVAC units shall each be controlled by a heating/cooling thermostat.

B. Toilet exhaust fans shall be controlled with associated lights.

C. Activation of a duct detector shall shut down its respective HVAC unit.

SECTION 23 21 00 - HYDRONIC PIPING SYSTEMS

1.01 WORK INCLUDED:

A. The work required is indicated on the drawings and includes, but is not necessarily limited to, a complete hydronic heating system, using a boiler as the heat source.

2.01 PIPING:

A. Piping shall be Type "L" copper with 50/50 solder joints or schedule 40 black steel with threaded or welded joints.

2.02 EXPANSION TANK:

A. The expansion tank shall be a welded steel, diaphragm type tank, ASME rated, sized as shown and sized on the drawings. The tank fitting shall include an air purger, air vent, and fill valve.

2.03 PUMPS:

A. Pumps shall be 1750 rpm single-stage, in-line, centrifugal oil-lubricated, sleeve-bearing pump bronze fitted with cast iron casting with flanged piping connections, and having mechanical seals.

B. Motor selections shall be such that they are non-overloading under all conditions of operation. Motors shall be open drip-proof type. Provide motor controller for each pump.

C. All pumps shall be by the same manufacturer, Grundfos, Bell & Gossett, Taco, Paco, or approved equal.

2.04 BOILER

A. The boiler will be of a sealed combustion low-pressure, 90%+ efficiency condensing boiler capable of developing full A.G.A. certified gross output capacity at 100 percent firing rate.

B. The boiler shall be stamped with the required official ASME symbol, hydrostatically pressure tested for 160 psig, ASME working pressure. Maximum working pressure will be 15 psig.

C. The boiler shall be furnished with a heavy-gauge aluminized steel base with aluminized steel curtain walls. The end, front, and back base panels shall be protected with high- temperature insulation board panels. The boiler base shall be factory packaged with burner manifolds, main burners, base panels, and insulation board panels.

D. Gas burners : The boiler shall be provided with stainless steel main burners which shall be manufactured of one-piece construction. The burner shall modulate down to 10%.

E. Controls:

1. All electrical safety controls are to be of accepted quality manufacture and shall be U.L. and A.G.A. design certified.
2. The boiler shall be equipped with intermittent electronic ignition pilot system.
3. The inlet gas pressure to the boiler manual main shut-off gas valves should be no less than 5" water column or no more than 7" water column.
4. Operating controls shall be as shown on the plans.

F. Water Boiler Standard Controls:

1. Low-limit (operating) and high-limit temperature controls. The low-limit control shall be set according to the design requirements of the heating system. The high-limit control should be set at least 20oF higher than the low-limit control setting.
2. ASME-certified pressure relief valves and the valves shall be set to relieve at the rated boiler ASME working pressure.
3. Low water cut-off with manual reset, per the state boiler code.

G. The boiler will be manufactured by Triangle Tube, Laars, Raypak, or equivalent.

2.05 WATER HEATER (HYDRONIC):

A. Provide a hydronic water heater, sized as shown on the plans. The heater shall be constructed of a polyethylene tank, insulated with urethane foam insulation, with a steel outer shell. The heat exchanger shall be made of coiled copper tubes, completely immersed within the tank. An immersion thermostat shall be provided with adjustable temperature control, including necessary interlocks and relays for the hydronic pump control interface. Provide a P/T relief, sized for the heater, piped full size to a nearby floor drain.

3.01 HYDRONIC HEAT PIPING SYSTEM:

A. Provide air vents at all high points where air pocket might form and drain valves with hose ends at low points.

B. No connections will be permitted that do not make ample and approved allowance for expansion, and provide for proper drainage at all times.

C. Provide isolation valves and balancing cocks on each supply and return connection from branches. Install terminal units: baseboard, fin tube, fan coil units, etc per manufacturer's instructions.

D. Provide dielectric unions at all points of connection between steel and copper piping.

3.02 PUMPS:

A. In-line pumps shall be supported by hanging or welded floor supports. They shall not be supported by connecting piping.

B. Provide taps on the inlet and discharge of each pump to measure pressure differential.

3.03 BOILER:

A. The boiler shall be pre-assembled or assembled and installed per manufacturer's instructions.

SECTION 23 21 13 - RADIANT SNOW MELT SYSTEM

4.01 GENERAL

A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements shall be used in conjunction with this division as a part of the Contract Documents. Contractors shall be responsible for and be governed by all requirements hereunder.

B. Provide hydronic snow melt system that is manufactured, fabricated and installed to comply with regulatory agencies and authorities with jurisdiction, and maintain performance criteria stated by the PEX tubing manufacturer without defects, damage or failure, including system controls and manufacturer-supported system startup and commissioning.

C. Installer must be factory trained and certified by the PEX tubing manufacturer, with demonstrated experience on projects of similar size and complexity.

D. Do not expose PEX tubing to direct sunlight for more than 30 days. If construction delays are encountered, cover the tubing to prevent exposure to direct sunlight.

4.02 WARRANTY

A. PEX Tubing: 30-year, non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion when installed by a factory-trained contractor.

B. Manifolds and Fittings: 5-year, non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion when installed by a factory-trained contractor

C. Warranty Period for Controls and Electrical Components: 2-year, non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion when installed by a factory-trained contractor.

5.01 TUBING:

A. Tubing shall be crosslinked polyethylene (PEX) manufactured by the PEX-a method with an oxygen-diffusion barrier in accordance with German DIN 4726 and ASTM F876.

B. Tubing shall be PEX Type: Wirsbo hePEX™ or equivalent.

5.02 FITTINGS

A. Fittings shall be brass compression fittings, of the same manufacturer as the tubing. The fitting assembly consists of a barbed insert, a compression ring and a compression nut. The barbed insert is manufactured with an o-ring to facilitate air pressure testing. Fitting assembly manufactured from UNS C3600 series brass material.

B. The following proprietary fitting system(Uponor ProPEX-QS20) or equivalent may be used.

1. The fitting assembly consists of a barbed adapter and an appropriately sized PEX ring. The barbed insert may include an o-ring to facilitate pressure testing with air.
2. Fittings manufactured in accordance with ASTM F1960

5.03 BRASS MANIFOLDS

A. Manifolds shall be 1¼-inch brass, sized to allow the manifold assemblies to be mounted inside the wall cavity.

B. Manifolds must be capable of individual flow control for each loop on the manifold through valve actuators available from the manifold supplier, and manual flow balancing capability within the manifold body. Flow setters shall be provided on the return leg from the manifold to provide flow balancing between manifolds.

C. Each manifold shall have a manual air vent.

6.01 INSTALLATION

A. Verify that site conditions are acceptable for installation of the hydronic radiant snow melt system before installation begins.

B. Minimum Bend Radius (Cold Bending): No less than six times the outside diameter. Use the PEX tubing manufacturer's bend supports if radius is less than stated. For tubing that exits the slab in a 90-degree bend, use metal or PVC bend supports.

C. Fasten the tubing to the flat mesh or reinforcing bar or snap into PEX rails according to the PEX tubing manufacturer's recommendations.

D. Do not exceed 9 inches on center for snow melt sections of the design. Do not install tubing within 6 inches of any wall.

E. Refer to the submitted radiant snow melt design layout for actual on-center information.

F. Install tubing at a consistent depth below the surface elevation as determined by the project engineer. Ensure sufficient clearance to avoid control joint cuts.

6.02 SLAB ON-GRADE INSTALLATION

A. With under-slab insulation, the structural engineer determines the vertical compressive strength of the high-density extruded board insulation. The radiant floor design determines the required R-value.

B. When using high-density board insulation, staple the tubing to the board per mfgr's instructions.

C. Use edge insulation when the heated system directly contacts an exterior wall or beam.

D. Where tubing must cross metal expansion joints route the tubing below the joints. Depending on the manufacturer's and structural engineer's recommendation, fibrous expansion joints may tolerate penetration.

SECTION 23 25 00 - WATER TREATMENT

7.01 WORK INCLUDED

A. Install materials, equipment, and services for the following systems:

1. Boiler water softening. Furnished and installed by the mechanical contractor.
2. Chlorination of Domestic Water Lines: See Section 23 05 00 Basic Materials and Methods.

7.02 QUALITY ASSURANCE

A. Chemical Treatment Contractor shall specialize in Water Treatment Service and have laboratory facilities, both central and field, available to service the Owner's account.

7.03 SUBMITTALS

A. The Water Treatment Contractor shall provide a written Engineering Report on the results of the water treatment for the first year. One copy to the Owner and one copy to the Engineer and Architect.

B. Technical literature shall be delivered at turnover to the Owner's designated representative in duplicate for each chemical and piece of equipment provided.

7.04 MAINTENANCE

A. Provide quarterly service calls to instruct Contractor's and Owner's personnel in treatment, testing, and maintenance of the chemical treatment program from one month prior to turnover until the end of the one-year guarantee.

B. Written chemical test report and recommendations shall be made at each visit with one copy to the Owner's designated representative and one copy to the mechanical engineer.

8.01 WATER SOFTENER

A. Provide a water softener with related components to process water supply to the water heater, capable of 45 gpm at 25 psi, 8 gpm at 5 psi. The exchange capacity shall be a minimum 60,000gr per lb, base on 10 grains per gallon entering water.

B. The controls will be based on a seven day time clock with an aqua sensor to allow regeneration at 4AM on the morning following measurement of hardness which exceeds 3 gr.

C. The unit shall be a Culligan HI-FLO 2/2E-PV-90B, or equivalent. The equipment shall be a part of a service agreement entered into with owner.

8.02 CLOSED SYSTEMS WITH GLYCOL:

A. A buffered nitrite corrosion inhibitor compatible with 40% propylene glycol solution shall be provided to initially treat the closed hydronic systems. The Water Treating Contractor shall add and maintain in the system 500 to 1000 ppm. NaNO2.

1. After closed systems have been cleaned and flushed they shall be filled with a solution of water and pure ethylene glycol (30% by volume). The Water Treatment Contractor shall then add the Buffered Nitrite to the system to bring the residual up to 500 to 1000 ppm. NaNO2.
2. Solution tests for Glycol and Nitrite shall be submitted to the engineer and architect after the system has been filled by the Water Treatment Contractor.
3. Standard automotive antifreeze or any other solution with oil-base are not allowed.

SECTION 23 30 00 - HVAC AIR DISTRIBUTION SYSTEMS

1.01 DUCTWORK

A. General All ductwork shall be constructed strictly according to the latest ASHRAE, SMACNA, and IMC standards. Duct sizes shown are inside clear dimensions; maintain sizes inside lining for lined ducts.

B. Sheet Metal:

1. Sheet metal shall be constructed of coated galvanized steel of lock-forming grade conforming to ASTM Standards A-653/A653M and A-924. Reinforcement shall be constructed of galvanized steel.
2. Duct thickness shall conform to the above standards. Where there is a discrepancy, the greater thickness shall apply. Reinforcement, joint type, spacing and thicknesses may be varied at the contractors discretion, in conformance with the above standards, except where specifically noted. Transfer ducts across rated corridors shall be 26 gauge, or as required by Code.
3. Round ductwork exposed to the public will be galvanized steel, spiral wound, maintaining in a clean, shiny appearance, and not utilizing visible sealing material. Concealed round ductwork may spiral wound, or snap lock type galvanized steel ductwork.
4. Sealing: All longitudinal and transverse joints in ductwork shall be sealed with Mon-Eco Industries Eco Duct Seal 44-50 or equivalent as follows:
   a. Main supply ductwork shall be sealed to SMACNA Class B Standards(3”W.G. or less).
   b. Return, exhaust, and supply ductwork shall be sealed to SMACNA Class B Standards(3”W.G. or less).
   c. Return, exhaust, and supply ductwork downstream of coils and VAV boxes shall be sealed to SMACNA Class C. (2”W.G. or less).
5. Location: Sheet metal may be used throughout the project.

C. Flexible Ductwork (Polymer Liner):

1. Flexible ductwork shall be constructed of a spring steel helix supporting a plastic core. It shall be insulated with 1" fiberglass having a density of 1 lb./cu.ft. The insulation is sheathed in an copolymer vapor barrier jacket.
2. The duct shall be rated at 10" w.g., and a maximum velocity of 4000 fpm. The duct shall be listed in conformance with UL Standard 181, Class 1.
3. Flexible duct shall be limited to a maximum length of 2', as a means of connecting boxes, diffusers, etc. to the duct system. Uninsulated flexduct may be used where the adjacent ductwork is uninsulated or unlined.
4. Flexduct shall be manufactured by Hart & Cooley, Clevaflex or equivalent.

1.02 SPECIAL DUCT SYSTEMS

A. Kitchen hood exhaust:

1. Duct shall be constructed strictly according to the latest ASHRAE and SMACNA standards. All duct work shall be constructed of 16-gauge steel or 304 stainless steel, 18-gauge minimum. All duct, and duct to hood joints, with longitudinal seams and transverse joints continuously butt welded. Slope exhaust duct at not less than ½”/ft, except where other code requirements require a steeper slope. Duct connections to fans shall be flanged and gasketed to be grease tight.
2. Ducts shall be wrapped with a two layers of foil encapsulated, alumina/silica fibrous blanket, in strict accordance with the manufacturer's instructions, and in conformance with ASTM std 2336. Joints shall be butt joints with overlaps. The blanket shall be firmly secured to the duct using carbon steel bands. Blanket shall be 3M Firemaster , Ductwrap or Firewrap, or equivalent.
3. Exterior ducts shall be painted with paint rated for 150F, color as selected by the Architect. The duct will be cleaned and primed prior to painting.

B. Flue Piping:

1. All parts of flue vent system shall be Underwriter's Laboratories-listed, type B, double-wall, gas vent piping. The outer wall shall be galvanized steel; inner wall shall be 1100 alloy aluminum with built-in 1" air space. All flues shall terminate in a roof cap, as required by code.
2. The flue vent piping shall be manufactured by Metalbestos. Approved equivalents are Heat-fab, Selkirk, or Hart and Cooley.

1.03 DUCT ACCESS DOORS

A. Where motorized dampers, fire dampers, control equipment, etc. are installed in ducts, and for cleaning ductwork, access doors shall be provided in the ducts, made air-tight with gasketed edges. Use Ventlok, or equal, sponge rubber or felt gasketing material. The doors shall be double-wall construction with 1" of rigid insulation fill and shall be attached to the duct with cam latches. Omit access door insulation and double-wall construction if ducts are not specified to be insulated. Access doors shall be constructed of the same materials as the ductwork.

B. Provide access panels where required for access to the "Duct Access Doors." If these access panels are placed in fire-rated walls or ceiling or floor, then the access panel shall have the same rating.

1.04 FLEXIBLE CONNECTIONS

A. All supply and exhaust fans and other air handling units with inlet and outlet duct or casing connections shall have a flexible connector in each connection. Connector shall be made of at least one layer of Ventglas, two-side, neoprene-coated, heavy glass fabric, Underwriters' approved and labeled as manufactured by Ventfabrics, Inc.

2.01 GRILLES, REGISTERS, AND DIFFUSERS

A. Provide grilles, registers, and diffusers of the size and type shown on the plans. Grilles, registers, and diffusers shall be made of steel with a baked white enamel finish, or extruded aluminum with clear finish, as indicated for each grille, register, or diffuser. Secure GRD's to structure where connected by flex ductwork, or where required by local code. Paint ductwork visible behind GRD's flat black. G R D's shall be manufactured by Titus, Price, Metallaire, or equivalent.

2.02 CEILING RADIATION DAMPERS

A. Provide approved ceiling radiation dampers in ducts wherever they pass into fire-rated walls, floors, and ceiling enclosures and in any other locations required by code. All ceiling radiation dampers shall be U.L. approved and labeled for 1 hour rating unless otherwise indicated on drawings. Dampers shall be fabricated of galvanized steel and shall be of such design and length as to function as a wall-mounting sleeve, which shall be part of the fire damper. Frames shall be secured, bolted construction. Damper shall be dynamic rated and tested per UL555C. Dampers shall be Metal-Fab, Ruskin, United Sheet Metal, National Controlled Air, Louvers and Dampers, Inc., or approved equivalent. Dampers shall be Type B unless otherwise indicated.

2.03 FIRE DAMPERS

A. Provide approved fire dampers in ducts wherever they pass through fire-rated walls, floors, and shaft enclosures and in any other locations required by code. All fire dampers shall be U.L. approved and labeled for 1-1/2 hour rating unless otherwise indicated on drawings. Dampers shall be fabricated of galvanized steel and shall be of such design and length as to function as a wall-mounting sleeve, which shall be part of the fire damper. Frames shall be secured, bolted construction. Damper sleeves shall be secured in wall with 2" x 1" x No. 14-gauge retaining-angle irons on the top, both sides and bottom of wall sleeve, and on each side of the fire wall. Dampers shall be Ruskin, United Sheet Metal, National Controlled Air, Louvers and Dampers, Inc., or approved equivalent. Dampers shall be Type B unless otherwise indicated.

2.04 EXHAUST FAN, CEILING

A. The ceiling exhaust fan shall have a steel housing with a galvanized or baked enamel finish. An automatic back-draft damper shall be located within the duct connector and have cushioned stops. The fan wheels shall be balanced centrifugal and shall operate at less than 1200 rpm. Fans shall bear the AMCA certified rating seal and the U.L. label. The entire fan, motor, and wheel assembly shall be removable without disturbing the housing. Fan motors shall be grounded and mounted on vibration isolators. Fans shall be Penn Zephyr,

2.05 AIR INTAKE AND DISCHARGE LOUVERS

A. Exterior stationary louvers shall be anodized aluminum 4" blades on 2-7/8" centers at 30 deg with return bends. Louvers shall be weatherproof. Set in frame, secure, and caulk into opening. Provide galvanized steel 1/2", 19-gauge wire mesh behind louver. Size per the plans.

B. Approved manufacturer's shall be Louvers and Dampers, Airstream, Dowco, Ruskin, or Titus.

2.06 AIR FILTERS

A. Provide air filters where shown on the drawings. Filters shall be rigid, throw-away type, constructed of pleated fiber materials with metal mesh support maze across both faces of the media. Thickness will be 2”, unless 1” is the maximum thickness allowable. Filters shall have a UL listing of Class II and an average 30%(MERV 8) efficiency rating of ASHRAE Std. 52-76. Filters shall be Farr 30-30 or approved equivalent by Air Filters, Inc., Eco-Air, Cambridge, or American Air Filter.

2.07 HEAT PUMP AIR HANDLER

A. Furnish and install a heat pump unit as shown on the drawings. The heat pump air handler shall be suitable for use in the required configuration. The cabinet shall be 20 gauge galvanized with 1/2" thick 1-1/2 lb. density foil faced insulation and baked acrylic enamel finish

B. Controls shall be digital and shall include:

- LED display for diagnostics.
- DIP switch settings for motor speed controls.
- Capability of compressor control.
- Capability of economizer controls
- Capability of outdoor sensor input.

C. The DX coil shall be furnished by the same manufacturer, designed to be compatible with the furnace and condensing unit. The system will utilize a thermal expansion valve.

D. Provide condensate drain(for both heating and cooling), routed per manufacturer's instructions to an approved receptor.

E. The blower shall be a direct drive centrifugal blower with variable speed ECM motor. Blower controls shall be through a time delay blower relay. Single stage heating and cooling shall be available by means of the necessary controls, valves, and relays. Provide PVC trap on condensate drain, routed full size to an approved receptor.

F. Provide factory furnished filter rack for the configuration(s) shown, including door and gasketing. Field built filter racks will be allowed where necessary by field conditions. The configuration must allow for filter replacement without distortion of the filter

G. The unit will be provided with 1" thick throw-away pleated filters.

H. The heat pump shall be mounted on neoprene isolation pads, or hung using spring isolators.

I. Unit shall be manufactured by Lennox, Trane, Carrier, or York. Alternate manufacturer's will be accepted if heating efficiencies meet or exceed that of the specified product.

2.08 CONDENSING UNIT

A. Provide a DX cooling coil and condensing unit to be used in conjunction with the furnace(s) specified above, and as shown on the drawings. SEER shall be 15.0 or greater. The condenser shall consist of a hermetic scroll compressor(s) with five year warranty, vertical discharge direct drive condenser fan and motor, and copper condenser coil with aluminum fins.

B. The compressor shall have high-low pressure control, 5 minute anti-short circuit timer, and crankcase heat. The unit shall be furnished with an R-410A operating charge, Hi-Low pressure control, filter-dryer and all necessary relays and starters. The cabinet shall be 18 gauge galvanized with baked acrylic enamel finish. The compressor shall be pre-charged.

C. Single stage cooling shall be available by means of the necessary controls, valves, and relays. Refrigeration system shall use an expansion valve for refrigerant flow control.

D. Provide a factory furnished hail guard.

E. Provide a low ambient kit for operation down to 30F.

F. Provide lockable refrigerant caps on all access ports.

G. Unit shall be manufactured by Lennox, Trane, Carrier, or York. Alternate manufacturer's will be accepted if heating and cooling efficiencies meet or exceed that of the specified product.

3.01 DUCTWORK

A. Provide duct system, connections, air balancing dampers (opposed blade dampers where the take-off is in inaccessible ceiling), dampers, duct turns, housing, hinged sheet metal doors, and necessary removable access doors for the complete supply, return, and exhaust systems. Provide access doors in ductwork wherever required for observation and maintenance of dampers.

B. Duct workmanship. Ductwork shall be constructed and erected in a workmanlike manner. Ducts shall be straight and smooth on the inside with neatly finished joints, air-tight, and free from vibration. The internal ends of slip joints shall be made in the direction of the air flow. The ducts shall be securely attached to the building construction in an approved manner. Changes in dimensions and shape of the ducts shall be gradual. Duct sizes fall within the limiting dimensions indicated on the drawings unless otherwise approved.

C. Duct turns. 90° elbows up to 18" wide and 45° elbows shall consist of an inside radius of not less than half the width of the duct, or be furnished with air foil type duct vanes with 2-1/4" blade spacing. Shop fabricated duct vanes shall conform to details of the Sheet Metal and Air Conditioning Contractors National Association manual.

D. All dimensions shown on drawing are inside dimensions. Contractor shall make allowances for internal lining where called for on drawings or elsewhere in this specification.

E. All junctions, bends, turns, or elbows in all ducts shall have a large radius (centerline radius equal to 1-1/2 times duct width) in the throat in order to minimize the frictional resistance. No short radius turn or junction will be allowed unless turning blades of approved design are provided. Single vane-turning vanes shall be provided for all square turns.

F. Galvanized or aluminum angle iron strips shall be installed at points where ducts penetrate walls to close off the space between the wall opening and the duct.

G. All fittings shall be tack welded on 3" centers and sealed with neoprene sealer to ensure that they do not leak more than 1% when transverse joints are sealed. Areas where galvanize has been burned off shall be painted. Branch takeoffs of main shall be 45 degree "wye" type where possible. Conical takeoffs allowed where "wye" won't fit. Paint the inside of ducts flat black, where visible through grilles, registers or diffusers.

H. Fittings for round or oval spiral wound ductwork shall be installed per the manufacturer's instructions.

3.02 AIR FILTERS

A. Provide three complete sets of pleated, 30% efficient filters: construction phase, replacement just prior to balancing, and replacement set to the Owner.

B. Air handlers are not intended to be used during construction for heating or cooling. The construction set is intended to protect the equipment during initial startup and preliminary testing.

C. Filters shall be installed in factory-assembled filter banks. Enclosure shall be provided with access doors, gaskets to provide air-tight seal, and duct or equipment connections.

D. Filters shall be manufactured by Farr or American Air Filter.

3.03 CONDENSATE DRAIN

A. Provide condensate drain & overflow piping or provide condensate drain piping & overflow float in condensate pan, interlocked with the blower. Size condensate piping as noted on plans, or to match equipment drain outlet size, whichever is larger.

B. Flue Piping:

1. The gas vent piping shall be installed in full compliance with the terms of its listing, with the manufacturer's installation instructions. Maintain minimum clearance to combustibles.
2. Provide a vent cap above the roof as required by code.
3. Slope and offset flue pipe per code. Route in fire rated shafts where required. Provide a barometric damper where shown or required.

3.04 DUCTWORK TESTING

A. If leakage in excess of 5% of the system design flow is indicated after a balance and adjustment, reseal to eliminate excess leakage. Replace defective material or workmanship at the Contractor's expense and test until the same has met the approval of the Engineer.

B. All ductwork operating at static pressure in excess of 3” W.G. and exterior ductwork shall be leak-tested per SMACNA standards. A minimum 25% of all ductwork shall be tested and the maximum permitted leakage shall be LMAX = CLP0.65.

MICHAEL DEAN NAIR
38983
05/02/2024

NOTICE: DUTY OF COOPERATION

Release of these plans contemplates further cooperation among the owner, his contractor and the architect. Design and construction are complex. Although the architect and his consultants have performed their services with due care and diligence, they cannot guarantee perfection. Communication is imperfect and every contingency cannot be anticipated. Any ambiguity or discrepancy discovered by the use of these plans shall be reported immediately to the architect. Failure to notify the architect compounds misunderstanding and increases construction costs. A failure to cooperate by a simple notice to the architect shall relieve the architect from responsibility for the consequences. Changes made from the plans without consent of the architect are unauthorized and shall relieve the architect of responsibility for all consequences arriving out of such changes.

REVISIONS

No.	Description	Date

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/ 21/ 24
Drawn By:	AF
Checked By:	MV

Project Phase
PERMIT

Sheet Title
MECHANICAL SPECIFICATIONS

Sheet Number
M7.1

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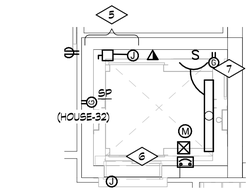


ELEVATOR POWER PLAN
1/4" = 1'-0"

DETAIL NOTES

1. PROVIDE QUAD WITH COMBINATION DUPLEX RECEPTACLE WITH HALF SWITCHED PORT. TOP RECEPTACLE IS TO BE SWITCHED PORTION FOR GARBAGE DISPOSAL OPERATION. PROVIDE TOTAL OF 3 UNSWITCHED RECEPTACLES.
2. TYPICAL UNIT ELECTRICAL PANEL. COORDINATE PANEL MOUNTING HEIGHT WITH ADA REQUIREMENTS (IN ACCESSIBLE UNITS). MAINTAIN MINIMUM CLEARANCE TO FRONT OF PANEL AS REQUIRED PER NEC, NO PIPING, DUCTWORK OR OTHER TRADES WORK TO BE ROUTED OVER PANEL. ALL WORK IN THIS AREA TO BE COORDINATED WITH G.C. AND E.C. PROPOSED ELECTRICAL SERVICE/GEAR. FIELD VERIFY EXACT LOCATION, MAINTAIN REQUIRED CLERANCES PER NEC.
3. UNIT TELEPHONE/CABLE TERMINAL; FIELD VERIFY LOCATION AND MOUNTING HEIGHT ON WALL WITH TELECOM SERVICE PROVIDER. LOCATE DUPLEX RECEPTACLE BELOW TERMINAL FOR CONNECTION OF TELECOM EQUIPMENT. RE: TELEPHONE/CABLE DETAIL FOR ADDITIONAL INFORMATION.
4. HOISTING MOTOR LOCATED IN ELEVATOR SHAFT; PROVIDE NON-FUSED DISCONNECT. FIELD VERIFY AND COORDINATE THE LOCATION & CONNECTION REQUIREMENTS WITH THE ELEVATOR MFG'S INSTALLATION SPECIFICATIONS PRIOR TO ROUGH-IN.
5. PROVIDE TELEPHONE, POWER, CIRCUIT(S), WIRING, J-BOX(ES) AND CONNECTION FOR ELEVATOR CAR. PROVIDE OVER CURRENT PROTECTION AND A LOCKABLE DISCONNECTING MEANS FOR ELEVATOR CAR RECEPTACLES, LIGHTING AND VENTILATION. THE E.C. SHALL FIELD VERIFY AND COORDINATE EXACT LOCATION AND CONNECTION REQUIREMENTS WITH THE ELEVATOR VENDOR PRIOR TO ROUGH-IN. LABEL SWITCH '120V ELEVATOR CAR DISCONNECT'.
6. PROVIDE LOCKABLE SHUNT TRIP BREAKER FOR ELEVATOR MOTOR, LOCATED WITHIN 15' OF DOOR. PROVIDE CONTROL WIRING AS REQUIRED BY LOCAL INSPECTOR.
7. PROVIDE GFCI TYPE RECEPTACLE; DO NOT CONNECT LUMINAIRE TO LOAD SIDE OF GFCI.
8. PROVIDE COUNTERTOP POP-UP 15A GFCI-PROTECTED RECEPTACLE.
9. COORDINATE RADIANT FLOOR HEAT SIZE AND LOCATION WITH ARCHITECTURAL PLANS. FIELD VERIFY CONNECTION LOCATION.
10. BASIS OF DESIGN FOR STEAMER; AMEREC AK8. COORDINATE INSTALLATION AND VERIFY REQUIREMENTS WITH MANUFACTURER.
11. TOWEL WARMER ASSUMED TO BE 150W/UNIT. COORDINATE ACTUAL WATTAGE AND VERIFY REQUIREMENTS WITH MANUFACTURER. FIELD VERIFY CONNECTION LOCATION.
12. POWER FOR ELEVATOR SMOKE CURTAIN. COORDINATE CONNECTION TYPE AND INSTALLATION REQUIREMENTS WITH MANUFACTURER.
13. POWER FOR WINDOW SHADE. COORDINATE WITH MANUFACTURER/INSTALLER FOR POWER AND LOW VOLTAGE REQUIREMENTS.

GENERAL NOTES

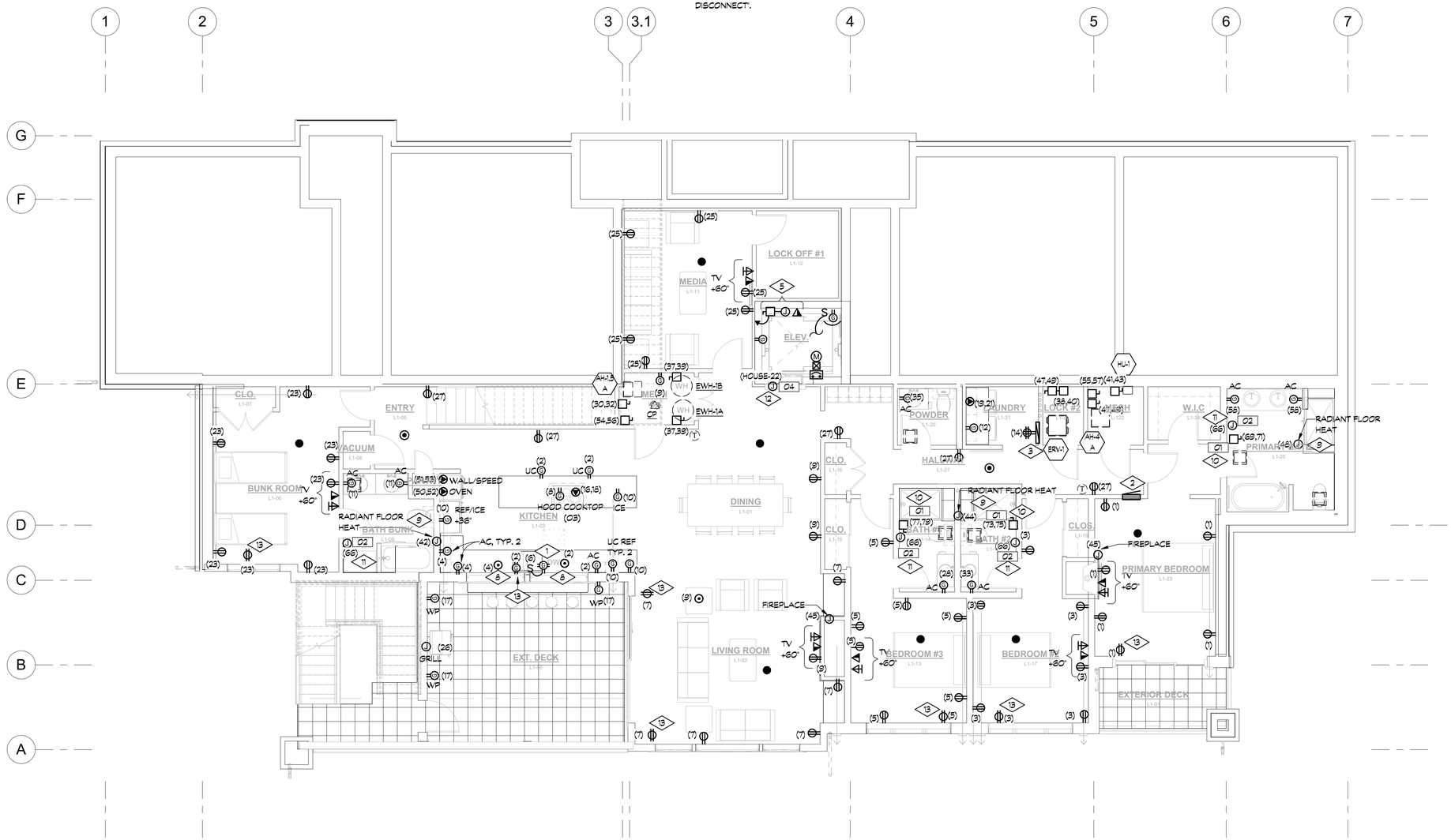
A. ELECTRICAL CONDUITS, WATER, SEWER AND GAS LINES MUST FIT WITHIN WALLS. CONFLICTS WITH OTHER TRADES MUST BE COORDINATED OR WORK WILL BE REDONE.

B. GFCI PROTECTION: BASIS OF DESIGN IS GFCI PROTECTION PROVIDED AT PANEL. EC MAY PROVIDE ALTERNATE PRICING WHERE PERMITTED BY CODE TO PROVIDE DOWNSTREAM GFCI PROTECTION OF DEVICES WITH A SINGLE GFCI RECEPTACLE. (DEDICATED NEUTRAL SHALL BE PROVIDED FOR GFCI BREAKERS)

C. COORDINATE ALL DEVICE AND FIXTURE LOCATIONS WITH FURNITURE, EQUIPMENT, MILLWORK AND MECHANICAL SYSTEM (DUCTWORK) LAYOUT PRIOR TO ROUGH-IN.

D. ALL EXTERIOR ELECTRICAL COMPONENTS SHALL MEET ALL NEC INSTALLATION AND LABELING REQUIREMENTS FOR WET LOCATIONS.

E. ALL RECEPTACLES TO BE LABELED WITH PANEL CIRCUIT ID ON BACKSIDE OF COVER PLATE.



LOWER LEVEL 1 POWER PLAN
3/16" = 1'-0"

5/2/2024 2:51:36 PM

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ERIC DEAN SMITH
38983
05/02/2024
PROFESSIONAL ENGINEER

NOTICE: DUTY OF COOPERATION

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REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	Author
Checked By:	EM

Project Phase
PERMIT

Sheet Title
LOWER LEVEL 1 POWER PLAN

Sheet Number
E1.1

DETAIL NOTES THIS SHEET

1. STAIRS SHALL BE ON EM BACKUP. SEE MAIN LEVEL LIGHTING PLAN FOR REFERENCE.

GENERAL LIGHTING NOTES

A. E.C. SHALL VERIFY THE EXACT LOCATION, MOUNTING HEIGHTS AND QUANTITY OF ALL FIXTURES AND DEVICES WITH THE ARCHITECTURAL DRAWINGS.

B. E.C. SHALL VERIFY FIXTURE LOCATION, DETAILS, AND QUANTITY OF ALL FIXTURES WITH THE LIGHTING DESIGNER DRAWINGS.

C. SOME LIGHTING FIXTURES AND DEVICES ARE SHOWN OFFSET ON THE PLAN FOR GRAPHIC PURPOSES. E.C. SHALL COORDINATE THE EXACT LOCATION AND ROUGH-IN HEIGHT OF ALL FIXTURES AND DEVICES.

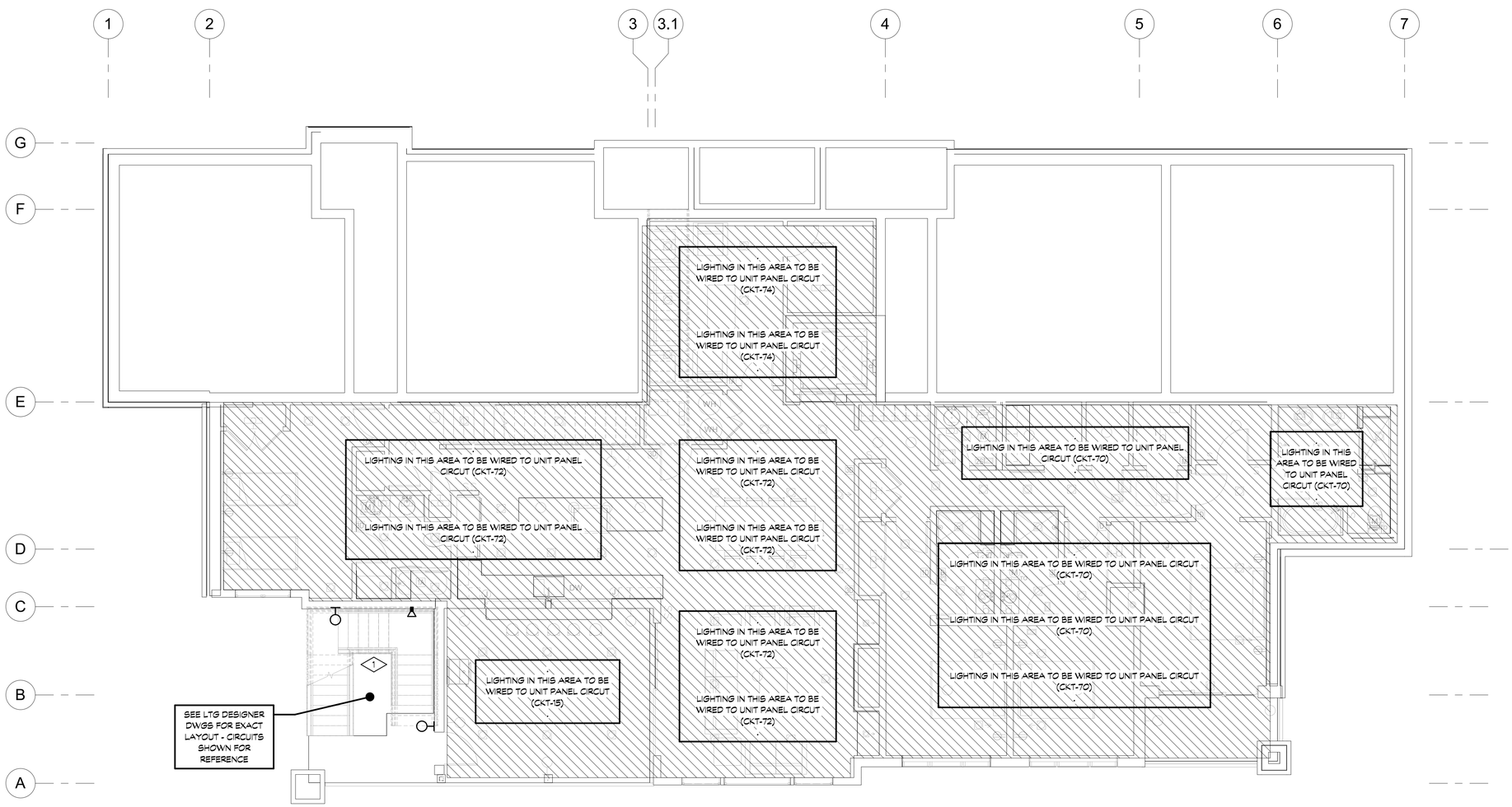
D. ALL EMERGENCY EGRESS LIGHTING SHALL COMPLY WITH 2021 - IBC 1008.2.1

E. ALL EXTERIOR LIGHTING FIXTURES SHALL BE INSTALLED, SHIELDED AND/OR CONTROLLED IN COMPLIANCE WITH LOCAL ORDINANCES.

F. ALL EXTERIOR ELECTRICAL COMPONENTS SHALL MEET ALL NEC INSTALLATION AND LABELING REQUIREMENTS FOR WET LOCATIONS.

G. COORDINATE REQUIRED BLOCKING FOR ADDED CEILING FANS WITH LANDLORD'S REPRESENTATIVE.

H. LIGHTING SYSTEM FUNCTIONALITY TESTING/COMMISSIONING SHALL BE PERFORMED IN ACCORDANCE WITH IECC 408.3, ADDITIONAL LOCAL JURISDICTIONAL REQUIREMENTS TO BE CONFIRMED WITH BUILDING OFFICIAL PRIOR TO COMPLETION OF PROJECT.



LOWER LEVEL 1 LIGHTING PLAN
3/16" = 1'-0"

5/2/2024 2:51:37 PM

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ERIC SMITH
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ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5455, (303) 442-4745 FAX

Job Number:	23035-7
Date:	05/21/24
Drawn By:	Author
Checked By:	EM

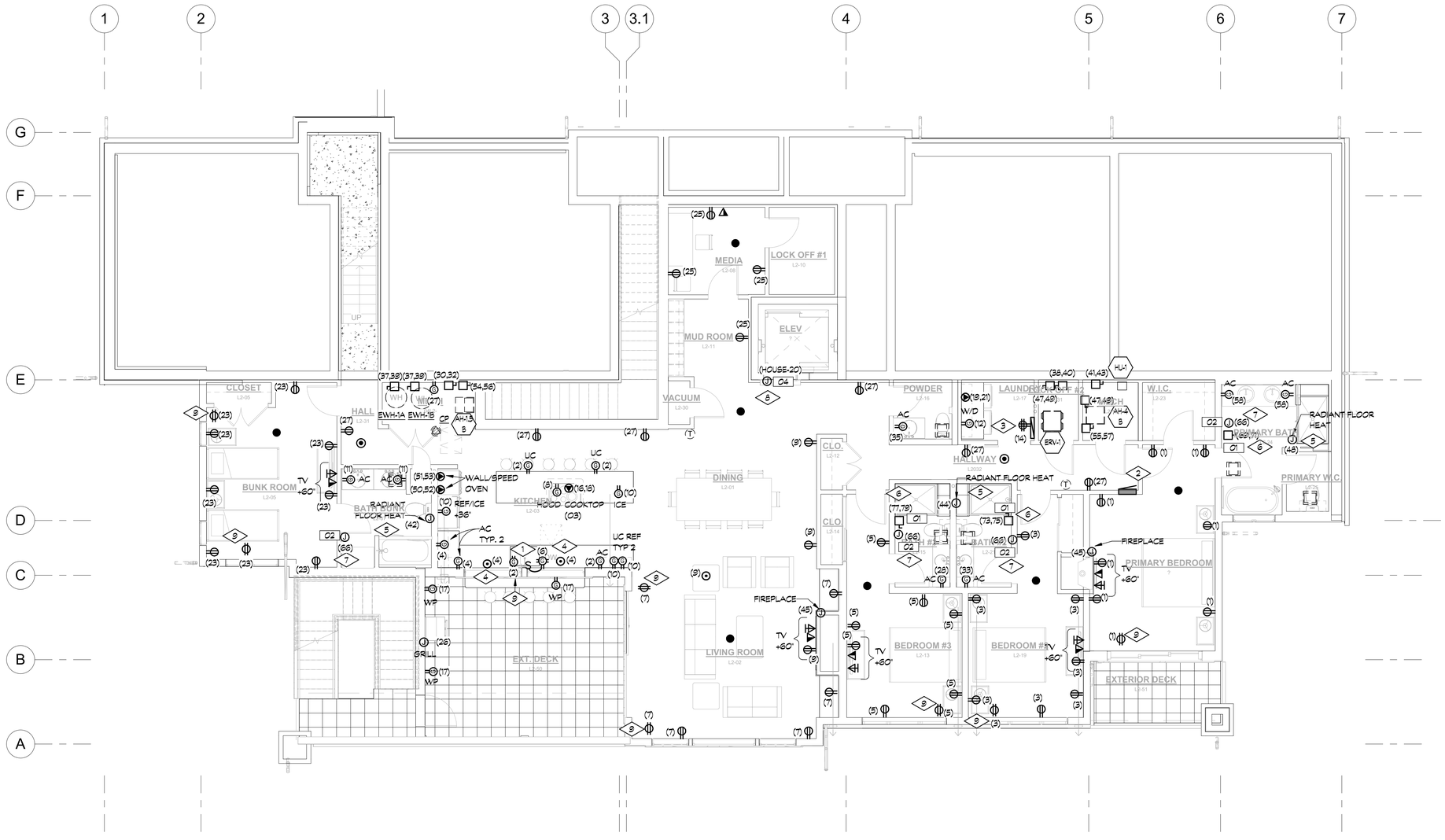
Project Phase
PERMIT

Sheet Title
LOWER LEVEL 1 LIGHTING PLAN

Sheet Number
E1.2

DETAIL NOTES

1. PROVIDE QUAD WITH COMBINATION DUPLEX RECEPTACLE WITH HALF SWITCHED PORT. TOP RECEPTACLE IS TO BE SWITCHED PORTION FOR GARBAGE DISPOSAL OPERATION. PROVIDE TOTAL OF 3 UNSWITCHED RECEPTACLES.
2. TYPICAL UNIT ELECTRICAL PANEL, COORDINATE PANEL MOUNTING HEIGHT WITH ADA REQUIREMENTS (IN ACCESSIBLE UNITS). MAINTAIN MINIMUM CLEARANCE TO FRONT OF PANEL AS REQUIRED PER NEC, NO PIPING, DUCTWORK OR OTHER TRADES WORK TO BE ROUTED OVER PANEL. ALL WORK IN THIS AREA TO BE COORDINATED WITH G.C. AND E.C. PROPOSED ELECTRICAL SERVICE/GEAR. FIELD VERIFY EXACT LOCATION, MAINTAIN REQUIRED CLEARANCES PER NEC.
3. UNIT TELEPHONE/CABLE TERMINAL; FIELD VERIFY LOCATION AND MOUNTING HEIGHT ON WALL WITH TELECOM SERVICE PROVIDER. LOCATE DUPLEX RECEPTACLE BELOW TERMINAL FOR CONNECTION OF TELECOM EQUIPMENT. RE: TELEPHONE/CABLE DETAIL FOR ADDITIONAL INFORMATION.
4. PROVIDE COUNTERTOP POP-UP 15A GFCI-PROTECTED RECEPTACLE.
5. COORDINATE RADIANT FLOOR HEAT SIZE AND LOCATION WITH ARCHITECTURAL PLANS. FIELD VERIFY CONNECTION LOCATION.
6. BASIS OF DESIGN FOR STEAMER: AMEREC AK8. COORDINATE INSTALLATION AND VERIFY REQUIREMENTS WITH MANUFACTURER.
7. TOWEL WARMER ASSUMED TO BE 150W/UNIT. COORDINATE ACTUAL WATTAGE AND VERIFY CONNECTION REQUIREMENTS WITH MANUFACTURER. FIELD VERIFY CONNECTION LOCATION.
8. POWER FOR ELEVATOR SMOKE CURTAIN. COORDINATE CONNECTION TYPE AND INSTALLATION REQUIREMENTS WITH MANUFACTURER.
9. POWER FOR WINDOW SHADE. COORDINATE WITH MANUFACTURER/INSTALLER FOR POWER AND LOW VOLTAGE REQUIREMENTS.



LOWER LEVEL 2 POWER PLAN
3/16" = 1'-0"

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BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	Author
Checked By:	EM

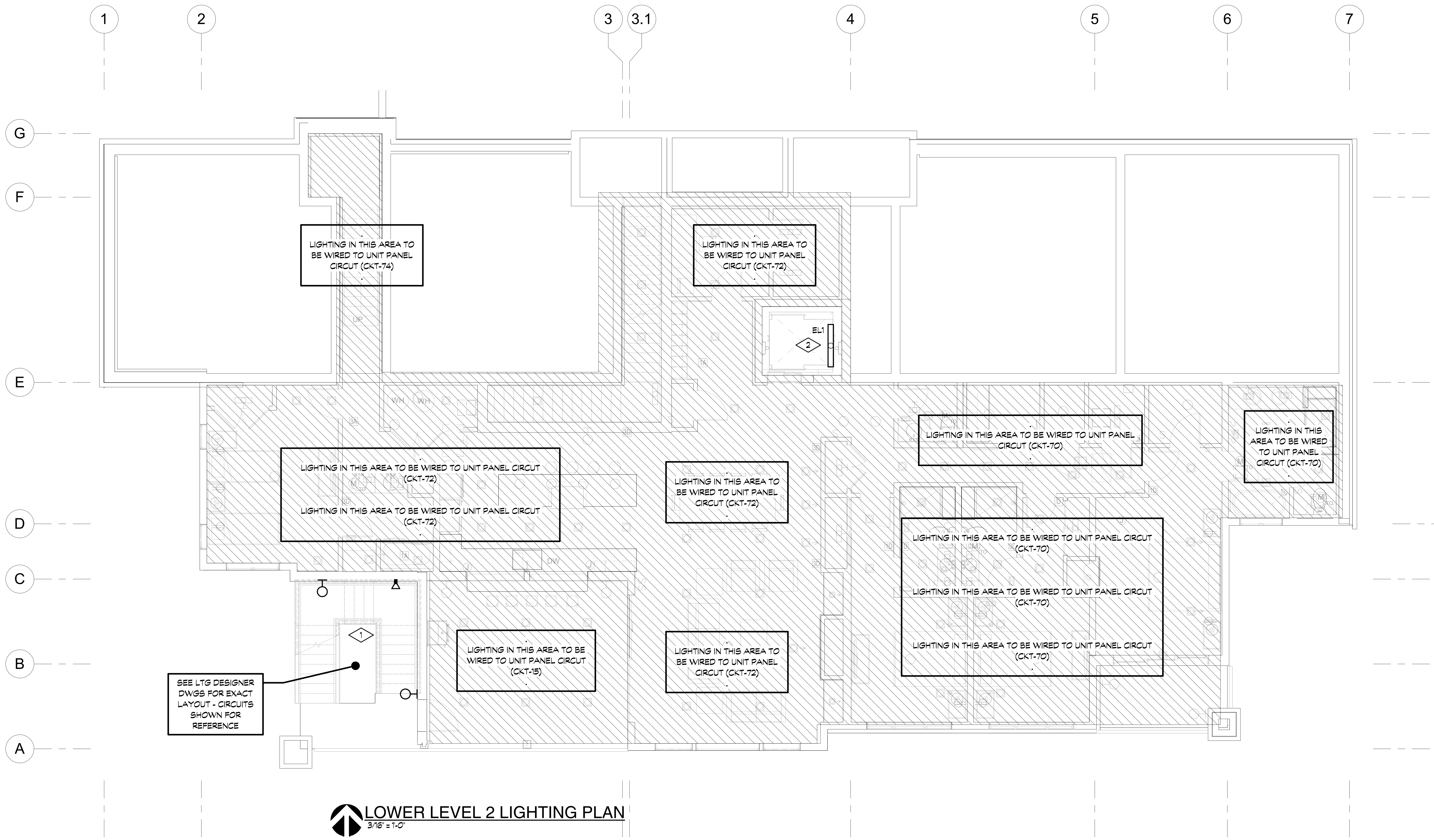
Project Phase
PERMIT

Sheet Title
LOWER LEVEL 2 POWER PLAN

Sheet Number
E2.1

DETAIL NOTES THIS SHEET

1. STAIRS SHALL BE ON EM BACKUP. SEE MAIN LEVEL LIGHTING PLAN FOR REFERENCE.
2. WIRE TO ELEVATOR SHAFT 120V POWER. HOUSE PANEL CKT-2. SEE POWER PLAN FOR REFERENCE.



LOWER LEVEL 2 LIGHTING PLAN
3/16" = 1'-0"

5/2/2024 2:51:43 PM

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1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/ 21/ 24
Drawn By:	Author
Checked By:	EM

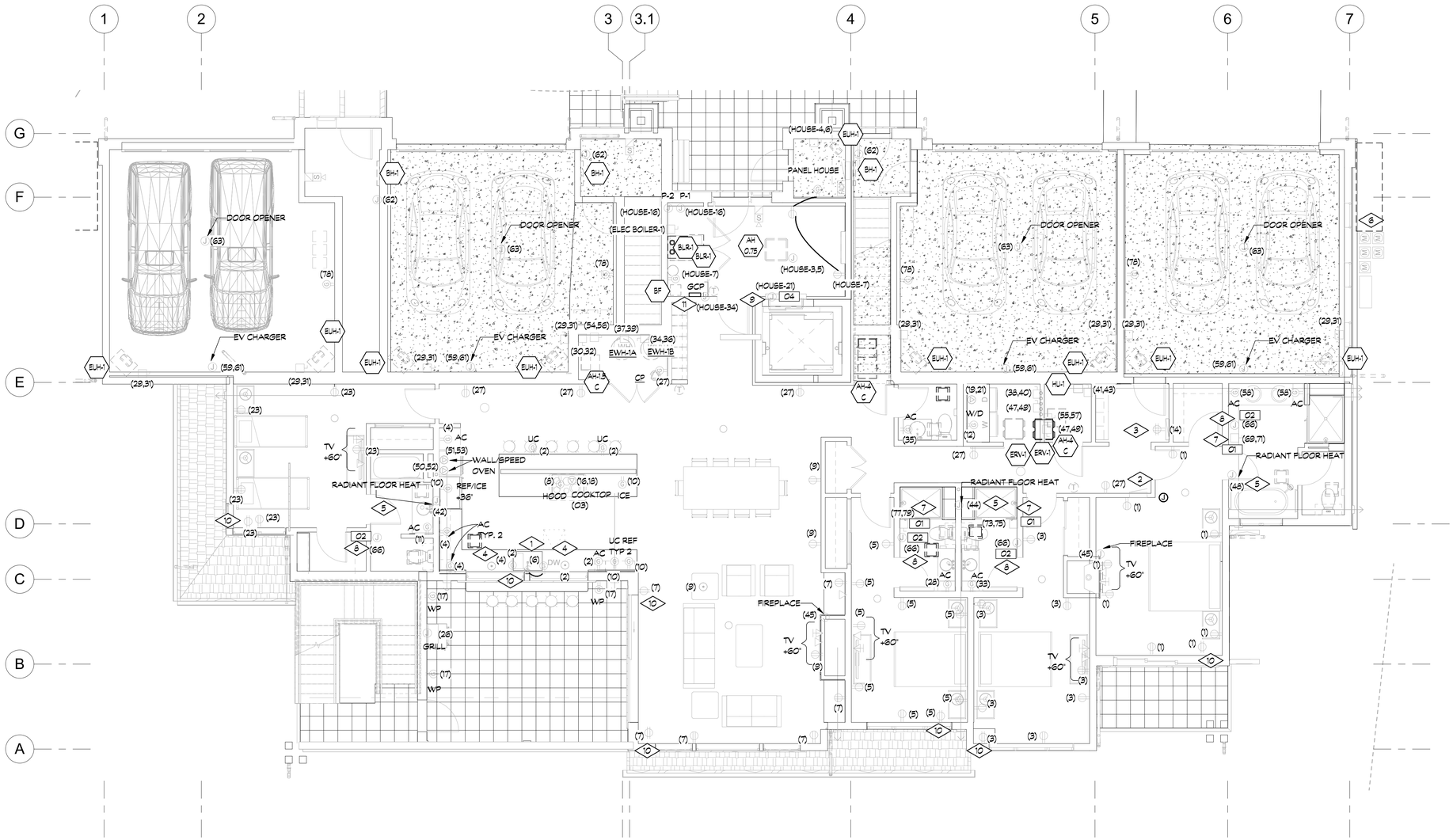
Project Phase
PERMIT

Sheet Title
LOWER LEVEL 2 LIGHTING PLAN

Sheet Number
E2.2

DETAIL NOTES

1. PROVIDE QUAD WITH COMBINATION DUPLEX RECEPTACLE WITH HALF SWITCHED PORT. TOP RECEPTACLE IS TO BE SWITCHED PORTION FOR GARBAGE DISPOSAL OPERATION. PROVIDE TOTAL OF 3 UNSWITCHED RECEPTACLES.
2. TYPICAL UNIT ELECTRICAL PANEL. COORDINATE PANEL MOUNTING HEIGHT WITH ADA REQUIREMENTS (IN ACCESSIBLE UNITS). MAINTAIN MINIMUM CLEARANCE TO FRONT OF PANEL AS REQUIRED PER NEC, NO PIPING, DUCTWORK OR OTHER TRADES WORK TO BE ROUTED OVER PANEL. ALL WORK IN THIS AREA TO BE COORDINATED WITH G.C. AND E.C. PROPOSED ELECTRICAL SERVICE/GEAR. FIELD VERIFY EXACT LOCATION, MAINTAIN REQUIRED CLEARANCES PER NEC.
3. UNIT TELEPHONE/CABLE TERMINAL; FIELD VERIFY LOCATION AND MOUNTING HEIGHT ON WALL WITH TELECOM SERVICE PROVIDER. LOCATE DUPLEX RECEPTACLE BELOW TERMINAL FOR CONNECTION OF TELECOM EQUIPMENT. RE: TELEPHONE/CABLE DETAIL FOR ADDITIONAL INFORMATION.
4. PROVIDE COUNTERTOP POP-UP 15A GFCI-PROTECTED RECEPTACLE.
5. COORDINATE RADIANT FLOOR HEAT SIZE AND LOCATION WITH A163 AND ARCHITECT.
6. PROPOSED LOCATION FOR ELECTRICAL SERVICE. MAINTAIN NECESSARY CLEARANCES. FIELD VERIFY CONNECTION LOCATION.
7. BASIS OF DESIGN FOR STEAMER: AMEREC AK9. COORDINATE INSTALLATION AND VERIFY REQUIREMENTS WITH MANUFACTURER.
8. TOWEL WARMER ASSUMED TO BE 150W/UNIT. COORDINATE ACTUAL WATTAGE AND VERIFY REQUIREMENTS WITH MANUFACTURER. FIELD VERIFY CONNECTION LOCATION.
9. POWER FOR ELEVATOR SMOKE/FIRE CURTAIN. COORDINATE CONNECTION TYPE AND INSTALLATION REQUIREMENTS WITH MANUFACTURER.
10. POWER FOR WINDOW SHADE. COORDINATE WITH MANUFACTURER/INSTALLER FOR POWER AND LOW VOLTAGE REQUIREMENTS.
11. ELEVATOR SMOKE/FIRE CURTAIN GROUP CONTROL PANEL. COORDINATE CLEARANCES WITH MANUFACTURER AND MECHANICAL EQUIPMENT. PROVIDE J BOX FOR POWER.



MAIN LEVEL POWER PLAN

3/16" = 1'-0"

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ERIC M. SMITH
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(303) 442-5456, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	Author
Checked By:	EM

Project Phase
PERMIT

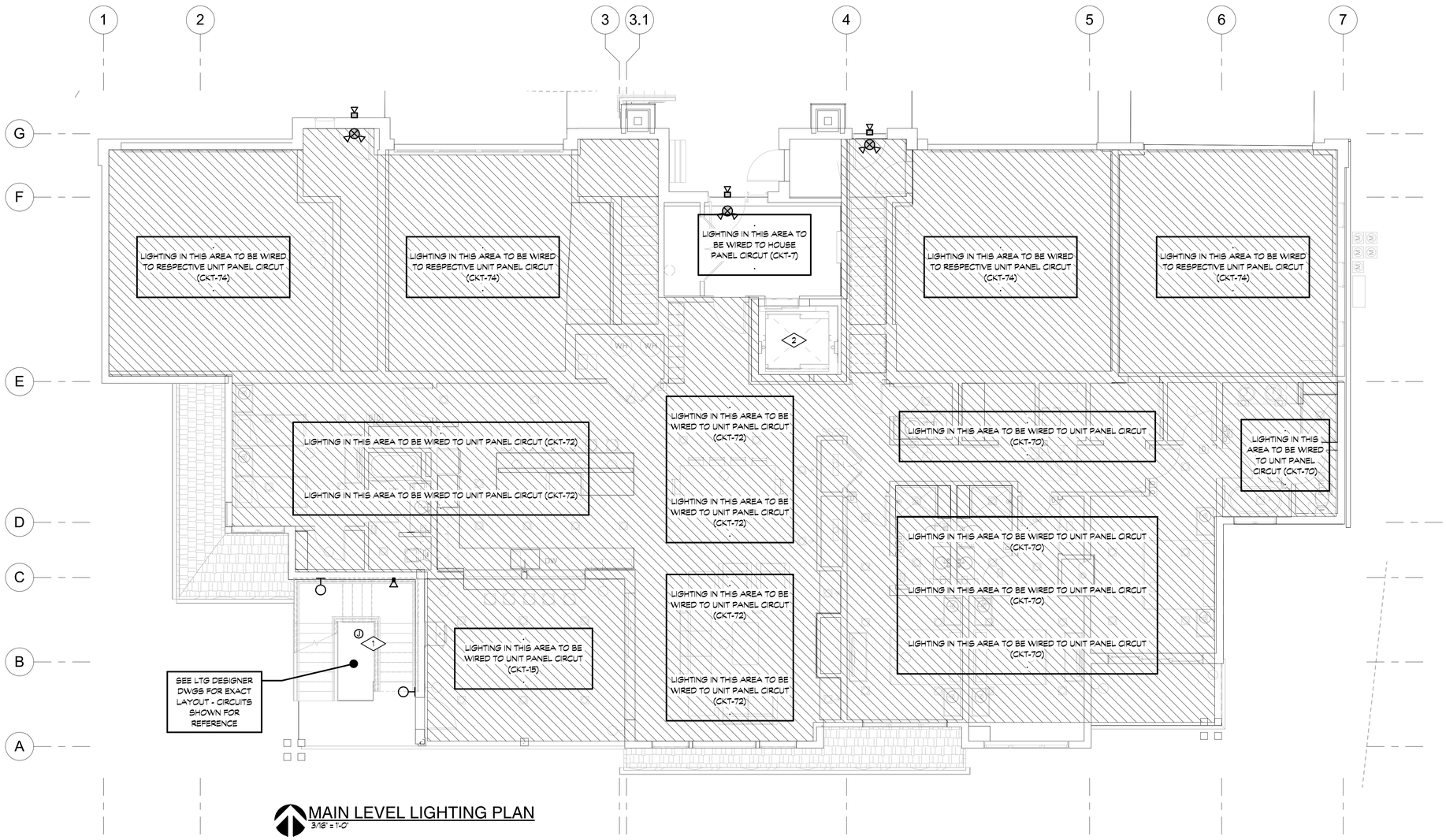
Sheet Title
MAIN LEVEL POWER PLAN

Sheet Number
E3.1

DETAIL NOTES THIS SHEET

1. STAIR LIGHTING SHALL BE ON EM INVERTER (LITEMINDER PWII OR SIMILAR) TO RUN FULL BRIGHT FOR 90 MIN UNDER POWER LOSS. FINAL WATTAGE SHALL BE COORDINATED WITH LIGHTING DESIGNER.

2. SEE UPPER AND LOWER LEVEL LIGHTING SHEETS.



MAIN LEVEL LIGHTING PLAN
3/16" = 1'-0"

5/2/2024 2:51:49 PM

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Job Number:	23055-7
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Drawn By:	Author
Checked By:	EM

Project Phase
PERMIT

Sheet Title
MAIN LEVEL LIGHTING PLAN

Sheet Number
E3.2

DETAIL NOTES

1. PROVIDE QUAD WITH COMBINATION DUPLEX RECEPTACLE WITH HALF SWITCHED PORT. TOP RECEPTACLE IS TO BE SWITCHED PORTION FOR GARBAGE DISPOSAL OPERATION. PROVIDE TOTAL OF 3 UNSWITCHED RECEPTACLES.
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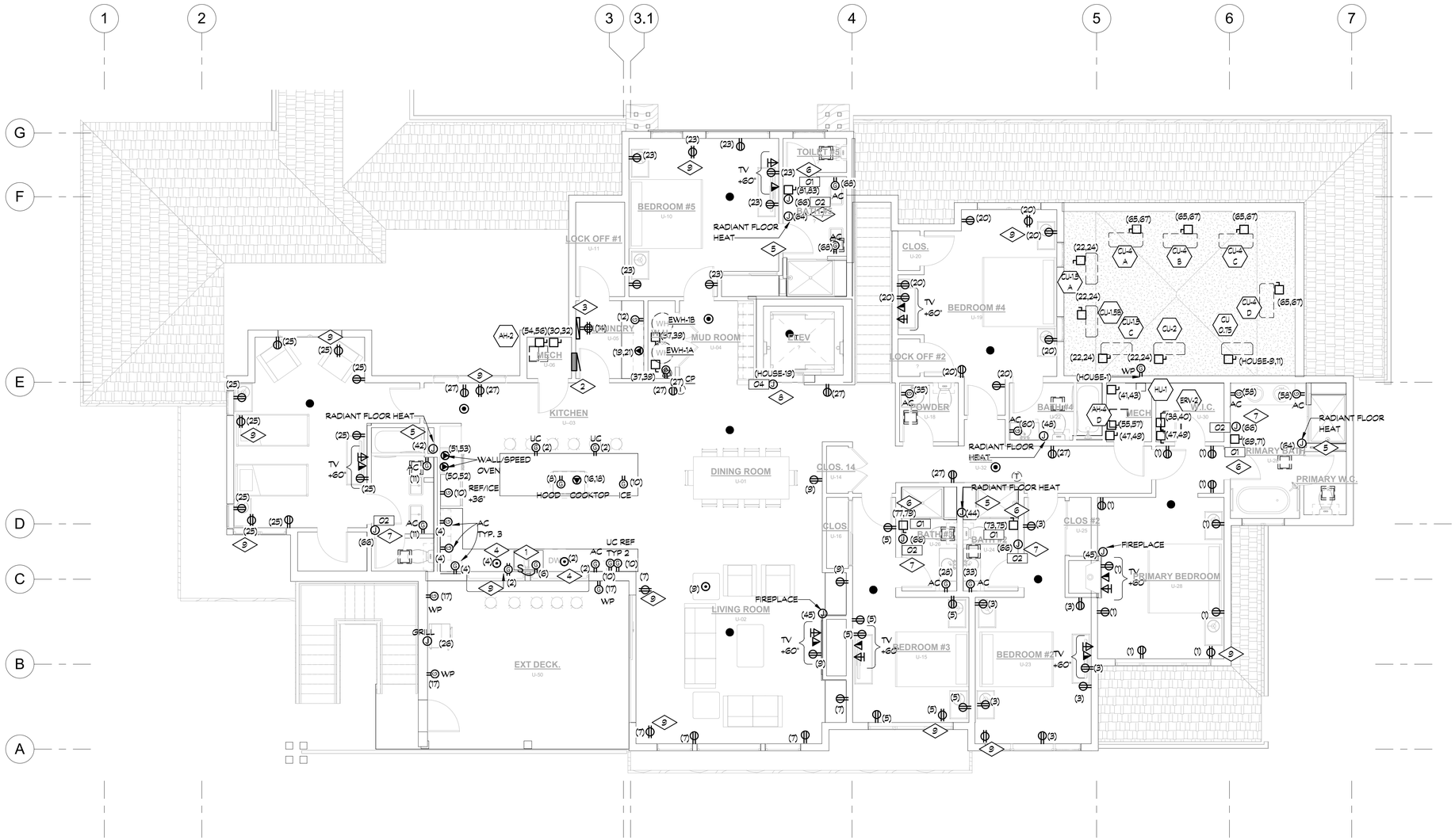
4. PROVIDE COUNTERTOP POP-UP 15A GFCI-PROTECTED RECEPTACLE.
5. COORDINATE RADIANT FLOOR HEAT SIZE AND LOCATION WITH ARCHITECTURAL PLANS.
6. BASIS OF DESIGN FOR STEAMER: AMEREC AK9. COORDINATE INSTALLATION AND VERIFY REQUIREMENTS WITH MANUFACTURER.
7. TOWEL WARMER ASSUMED TO BE 150W/UNIT. COORDINATE ACTUAL WATTAGE AND VERIFY REQUIREMENTS WITH MANUFACTURER.
8. POWER FOR ELEVATOR SMOKE CURTAIN. COORDINATE CONNECTION TYPE AND INSTALLATION REQUIREMENTS WITH MANUFACTURER.
9. POWER FOR WINDOW SHADE. COORDINATE WITH MANUFACTURER/INSTALLER FOR POWER AND LOW VOLTAGE REQUIREMENTS.



UPPER LEVEL POWER PLAN
3/16" = 1'-0"

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ERIC DEAN SMITH
38983
05/02/2024
PROFESSIONAL ENGINEER

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Checked By:	EM

Project Phase
PERMIT

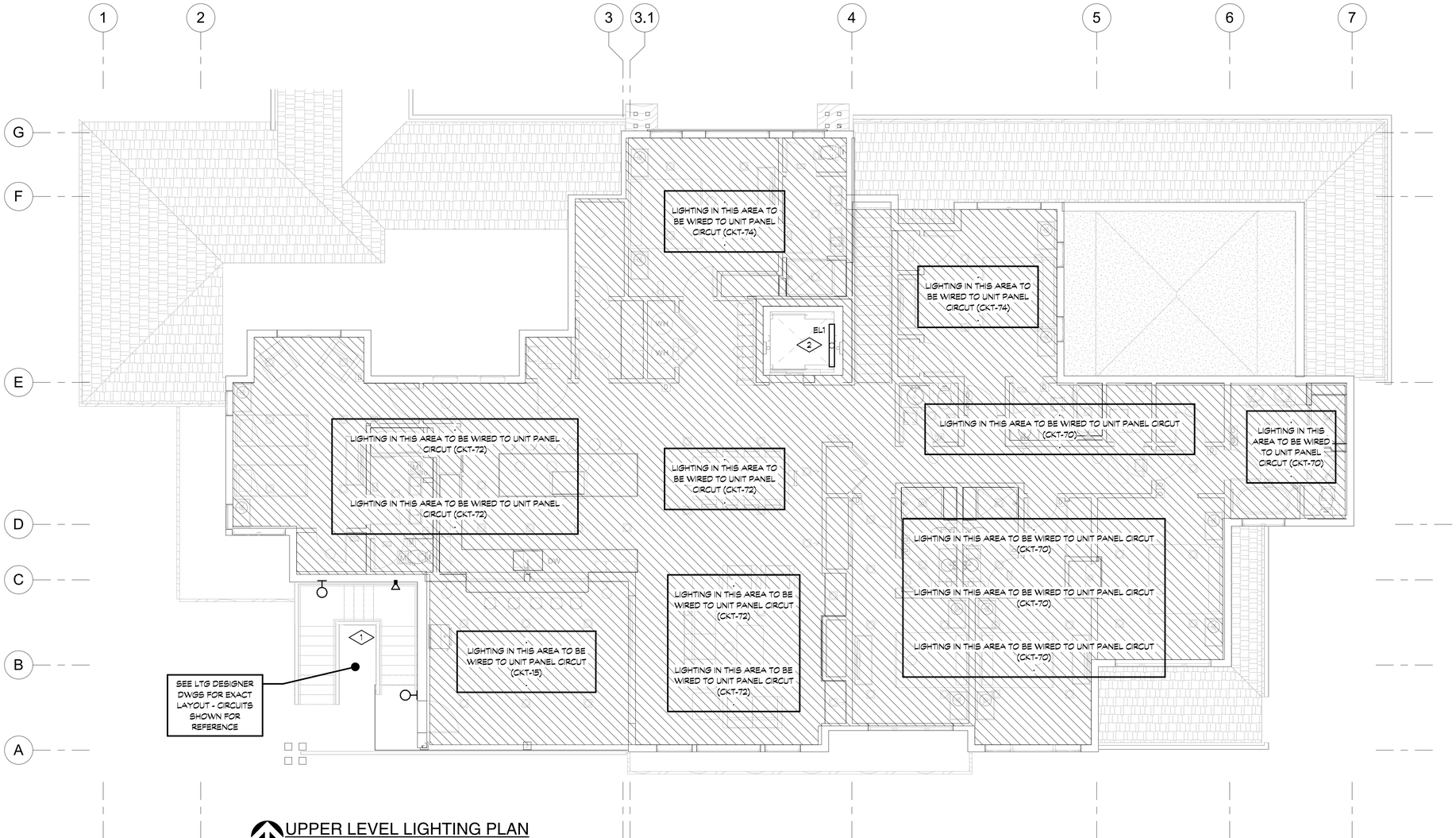
Sheet Title
UPPER LEVEL POWER PLAN

Sheet Number
E4.1

DETAIL NOTES THIS SHEET

1. STAIRS SHALL BE ON EM BACKUP. SEE MAIN LEVEL LIGHTING PLAN FOR REFERENCE.

2. WIRE TO ELEVATOR SHAFT 120V POWER. HOUSE PANEL CKT-2. SEE POWER PLAN FOR REFERENCE.



UPPER LEVEL LIGHTING PLAN
3/16" = 1'-0"

5/2/2024 2:51:55 PM

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ERIC D. SMITH
38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

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1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5456, (303) 442-4745 FAX

Job Number:	23035-7
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Drawn By:	Author
Checked By:	E.M.

Project Phase
PERMIT

Sheet Title
UPPER LEVEL LIGHTING PLAN

Sheet Number
E4.2

DETAIL NOTES THIS SHEET

1. COORDINATE SOLAR ARRAY LOCATION AND SIZE IWTH ARCHITECT AND PV VENDOR. VERIFY AREA OF ROOF USED FOR FUTURE PV INSTALLATION.

GENERAL NOTES - HEAT TRACE

A. BASIS OF DESIGN IS RAYCHEM ICESTOP SYSTEM (GM-2XT; 208V/1Ø). SYSTEM STARTUP TEMPERATURE TO BE SET AT 20ºF. MAXIMUM LENGTH OF CABLE PER CIRCUIT:
   1. 15A @208V = 180 L.F.
   2. 20A @208V = 235 L.F.

B. PROVIDE WITH APS SERIES MASTER SNOW CONTROLLER AND SC-20C SLAVE CONTROLLER AS REQUIRED.

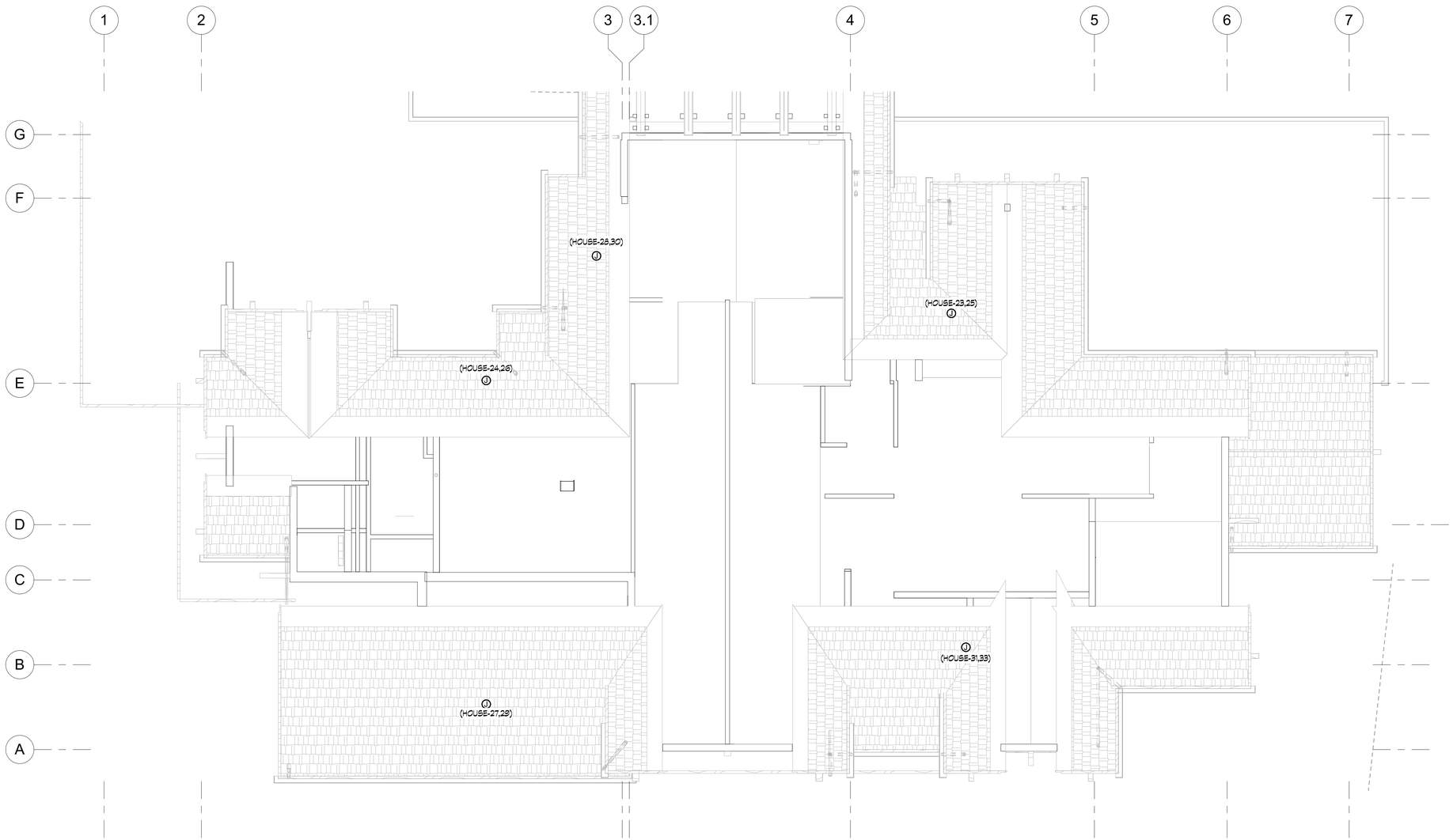
C. SYSTEM COMPONENTS TO INCLUDE AERIAL SNOW SENSOR (RAYCHEM SNOW OWL), GUTTER SENSOR (GIT-1), CABLE POWER CONNECTION KITS (FTC-P), SPLICE/TEE KITS (FTC-HST-PLUS),END SEAL KIT (RAYCLIC-E), ROOF CLIPS (GMK-RC) DOWNSPOUT HANGER (GM-RAKE) AND ANY ADDITIONAL ACCESSORIES REQUIRED TO INSTALL SYSTEM PER MANUFACTRURER'S INSTRUCTIONS.

D. GFCI PROTECTION TO BE PROVIDED AT SNOW MASTER/SLAVE CONTROLLERS.

E. TOTAL LENGTH OF HEAT TRACE ESTIMATED TO BE 1080 FT (FIVE 20A @208V CIRCUITS MINIMUM). COORDINATE CONNECTION ACCESSORIES AND INSTALLATION WITH MANUFACTURER. FIELD VERIFY INDIVIDUAL SEGMENT LENGTHS. J-BOXES SHOWN FOR COORDINATION AND LOAD ESTIMATION ONLY.

F. FOR VERTICAL DOWNSPOUTS: PROVIDE SINGLE RUN OF HEAT TRACE WITH 12" LOOP AT BOTTOM.

G. FOR GUTTERS: PROVIDE ONE RUN OF HEAT TRACE. CONTRACTOR TO PROVIDE A COMPLETE SYSTEM INCLUDING CONTROLS, TRANSFORMERS, PIPE STRAP, END SEAL KIT, GLASS TAPE, ECT. PROVIDE ONE CONTROLLER WITH TEMPERATURE SENSORS PER CIRCUIT. REFER TO DETAIL ON SHEET E300 FOR FURTHER INFORMATION.



ROOF ELECTRICAL PLAN
3/16" = 1'-0"

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Drawn By:	Author
Checked By:	E.M.

Project Phase
PERMIT

Sheet Title
ROOF ELECTRICAL PLAN

Sheet Number
E5.1

LEGEND

- MAIN DISTRIBUTION CENTER
- PANELBOARD
- ELECTRIC SERVICE METER
- CT — CURRENT TRANSFORMER
- T — TRANSFORMER
- CONCEALED CIRCUIT
- UNDERFLOOR / UNDERGROUND CIRCUIT
- EXPOSED CIRCUIT
- WM — WIREMOLD (SURFACE WIREWAY)
- PM — PLUGMOLD
- P-3 — HOMERUN TO PANELBOARD (ONE ARROW / CKT, PNL & CKT #'S SHOWN)
- (44,46) — CIRCUIT NUMBER(S) FOR SPECIFIED PANEL
- CONDUIT TURNS UP
- CONDUIT TURNS DOWN
- J — JUNCTION BOX / CARD READER
- K — PORCELAIN LAMP HOLDER (PC: PULL CHAIN)
- LIGHT FIXTURE: SURFACE MOUNTED
- RECESSED LIGHT FIXTURE
- WALL MOUNTED LIGHT FIXTURE
- EXIT LIGHT: DIRECTIONAL ARROW
- BATTERY PACK
- SURFACE FLUORESCENT FIXTURE
- RECESSED FLUORESCENT FIXTURE
- SINGLE OUTLET: C-CLOCK (+70")
- DUPLEX RECEPTACLE IG: ISOLATED GROUND
- CEILING DUPLEX RECEPTACLE
- G — DUPLEX RECEPTACLE - GFCI
- B — DUPLEX RECEPTACLE - GFCI BREAKER
- T — DUPLEX RECEPTACLE - TAMPER RESIST
- SPLIT WIRE DUPLEX
- QUADRAPLEX (DOUBLE DUPLEX)
- COMB. SWITCH / RECEPTACLE
- FLOOR MOUNTED RECEPTACLE
- SPECIAL PURPOSE (AS NOTED)
- TELEVISION OUTLET
- M — MOTOR OUTLET (sto - switched thermal overload)
- TELEPHONE TERMINAL
- TELEPHONE OUTLET
- FLOOR MTD. TELEPHONE OUTLET
- C — COMPUTER OUTLET
- COMB. TELE/COMPUTER OUTLET
- S — TOGGLE SWITCH
  - a-switching, p-pilot light
  - 2-2 pole, k-keyed
  - 3-3 way, to-thermal overload
  - 4-4 way, t-timer
- # — WALL MOUNTED LIGHTING CONTROL DEVICE RE: LIGHTING CONTROL DEVICE SCHEDULE
- CEILING MOUNTED LIGHTING CONTROL DEVICE RE: LIGHTING CONTROL DEVICE SCHEDULE
- T — THERMOSTAT
- TS — TIME SWITCH
- PE — PHOTOCELL
- PUSH-BUTTON STATION
- SAFETY SWITCH
- MOTOR STARTER / LIGHTING CONTACTOR
- COMBINATION MOTOR STARTER
- R — RELAY
- FACP — FIRE ALARM CONTROL PANEL
- ANNUNCIATOR
- PULL STATION
- HORN
- HORN / LIGHT COMBINATION
- HORN / STROBE
- STROBE
- BELL
- OS & Y VALVE
- F — FLOW SWITCH
- ROOM DETECTOR (SMOKE)
- T — ROOM DETECTOR (THERMAL)
- DUCT DETECTOR
- REMOTE INDICATING LIGHT / TEST SWITCH
- DOOR HOLDER
- CHIME
- FUSED SWITCH
- CIRCUIT BREAKER
- GROUND CONNECTOR
- MECHANICAL EQUIPMENT
- DETAIL NOTE
- KITCHEN / MEDICAL EQUIPMENT
- (E) — EXISTING TO REMAIN
- (ER) — EXISTING TO BE RELOCATED
- (ED) — EXISTING TO BE DEMOLISHED

LUMINAIRE SCHEDULE

KEY	LAMP	DESCRIPTION	CEIL'G (DEPTH)		MANUFACTURER/#	VOLT
B1	42W LED 3500K 5000 LUM	4'-0" LED LINEAR, STANDARD EFF, FLAT DIFFUSE LENS (WHITE)	SURFACE	0-10V 10%	LITHONIA CLX L48 5000LM SEF FDL MVOLT GZ10 35K 80CRI WH	120
C1	-	-	-	-	TBD	120
C2	23W LED 3000K XXX LUM	13" SURFACE MOUNTED LED - WET LOCATION	SURFACE	TRIAC	VERSA LITE / FMML 13 830 WL	120
D1	14W LED 3000K 1500 LUM	4" ROUND COMERCIAL GRADE DOWNLIGHT WITH 65 DEG BEAM (CLEAR TRIM)	GRID (5-3/4")	0-10V 10%	GOTHAM / EVO4 30/15 4AR WD 120 EZ10	120
D1W	14W LED 3000K 1500 LUM	4" ROUND COMERCIAL GRADE DOWNLIGHT WITH 65 DEG BEAM (CLEAR TRIM)	GRID (5-3/4")	0-10V 10%	GOTHAM / EVO4 30/15 4AR WD 120 EZ10	120
P3	22W LED 2000 LUM 3000K 80 CRI	4" ROUND CYLINDER (BLACK)	PENDANT (10'-0")		LITHONIA LIGHTING / LDN4CYL 30/20 LO4 BR LD MVOLT GZ10	120
W1	-	HALF DOME - INDOOR WALL SCONCE	-	-	TBD	120
W3	-	OUTDOOR WALL SCONCE	-	-	TBD	120
W4	-	OUTDOOR WALL SCONCE	-	-	TBD	120
P3	22W LED 2000 LUM 3000K 80 CRI	4" ROUND CYLINDER (BLACK)	PENDANT (10'-0")		LITHONIA LIGHTING / LDN4CYL 30/20 LO4 BR LD MVOLT GZ10	120
V1	25W LED 3500K 3200 LUM	37" VANITY (BRUSHED NICKEL)	WALL		BROWNLEE LIGHTING 5174-37-BN-H25LED-35K	120
V2	14W LED 925 LUM 4000K	UNIT - CLOSET LIGHT W/ IR SENSOR	WALL		LITHONIA - LED CLOSET LIGHT / FMMCL 18 840 PIR	120
EL 1	LED, 61W, 12000 LUMENS, 4000K	ELEVATOR PIT LIGHT, 0-10V DIMMING, SURFACE MOUNT WITH 120° DIFFUSED LENS	WALL		GE ABV3 0 12 T 47 1D Q V SM K Q W	120
X1	FURN	EXIT SIGN, GREEN LED STENCIL FACE, UNIVERSAL MOUNTING, 90 MIN BATTERY PACK, FINISH BY ARCHITECT	UNIVERSAL		LITHONIA LQM S * 3 G 120/277 ELN SD	120
X2	FURN	EXIT SIGN W/ DOUBLE FROG EYE, GREEN LED STENCIL FACE, 90 MIN BATTERY PACK, FINISH BY ARCHITECT	UNIVERSAL		LITHONIA LHQM LED * G (* = FINISH BY ARCH)	120
Z1	FURN	DOUBLE FROG EYE EMERGENCY LIGHT, 90 MIN BATTERY PACK, +10' MNT 60' SPACING, FINISH BY ARCHITECT	WALL		LITHONIA ELM4L * (* = FINISH BY ARCH)	120
Z2	FURN	DIE CAST ARCHITECTURAL EMERGENCY LIGHT, WET LOCATION LISTED, 90 MINUTE COLD WEATHER (0°F TO 122°F) BATTERY PACK	WALL		LITHONIA AFN * EXT (* = FINISH BY ARCH)	120

NOTES: *NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN MODEL NUMBERS AND DESCRIPTIONS PRIOR TO ORDERING
*VERIFY CEILING INSULATION W/ GC AND NOTIFY ENGINEER OF ANY IC RATING CONFLICTS PRIOR TO ORDERING

MECHANICAL EQUIPMENT

KEY	DESCRIPTION	LOAD	VOLT	CIRCUIT	CONNECTION	REMARKS
AC-0.75	VRF INDOOR HEAT PUMP, CASSETTE	0.2 MCA	208/1	(2-#12,#12G) 1/2"C	J-BOX	
CU-0.75	CONDENSING UNIT	15 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 15 FRN	
AH-1.5 A-C	DUCTED HEAT PUMP FAN COIL UNIT	2.5 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 4 FRN	
		5 KW	208/1	(2-#8,#10G) 3/4"C	60/2; 35 FRN	
CU-1.5 A-C	HEAT PUMP CONDENSING UNIT	16 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 20 FRN	
AH-2	DUCTED HEAT PUMP FAN COIL UNIT	4 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 4 FRN	
		5 KW	208/1	(2-#8,#10G) 3/4"C	60/2; 35 FRN	
CU-2	HEAT PUMP CONDENSING UNIT	16 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 20 FRN	
AH-4 A-D	DUCTED HEAT PUMP FAN COIL UNIT	9 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 10 FRN	
		8 KW	208/1	(2-#8,#10G) 3/4"C	60/2; 50 FRN	
CU-4 A-D	HEAT PUMP CONDENSING UNIT	16 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 20 FRN	
EF-1	CEILING EXHAUST FAN	20 W	120/1	(2-#12,#12G) 1/2"C	THERMAL O.L.	
HU-1	HUMIDIFIER	2.5 KW	208/1	(2-#12,#12G) 1/2"C	30/2; 20 FRN	
ERV-1	ENERGY RECOVERY VENTILATOR	10 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 10 FRN	
		3 KW	208/1	(2-#12,#12G) 1/2"C	30/2; 20 FRN	
ERV-2	ENERGY RECOVERY VENTILATOR	10 MCA	208/1	(2-#12,#12G) 1/2"C	30/2; 10 FRN	
		3 KW	208/1	(2-#12,#12G) 1/2"C	30/2; 20 FRN	
EUH-1	ELECTRIC UNIT HEATER	2.2 KW	208/1	(2-#12,#12G) 1/2"C	30/2; 15 FRN	CKT TO BE (2-#10,#10G) 1/2"C TO FUSED DISCONNECT
CP	RECIRC PUMP	25 W	120/1	(2-#12,#12G) 1/2"C	5-20R	
EWH-1 A,B	ELECTRIC WATER HEATER	5 KW	208/1	(2-#8,#10G) 3/4"C	60/2; 35 FRN	
BH-1	ELECTRIC BASEBOARD HEATER	500 W	120/1	(2-#12,#12G) 1/2"C	J-BOX	
EL	ELEVATOR	30 HP	208/3	(3-#2,#6G) 1-1/4"C	200/3; 125 FRN	
BLR-1	HYDRONIC BOILER	291.5 A	208/3	(3-500MCM,#3G) 4"C	400/3; 400 FRN	
P-1	CIRCULATION PUMP	115 W	120/1	(2-#12,#12G) 1/2"C	J-BOX	
P-2	CIRCULATION PUMP	187 W	120/1	(2-#12,#12G) 1/2"C	J-BOX	
BF	BOILER FEEDER	50 W	115/1	(2-#12,#12G) 1/2"C	5-20R	

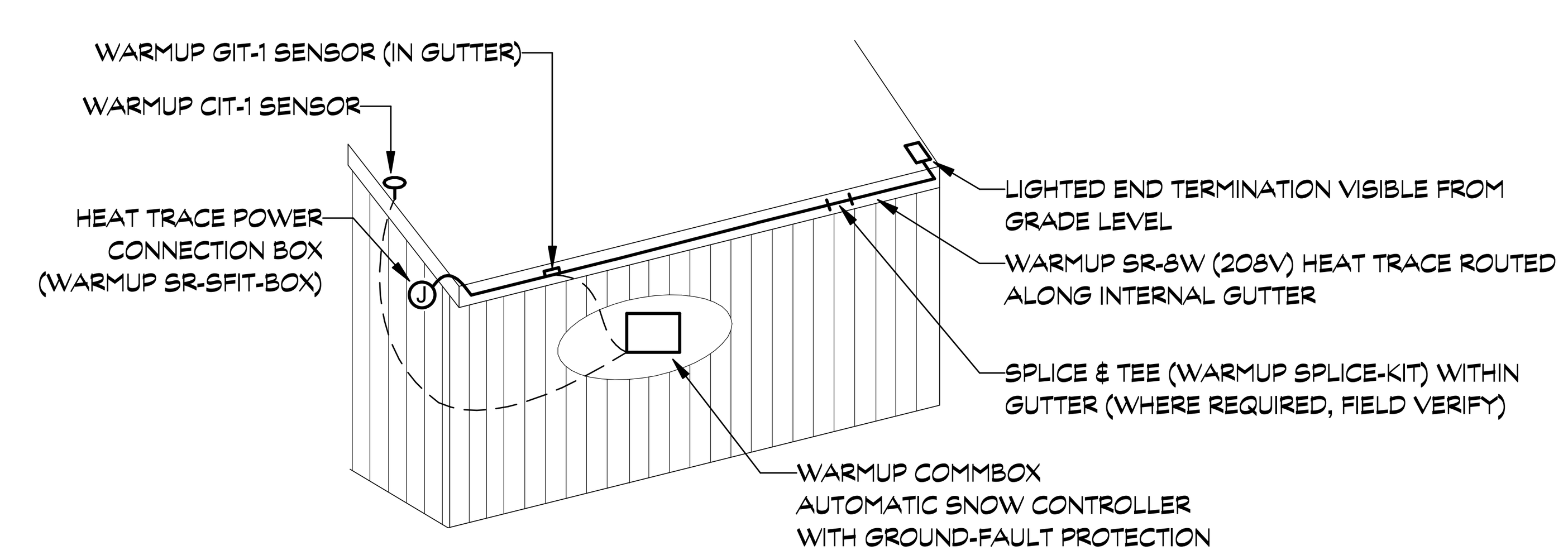
NOTES: *TEMPERATURE RATING OF ALL DEVICES COULD NOT BE VERIFIED, THEREFORE WIRE IS SIZED BASED ON 60C PER NEC 110.14(C)(1)(a)

OWNER SELECTED EQUIPMENT

KEY	DESCRIPTION	LOAD	VOLT	CIRCUIT	CONNECTION	REMARKS
01	STEAMER	9 KW	208/1	(2-#6,#10G) 1"C	60/2; 60 FRN	
02	TOWEL HEATER	150 W	120/1	(2-#12,#12G) 1/2"C	J-BOX	
03	COOKTOP	11.5 KW	240/1	(2-#6,#10G) 1"C	SPEC. PURPOSE	VERIFY OPERATION AT 208/1
04	ELEVATOR CURTAIN	15 MCA	120/1	(2-#12,#12G) 1/2"C	J-BOX	

NOTES: *TEMPERATURE RATING OF ALL DEVICES COULD NOT BE VERIFIED, THEREFORE WIRE IS SIZED BASED ON 60C PER NEC 110.14(C)(1)(a)
** LISTED EQUIPMENT FURNISHED WITH CORD AND PLUG; VERIFY CONFIGURATION
*COORDINATE ALL ROUGH-IN HEIGHTS AND LOCATIONS WITH KITCHEN VENDOR AND/OR OWNER.

NOTE: DIAGRAM SHOWN FOR SCHEMATIC PURPOSES, SYSTEM TO BE DESIGN BUILD BY E.C. CIRCUITS SHOWN ON PLANS FOR DESIGN INTENT, NOTIFY ENGINEER IG ADDITIONAL CIRCUITS ARE REQUIRED FOR SYSTEM



NTS

SNOW MELT SYSTEM DIAGRAM 2

SHORT CIRCUIT CALCULATION

LOCATION		SECONDARY VOLTAGE					Ø	KVA	%Z-*	Isc AVAIL.		"M"	Isc FAULT
TRANS	I_{sc}	208					3	300	1.6	833		62.5	52000
LOCATION		VOLT.	Ø	WIRE TYPE	CONDUIT TYPE	WIRE SIZE	#OF RUNS	LENGTH	"C" VALUE	Isc AVAIL.	"F"	"M"	Isc FAULT
MDC	I_1	208	3	AL	NON	400	4	30	18505	52000	0.175	0.851	44237
PANEL HOUSE	I_2	208	3	CU	MET	3/0	2	60	12843	44237	0.860	0.538	23778
UNIT 1	I_3	208	3	CU	MET	3/0	2	70	12843	44237	1.004	0.499	22076
UNIT 2	I_4	208	3	CU	MET	3/0	2	60	12843	44237	0.860	0.538	23778
UNIT 3	I_5	208	3	CU	MET	3/0	2	30	12843	44237	0.430	0.699	30930
UNIT 4	I_6	208	3	CU	MET	3/0	2	80	12843	44237	1.147	0.466	20602
ELEV DISC	I_7	208	3	CU	MET	1	1	70	7292	23778	1.901	0.345	8197
ELEVATOR	I_8	208	3	CU	MET	1	1	5	7292	8197	0.047	0.955	7831
BLR 1 CT	I_9	208	3	CU	MET	3/0	2	30	12843	52000	0.506	0.664	34535
BLR DISC	I_{10}	208	3	CU	MET	3/0	2	70	12843	34535	0.784	0.561	19361

NOTES: SWITCHBOARDS, PANELBOARDS AND LOAD CENTERS ARE TO BE FULLY RATED AS SHOWN. PROVIDE A DEDUCT PRICE TO USE SERIES RATED EQUIPMENT AND PROVIDE THE TESTED OCPD COMBINATION USED TO OBTAIN THE SERIES RATING. ALL EQUIPMENT TO HAVE PERMANENTLY ATTACHED LABELING PROVIDED BY THE EQUIPMENT MANUFACTURER AND INSTALLER PER NEC 110.22 AND 240.86 (B)
PROVIDE MARKING ON ALL SERVICE EQUIPMENT WITH MAXIMUM CALCULATED FAULT CURRENT PER NEC 110.24
*-AVAILABLE FAULT CURRENT AT TRANSFORMER CACLUCATED BASED ON %Z FROM UTILITY COMPANY DESIGN STANDARDS. IF TRANSFORMER SIZE IS OTHER THAN SHOWN, NOTIFY ENGINEER.

ELEC BOILER LOAD SUMMARY

VOLTS: 120/208 Wye PHASE: 3 WIRES: 4
NOTE: ALL EXISTING METER CALCULATED AT 125% PER NEC 220.87

CKT	CIRCUIT DESCRIPTION	LOAD	AMPS
1	BLR 1	105.0 kVA	291.5 A
2			
3			
4			

TOTAL CONNECTED: 105.0 kVA

LOAD TYPE		CONN. LOAD	DEMAND FACT.	EST. DEMAND
LIGHTING / EV -	L	0 kVA	0%	0 kVA
RECEPTACLE -	R	0 kVA	0%	0 kVA
MOTOR -	M	105.02 kVA	125%	131.27 kVA
KITCHEN -	K	0 kVA	0%	0 kVA
OTHER -	O	0 kVA	0%	0 kVA
EXISTING -	E	0 kVA	0%	0 kVA
NEC-220.84-	NC	0 kVA	0%	0 kVA
TOTAL DEMAND:				131.27 kVA/364 A

MDC LOAD SUMMARY

VOLTS: 120/208 Wye PHASE: 3 WIRES: 4
NOTE: ALL EXISTING METER CALCULATED AT 125% PER NEC 220.87

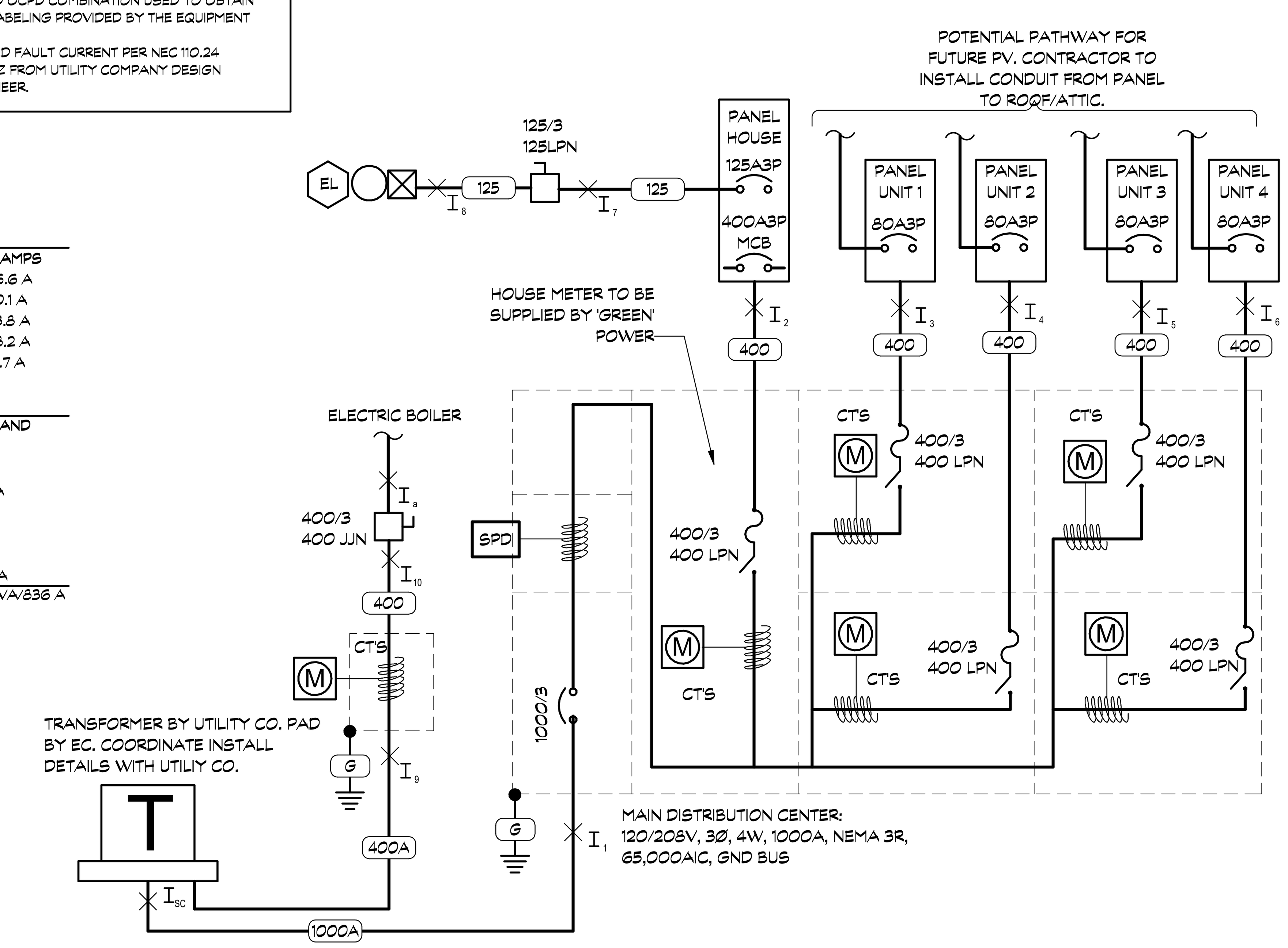
CKT	CIRCUIT DESCRIPTION	LOAD	AMPS
1	4-BED (UNIT 1)	124.9 kVA	346.6 A
2	4-BED (UNIT 2)	126.1 kVA	350.1 A
3	4-BED (UNIT 3)	123.9 kVA	343.8 A
4	6-BED (UNIT 4)	139.9 kVA	388.2 A
5	HOUSE	61.5 kVA	170.7 A
6			

TOTAL CONNECTED: 576.2 kVA

LOAD TYPE		CONN. LOAD	DEMAND FACT.	EST. DEMAND
LIGHTING / EV -	L	1.82 kVA	125%	2.28 kVA
RECEPTACLE -	R	1.08 kVA	100%	1.08 kVA
MOTOR -	M	41.93 kVA	118%	49.43 kVA
KITCHEN -	K	0 kVA	0%	0 kVA
OTHER -	O	16.67 kVA	100%	16.67 kVA
EXISTING -	E	0 kVA	0%	0 kVA
NEC-220.84-	NC	514.73 kVA	45%	231.63 kVA
TOTAL DEMAND:				301.08 kVA/836 A

WIRING LEGEND

125	(4-#1 CU, #6 CU G)1-1/2"C
400	2[(4-3/0 CU, #3 CU G)2"C]
400A	2[(4-3/0 CU)2"C]
1000A	4[(4-400MCM AL)4"C]
G	(3/0 CU)3/4"C TO BLDG STEEL, COLD WATER PIPE, CONCRETE ENCASED ELECTRODE; 2[(#6CU)1/2"C] TO DRIVEN; GROUND RODS NOT LESS THAN 6'0 APART



NTS

ELECTRIC ONE-LINE DIAGRAM 1

FIRE ALARM ZONE SCHEDULE

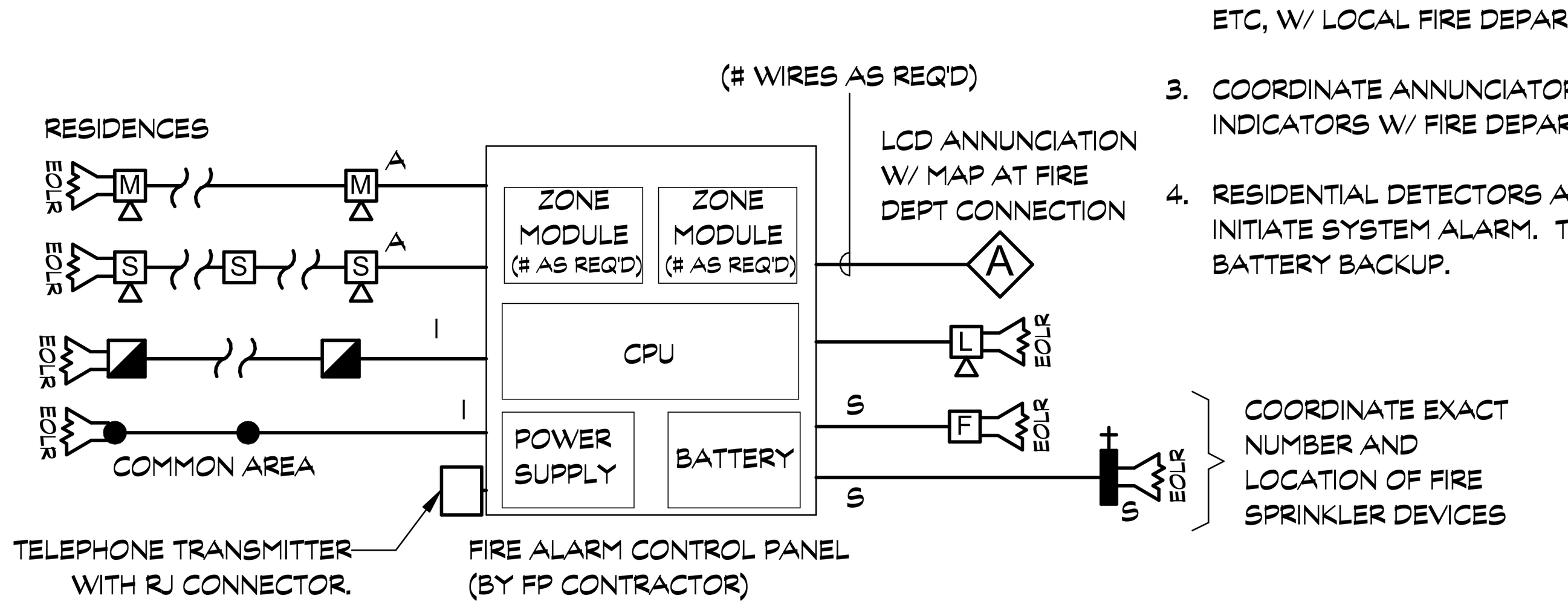
1. SPRINKLER
2. ROOFTOP UNITS
3. TAMPER SWITCH, TROUBLE ALARM
4. PULL STATIONS: FACP
5. SPARE

FIRE ALARM WIRING LEGEND

- I INITIATING CIRCUIT
- A ALARM CIRCUIT
- S SUPERVISORY CIRCUIT
- M MECHANICAL INTERLOCK CIRCUIT

FIRE ALARM NOTES

1. FIRE ALARM PANEL WITH AUTO DIALER, BATTERIES, ETC BY ELECTRICAL CONTRACTOR. WIRE UP ANCILLARY EQUIPMENT TO THIS PANEL AS REQUIRED BY LOCAL CODE.
2. THERE IS ONE FACP TO SERVE ENTIRE BUILDING. COORDINATE NUMBER AND LOCATION OF FLOW, TAMPER, ETC, W/ LOCAL FIRE DEPARTMENT.
3. COORDINATE ANNUNCIATORS, MAPS AND AREA INDICATORS W/ FIRE DEPARTMENT.
4. RESIDENTIAL DETECTORS ARE LOCAL ONLY AND DO NOT INITIATE SYSTEM ALARM. THEY SHALL BE PROVIDED W/ BATTERY BACKUP.



NTS

FIRE ALARM ONE LINE DIAGRAM 3

38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date
1	Revision 1	Date 1

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number: 23035-7
Date: 03/21/24
Drawn By: Author
Checked By: EM

Project Phase: PERMIT

Sheet Title: ELECTRICAL DETAILS & SCHEDULES

Sheet Number: E6.1

5/2/2024 2:51:56 PM

PANEL 4-BED UNIT 2 (LARGEST)

SUPPLY FROM: | VOLTS: 120/208 Wye | A.I.C. RATING: 65,000
MOUNTING: RECESSED | PHASES: 3 | MAINS TYPE: MLO
ENCLOSURE: NEMA 1 | WIRES: 4 | MAINS RATINGS: 400 A

CIRCUIT DESCRIPTION	LT	TRIP	P	BT		A			B			C		BT	P	TRIP	LT	CIRCUIT DESCRIPTION
BEDROOM #1 RECEPTS	ND	20	1	A	1	O	O							2	AG	1	20	ND	KITCHEN RECEPTS
BEDROOM #2 RECEPTS	ND	20	1	A	3				O	O				4	AG	1	20	ND	KITCHEN RECEPTS
BEDROOM #3 RECEPTS	ND	20	1	A	5							O	O	6	AG	1	20	ND	DISH / DISPOSAL
LIVING RM RECEPTS	ND	20	1	A	7	O	O							8	A	1	20	ND	MICRO / HOOD
LIVING RM RECEPTS / SPARE	ND	20	1	A	9				O	O				10	AG	1	20	ND	REFRIG / ISLAND RECEPTS
BATHROOM GFCI	ND	20	1	AG	11							O	O	12	AG	1	20	ND	WASHER
LTG CKT - BATHROOM	ND	20	1	A	13	O	O							14	A	1	20	ND	DATA / TELECOM
LTG CKT - EXT	ND	20	1	A	15				O	O				16					
EXTERIOR GFCI	ND	20	1	AG	17							O	O	18	S	2	70	ND	COOKTOP
DRYER	ND	35	2	S	19	O	O							20		1	20	--	SPARE
					21				O	O				22	S	2	20	ND	CU 1.5
BED #4/BUNK RECEPTS	ND	20	1	A	23							O	O	24					
OFFICE RECEPTS/BED #5	ND	20	1	A	25	O	O							26	S	1	20	ND	GRILL / SPARE
HALLWAY RECEPTS	ND	20	1	A	27				O	O				28	AG	1	20	ND	BATHROOM GFCI
2X EUH-1	ND	30	2	S	29							O	O	30					
					31	O	O							32	S	2	20	ND	AH 1.5
BATHROOM GFCI	ND	20	1	AG	33				O	O				34					
BATHROOM GFCI	ND	20	1	AG	35							O	O	36	S	2	35	ND	EWH
EWH	ND	35	2	S	37	O	O							38					
					39				O	O				40	S	2	20	ND	ERV DUCT HEAT
HUMIDIFIER	ND	20	2	S	41							O	O	42	AG	1	20	ND	RADIANT FLOOR...
					43	O	O							44	AG	1	20	ND	RADIANT FLOOR BATH 1/2
FIREPLACE	ND	20	1	A	45				O	O				46	AG	1	20	ND	RADIANT FLOOR BATH 3
ERV & AH 4	ND	20	2	S	47							O	O	48	AG	1	20	ND	RADIANT FLOOR PRIM BATH
					49	O	O							50	S	2	35	ND	WALL OVEN 2
WALL OVEN 1	ND	35	2	S	51				O	O				52					
					53							O	O	54	S	2	35	ND	AH 1.5 DUCT HEATER
AH 4 DUCT HEATER	ND	50	2	S	55	O	O							56					
					57				O	O				58	AG	1	20	ND	BATHROOM GFCI
EV CHARGER	ND	40	2	S	59							O	O	60	AG	1	20	ND	BATHROOM GFCI/SPARE
					61	O	O							62	S	1	20	ND	BH1
GARAGE DOOR OPENER	ND	20	1	S	63				O	O				64		1	20	--	SPARE
CU 4	ND	20	2	S	65							O	O	66	S	1	20	ND	TOWEL WARMER
					67	O	O							68	A	1	20	--	SPARE
STEAMER 1	ND	60	2	S	69				O	O				70	A	1	20	ND	LTG CKT - EAST
					71							O	O	72	A	1	20	ND	LTG CKT - WEST
STEAMER 2	ND	60	2	S	73	O	O							74	A	1	20	ND	GARAGE
					75				O	O				76	A	1	20	ND	FA (120V)
STEAMER 3	ND	60	2	S	77							O	O	78	AG	1	20	ND	GARAGE GFCI
					79	O	O							80					
SPACE	--	--	1		81				--	O				82	S	3	80	--	FOR FUTURE SOLAR ELECTRIC
SPACE	--	--	1		83							--	O	84					

TOTAL LOAD: 25.93 kVA | 25.93 kVA | 25.93 kVA
TOTAL AMPS: 216 A | 216 A | 216 A

LOAD TYPE		CONN.LOAD	DEMAND FACT.	EST. DEMAND	BREAKER TYPE	
LIGHTING / EV -	L	0 kVA	0%	0 kVA	SHUNT TRIP -	ST
RECEPTACLE -	R	0 kVA	0%	0 kVA	GFCI -	G
MOTOR -	M	0 kVA	0%	0 kVA	HANDLE BLOCK -	H
KITCHEN -	K	0 kVA	0%	0 kVA	HANDLE TIE -	T
OTHER -	O	0 kVA	0%	0 kVA	AFCI -	A
EXISTING -	E	0 kVA	0%	0 kVA	STANDARD -	S
NEC-220.84-					LOCKOUT -	L

PANEL TOTALS
TOTAL CONN. LOAD: 77.78 kVA
TOTAL EST. DEMAND: 77.78 kVA
TOTAL CONN.: 216 A
TOTAL EST. DEMAND: 216 A

PANEL 6-BED UNIT 4 (LARGEST)

SUPPLY FROM: | VOLTS: 120/208 Wye | A.I.C. RATING: 65,000
MOUNTING: RECESSED | PHASES: 3 | MAINS TYPE: MLO
ENCLOSURE: NEMA 1 | WIRES: 4 | MAINS RATINGS: 400 A

CIRCUIT DESCRIPTION	LT	TRIP	P	BT		A			B			C		BT	P	TRIP	LT	CIRCUIT DESCRIPTION
BEDROOM #1 RECEPTS	--	20	1	A	1	O	O							2	AG	1	20	--	KITCHEN RECEPTS
BEDROOM #2 RECEPTS	--	20	1	A	3				O	O				4	AG	1	20	--	KITCHEN RECEPTS
BEDROOM #3 RECEPTS	--	20	1	A	5							O	O	6	AG	1	20	--	DISH / DISPOSAL
LIVING RM RECEPTS	--	20	1	A	7	O	O							8	A	1	20	--	MICRO / HOOD
LIVING RM RECEPTS / SPARE	--	20	1	A	9				O	O				10	AG	1	20	--	REFRIG / ISLAND RECEPTS
BATHROOM GFCI/RECIRC PUMP	--	20	1	AG	11							O	O	12	AG	1	20	--	WASHER
LTG CKT - BATHROOM	--	20	1		13	O	O							14	A	1	20	--	DATA / TELECOM
LTG CKT - EXT	--	20	1		15				O	O				16					
EXTERIOR GFCI	--	20	1	AG	17							O	O	18	S	2	70	--	COOKTOP
DRYER	--	20	2	AG	19	O	O							20	A	1	20	ND	BEDROOM/SPARE
					21				O	O				22	S	2	20	--	CU 2
BED #4/BUNK RECEPTS	--	20	1	A	23							O	O	24					
BEDROOM #5	--	20	1	A	25	O	O							26	S	1	20	--	GRILL / SPARE
HALLWAY RECEPTS	--	20	1	A	27				O	O				28	AG	1	20	--	BATHROOM GFCI
2X EUH 1	--	20	2	S	29							O	O	30					
					31	O	O							32	S	2	20	--	AH 2
BATHROOM GFCI	--	20	1	AG	33				O	O				34					
BATHROOM GFCI	--	20	1	AG	35							O	O	36	S	2	35	--	EWH
EWH	--	35	2	S	37	O	O							38					
					39				O	O				40	S	2	20	--	ERV
HUMIDIFIER	--	20	2	S	41							O	O	42	AG	1	20	--	RADIANT FLOOR...
					43	O	O							44	AG	1	20	--	RADIANT FLOOR BATH 1/2
FIREPLACE	--	20	1	A	45				O	O				46	AG	1	20	--	RADIANT FLOOR BATH 3
ERV & AH 4	--	20	2	S	47							O	O	48	AG	1	20	--	RADIANT FLOOR PRIM BATH
					49	O	O							50	S	2	35	--	WALL OVEN 2
WALL OVEN 1	--	35	2	S	51				O	O				52					
					53							O	O	54	S	2	35	--	AH 2 DUCT HEATER
AH 4 DUCT HEATER	--	50	2	S	55	O	O							56					
					57				O	O				58	AG	1	20	--	BATHROOM GFCI
EV CHARGER	--	40	2	S	59							O	O	60	AG	1	20	--	BATHROOM GFCI
					61	O	O							62	S	1	20	--	BH1
GARAGE DOOR OPENER	--	20	1	S	63				O	O				64	AG	1	20	ND	RADIANT FLOOR BATH 5
CU 4	--	20	2	S	65							O	O	66	S	1	20	--	TOWEL WARMER
					67	O	O							68	AG	1	20	ND	BATHROOM GFCI
STEAMER 1	--	60	2	S	69				O	O				70	A	1	20	ND	LTG CKT - EAST
					71							O	O	72	A	1	20	ND	LTG CKT - WEST
STEAMER 2	--	60	2	S	73	O	O							74	A	1	20	ND	LTG CKT - NORTH
					75				O	O				76	A	1	20	ND	LTG CKT - SOUTH
STEAMER 3	--	60	2	S	77							O	O	78	AG	1	20	--	GARAGE GFCI
					79	O	O							80					
STEAMER 4	ND	60	2	S	81				O	O				82	S	3	80	--	FOR FUTURE SOLAR ELECTRIC
					83							O	O	84					

TOTAL LOAD: 28.41 kVA | 28.41 kVA | 28.41 kVA
TOTAL AMPS: 237 A | 237 A | 237 A

LOAD TYPE		CONN.LOAD	DEMAND FACT.	EST. DEMAND	BREAKER TYPE	
LIGHTING / EV -	L	0 kVA	0%	0 kVA	SHUNT TRIP -	ST
RECEPTACLE -	R	0 kVA	0%	0 kVA	GFCI -	G
MOTOR -	M	0 kVA	0%	0 kVA	HANDLE BLOCK -	H
KITCHEN -	K	0 kVA	0%	0 kVA	HANDLE TIE -	T
OTHER -	O	0 kVA	0%	0 kVA	AFCI -	A
EXISTING -	E	0 kVA	0%	0 kVA	STANDARD -	S
NEC-220.84-					LOCKOUT -	L

PANEL TOTALS
TOTAL CONN. LOAD: 85.24 kVA
TOTAL EST. DEMAND: 85.24 kVA
TOTAL CONN.: 237 A
TOTAL EST. DEMAND: 237 A

BUILDING RESIDENTIAL LOAD CALCS BASED UPON NEC 220.84

Number of Units: 4
Total square footage: 12,950

(1) Appliance and Laundry Circuits					
8	Appliance Circuits	@	1,500 VA	=	12,000 VA
4	Laundry Circuits	@	1,500 VA	=	6,000 VA
SUB-TOTAL				=	18,000 VA
(2) Gen Lighting and Gen Use Receptacles					
12950	Sq Ft @ 3 Watts/sq ft			=	38,850 VA
(3) Appliances					
4	Clothes Dryer	@	5,000 VA	=	20,000 VA
4	Cooktop	@	11,500 VA	=	46,000 VA
4	Dishwasher	@	1,200 VA	=	4,800 VA
4	Disposer	@	1,180 VA	=	4,720 VA
4	Humidifier	@	3,200 VA	=	12,800 VA
4	Range Hood	@	600 VA	=	2,400 VA
4	Refrigerator/Freezer	@	500 VA	=	2,000 VA
17	TOWEL HEAT	@	150 VA	=	2,550 VA
8	Wall Oven	@	5,000 VA	=	40,000 VA
13	Steamer	@	9,000 VA	=	117,000 VA
8	U. C. Refrigerator	@	500 VA	=	4,000 VA
4	Ice Machine	@	180 VA	=	720 VA
8	Electric Water Htr	@	5,000 VA	=	40,000 VA
8	Fireplace	@	120 VA	=	960 VA
SUB-TOTAL				=	297,950 VA
(4) Other Motor or Low P. F. Loads					
25	Bath Exhaust Fan	@	50 VA	=	1,250 VA
4	Garage Door openers	@	1,000 VA	=	4,000 VA
4	Humidifier	@	2,500 VA	=	10,000 VA
SUB-TOTAL				=	15,250 VA
(5) Plus 100% Larger of Heating/Cooling Load					
8	Furnace	@	1,200 VA	=	9,600 VA
3	1.5 Tons	@	2,496 VA	=	7,488 VA
3	BH1	@	500 VA	=	1,500 VA
1	2 Tons	@	4,160 VA	=	4,160 VA
8	EUH	@	2,200 VA	=	17,600 VA
1856	Radiant Floors (sq ft)	@	13 VA	=	23,571 VA
4	ERV	@	6,200 VA	=	24,800 VA
4	EV	@	8,000 VA	=	32,000 VA
4	Furnace		5990		23,960 VA
SUB-TOTAL				=	144,679 VA
TOTAL OF ALL LOADS					
Total Load				=	514,729 VA
Multy Family Demand Factor (220-84)					0.45
GRAND TOTAL LOAD				=	231,628 VA
				(@208/3)	643.7 A

LARGEST 4BED (A-C) UNIT RESIDENTIAL LOAD CALCS BASED UPON NEC 220.82

Total square footage: 3,368

(1) Appliance and Laundry Circuits					
2	Appliance Circuits	@	1,500 VA	=	3,000 VA
1	Laundry Circuits	@	1,500 VA	=	1,500 VA
SUB-TOTAL				=	4,500 VA
(2) Gen Lighting and Gen Use Receptacles					
3368	Sq Ft @ 3 Watts/sq ft			=	10,104 VA
(3) Appliances					
1	Clothes Dryer	@	5,000 VA	=	5,000 VA
1	Cooktop	@	11,500 VA	=	11,500 VA
1	Dishwasher	@	1,200 VA	=	1,200 VA
1	Disposer	@	1,180 VA	=	1,180 VA
1	Humidifier	@	3,200 VA	=	3,200 VA
1	Range Hood	@	600 VA	=	600 VA
1	Refrigerator/Freezer	@	500 VA	=	500 VA
4	TOWEL HEAT	@	150 VA	=	600 VA
2	Wall Oven	@	5,000 VA	=	10,000 VA
3	Steamer	@	9,000 VA	=	27,000 VA
2	U. C. Refrigerator	@	500 VA	=	1,000 VA
1	Ice Machine	@	180 VA	=	180 VA
2	Electric Water Htr	@	5,000 VA	=	10,000 VA
2	Fireplace	@	120 VA	=	240 VA
SUB-TOTAL				=	72,200 VA
(4) Other Motor or Low P. F. Loads					
6	Bath Exhaust Fan	@	50 VA	=	300 VA
1	Garage Door openers	@	1,000 VA	=	1,000 VA
1	Humidifier	@	2,500 VA	=	2,500 VA
SUB-TOTAL				=	3,800 VA
(B) Total of "General" Loads [(1)+(2)+(3)+(4)]				=	90,604 VA
First	10,000	@	100%	=	10,000 VA
Remainder	80,604	@	40%	=	32,242 VA
SUB-TOTAL					42,242 VA
(C) Plus 100% Larger of Heating/Cooling Load					
2	Furnace	@	1,200 VA	=	2,400 VA
1	1.5 Tons	@	2,496 VA	=	2,496 VA
1	BH1	@	500 VA	=	500 VA
0	2 Tons	@	4,160 VA	=	-
2	EUH	@	2,200 VA	=	4,400 VA
437	Radiant Floors (sq ft)	@	13 VA	=	5,550 VA
1	ERV	@	6,200 VA	=	6,200 VA
1	EV	@	8,000 VA	=	8,000 VA
1	4TON	@	5,990 VA		5,990 VA
SUB-TOTAL				=	35,536 VA
TOTAL OF ALL LOADS					
"Other" Loads				=	42,242 VA
Heating / Cooling Load				=	35,536 VA
GRAND TOTAL LOAD				=	77,778 VA
				(@208/3)	216.1 A

LARGEST 5BED (D) UNIT RESIDENTIAL LOAD CALCS BASED UPON NEC 220.82

Total square footage: 3,758

(1) Appliance and Laundry Circuits					
2	Appliance Circuits	@	1,500 VA	=	3,000 VA
1	Laundry Circuits	@	1,500 VA	=	1,500 VA
SUB-TOTAL				=	4,500 VA
(2) Gen Lighting and Gen Use Receptacles					
3758	Sq Ft @ 3 Watts/sq ft			=	11,274 VA
(3) Appliances					
1	Clothes Dryer	@	5,000 VA	=	5,000 VA
1	Cooktop	@	11,500 VA	=	11,500 VA
1	Dishwasher	@	1,200 VA	=	1,200 VA
1	Disposer	@	1,180 VA	=	1,180 VA
1	Humidifier	@	3,200 VA	=	3,200 VA
1	Range Hood	@	600 VA	=	600 VA
1	Refrigerator/Freezer	@	500 VA	=	500 VA
5	TOWEL HEAT	@	150 VA	=	750 VA
2	Wall Oven	@	5,000 VA	=	10,000 VA
4	Steamer	@	9,000 VA	=	36,000 VA
2	U. C. Refrigerator	@	500 VA	=	1,000 VA
1	Ice Machine	@	180 VA	=	180 VA
2	Electric Water Htr	@	5,000 VA	=	10,000 VA
2	Fireplace	@	120 VA	=	240 VA
SUB-TOTAL				=	81,350 VA
(4) Other Motor or Low P. F. Loads					
8	Bath Exhaust Fan	@	50 VA	=	400 VA
1	Garage Door openers	@	1,000 VA	=	1,000 VA
1	Humidifier	@	2,500 VA	=	2,500 VA
SUB-TOTAL				=	3,900 VA
(B) Total of "General" Loads [(1)+(2)+(3)+(4)]				=	101,024 VA
First	10,000	@	100%	=	10,000 VA
Remainder	91,024	@	40%	=	36,410 VA
SUB-TOTAL					46,410 VA
(C) Plus 100% Larger of Heating/Cooling Load					
2	Furnace	@	1,200 VA	=	2,400 VA
0	1.5 Tons	@	2,496 VA	=	-
1	BH1	@	500 VA	=	500 VA
1	2 Tons	@	4,160 VA	=	4,160 VA
2	EUH	@	2,200 VA	=	4,400 VA
565	Radiant Floors (sq ft)	@	13 VA	=	7,176 VA
1	ERV	@	6,200 VA	=	6,200 VA
1	EV	@	8,000 VA	=	8,000 VA
1	4TON	@	5,990 VA		5,990 VA
SUB-TOTAL				=	38,826 VA
TOTAL OF ALL LOADS					
"Other" Loads				=	46,410 VA
Heating / Cooling Load				=	38,826 VA
GRAND TOTAL LOAD				=	85,235 VA
				(@208/3)	236.9 A

PANEL HOUSE

SUPPLY FROM: MDC | VOLTS: 120/208 Wye | A.I.C. RATING: 65,000
MOUNTING: SURFACE | PHASES: 3 | MAINS TYPE: MLO
ENCLOSURE: NEMA 1 | WIRES: 4 | MAINS RATINGS: 400 A

CIRCUIT DESCRIPTION	LT	TRIP	P	BT		A			B			C		BT	P	TRIP	LT	CIRCUIT DESCRIPTION
CONVENIENCE RECEPT	R	20	1	G	1	180	200							2	S	1	20	L	ELEVATOR LTG
AC 0.75	M	20	2	S	3				17	1100				4	S	2	20	M	EUH 1 WATER ENTRY
					5							17	1100	6					
COMMON AREA RECEPTS	R	20	1	S	7	720	1440							8	S	1	20	L	COMMON AREA LTG
CU 0.75	M	20	2	S	9				1248	10000				10					
					11							1248	10000	12	S	3	125	M	EL - ELEVATOR
SPARE	--	20	1		13	0	10000							14					
SPARE	--	20	1		15				0	302				16	S	1	20	O	BOILER CIRCULATION PUMPS
SPARE	--	20	1		17							0	180	18	S	1	20	L	INVERTER/STAIR LTG
UPPER LEVEL ELEV. SMOKE...	M	20	1	S	19	1440	1440							20	S	1	20	M	LL2 ELEV. SMOKE CURTAIN
MAIN LEVEL ELEV. SMOKE...	M	20	1	S	21				1440	1440				22	S	1	20	M	LL1 ELEV. SMOKE CURTAIN
HEAT TRACE	O	20	2	S	23							1637	1637	24					
					25	1637	1637							26	S	2	20	O	HEAT TRACE
HEAT TRACE	O	20	2	S	27				1637	1637				28					
					29							1637	1637	30	S	2	20	O	HEAT TRACE
HEAT TRACE	O	20	2	S	31	1637	180							32	S	1	20	R	ELEVATOR SUMP
					33				1637	1440				34	S	1	20	M	GCP
SPARE	--	20	1		35							0	0	36		1	20	--	SPARE
SPARE	--	20	1		37	0	0							38		1	20	--	SPARE
SPACE	--	--	1		39				--	--				40		1	--	--	SPACE
SPACE	--	--	1		41							--	--	42		1	--	--	SPACE

TOTAL LOAD: 20.51 kVA | 21.9 kVA | 18.08 kVA
TOTAL AMPS: 173 A | 184 A | 152 A

LOAD TYPE		CONN.LOAD	DEMAND FACT.	EST. DEMAND	BREAKER TYPE	
LIGHTING / EV -	L	1.82 kVA	125%	2.28 kVA	SHUNT TRIP -	ST
RECEPTACLE -	R	1.08 kVA	100%	1.08 kVA	GFCI -	G
MOTOR -	M	41.93 kVA	116%	48.43 kVA	HANDLE BLOCK -	H
KITCHEN -	K	0 kVA	0%	0 kVA	HANDLE TIE -	T
OTHER -	O	16.67 kVA	100%	16.67 kVA	AFCI -	A
EXISTING -	E	0 kVA	0%	0 kVA	STANDARD -	S
NEC-220.84-					LOCKOUT -	L

PANEL TOTALS
TOTAL CONN. LOAD: 61.5 kVA
TOTAL EST. DEMAND: 69.46 kVA
TOTAL CONN.: 171 A
TOTAL EST. DEMAND: 193 A

COLORADO LICENSED ENGINEER
ERIC SMITH
38983
05/02/2024
PROFESSIONAL ENGINEER

NOTICE: DUTY OF COOPERATION

Release of these plans contemplates further cooperation among the owner, his contractor and the architect. Design and construction are complex. Although the architect and his consultants have performed their services with due care and diligence, they cannot guarantee perfection. Communication is imperfect and every contingency cannot be anticipated. Any ambiguity or discrepancy discovered by the use of these plans shall be reported immediately to the architect. Failure to notify the architect compounds misunderstanding and increases construction costs. A failure to cooperate by a simple notice to the architect shall relieve the architect from responsibility for the consequences. Changes made from the plans without consent of the architect are unauthorized and shall relieve the architect of responsibility for all consequences arriving out of such changes.

REVISIONS

No.	Description	Date
1	Revision 1	Date 1

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5455, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	Author
Checked By:	EM

Project Phase: PERMIT

Sheet Title: ELECTRICAL SCHEDULE

Sheet Number: E6.2

5/2/2024 2:51:56 PM

PANEL 4-BED UNIT 1

SUPPLY FROM: | VOLTS: 120/208 Wye | A.I.C. RATING: 65,000
MOUNTING: RECESSED | PHASES: 3 | MAINS TYPE: MLO
ENCLOSURE: NEMA 1 | WIRES: 4 | MAINS RATINGS: 400 A

CIRCUIT DESCRIPTION	LT	TRIP	P	BT		A		B		C			BT	P	TRIP	LT	CIRCUIT DESCRIPTION
BEDROOM #1 RECEPTS	--	20	1	A	1	0	0					2	AG	1	20	--	KITCHEN RECEPTS
BEDROOM #2 RECEPTS	--	20	1	A	3			0	0			4	AG	1	20	--	KITCHEN RECEPTS
BEDROOM #3 RECEPTS	--	20	1	A	5					0	0	6	AG	1	20	--	DISH / DISPOSAL
LIVING RM RECEPTS	--	20	1	A	7	0	0					8	A	1	20	--	MICRO / HOOD
LIVING RM RECEPTS / SPARE	--	20	1	A	9			0	0			10	AG	1	20	--	REFRIG / ISLAND RECEPTS
BATHROOM GFCI	--	20	1	AG	11					0	0	12	AG	1	20	--	WASHER
LTG CKT - BATHROOM	--	20	1	A	13	0	0					14	A	1	20	--	DATA / TELECOM
LTG CKT - EXT	--	20	1	A	15			0	0			16	S	2	70	--	COOKTOP
EXTERIOR GFCI	--	20	1	AG	17					0	0	18					
DRYER	--	35	2	S	19	0	0					20		1	20	--	SPARE
					21			0	0			22	S	2	20	--	CU 1.5
BED #4/BUNK RECEPTS	--	20	1	A	23					0	0	24					
OFFICE RECEPTS/BED #5	--	20	1	A	25	0	0					26	S	1	20	--	GRILL / SPARE
HALLWAY RECEPTS	--	20	1	A	27			0	0			28	AG	1	20	--	BATHROOM GFCI
2X EUH-1	--	20	2	S	29					0	0	30	S	2	20	--	AH 1.5
					31	0	0					32					
BATHROOM GFCI	--	20	1	AG	33			0	0			34	S	2	35	--	EWH
BATHROOM GFCI	--	20	1	AG	35					0	0	36					
EWH	--	35	2	S	37	0	0					38	S	2	20	--	ERV DUCT HEAT
					39			0	0			40					
HUMIDIFIER	--	20	2	S	41					0	0	42	AG	1	20	--	RADIANT FLOOR...
					43	0	0					44	AG	1	20	--	RADIANT FLOOR BATH 1/2
FIREPLACE	--	20	1	A	45			0	0			46	AG	1	20	--	RADIANT FLOOR BATH 3
ERV & AH 4	--	20	2	S	47					0	0	48	AG	1	20	--	RADIANT FLOOR PRIM BATH
					49	0	0					50	S	2	35	--	WALL OVEN 2
WALL OVEN 1	--	35	2	S	51			0	0			52					
					53					0	0	54	S	2	20	--	AH 1.5 DUCT HEATER
AH 4 DUCT HEATER	--	50	2	S	55	0	0					56					
					57			0	0			58	AG	1	20	--	BATHROOM GFCI
EV CHARGER	--	40	2	S	59					0	0	60	AG	1	20	--	BATHROOM GFCI/SPARE
					61	0	0					62	S	1	20	--	BH1
GARAGE DOOR OPENER	--	20	1	S	63			0	0			64		1	20	--	SPARE
CU 4	--	20	2	S	65					0	0	66	S	1	20	--	TOWEL WARMER
					67	0	0					68		1	20	--	SPARE
STEAMER 1	--	60	2	S	69			0	0			70	A	1	20	--	LTG CKT - EAST
					71					0	0	72	A	1	20	--	LTG CKT - WEST
STEAMER 2	--	60	2	S	73	0	0					74	A	1	20	--	GARAGE
					75			0	0			76	A	1	20	--	FA (120V)
STEAMER 3	--	60	2	S	77					0	0	78	AG	1	20	--	GARAGE GFCI
					79	0	0					80	S	3	80	--	FOR FUTURE SOLAR ELECTRIC
SPARE	--	20	1		81			0	0			82					
SPARE	--	20	1		83					0	0	84					

TOTAL LOAD: 25.67 kVA 25.67 kVA 25.67 kVA

TOTAL AMPS: 214 A 214 A 214 A

LOAD TYPE		CONN.LOAD	DEMAND FACT.	EST. DEMAND	BREAKER TYPE		PANEL TOTALS
LIGHTING / EV -	L	0 kVA	0%	0 kVA	SHUNT TRIP -	ST	
RECEPTACLE -	R	0 kVA	0%	0 kVA	GFCI -	G	TOTAL CONN. LOAD: 77.02 kVA
MOTOR -	M	0 kVA	0%	0 kVA	HANDLE BLOCK -	H	TOTAL EST. DEMAND: 77.02 kVA
KITCHEN -	K	0 kVA	0%	0 kVA	HANDLE TIE -	T	TOTAL CONN.: 214 A
OTHER -	O	0 kVA	0%	0 kVA	AFCI -	A	TOTAL EST. DEMAND: 214 A
EXISTING -	E	0 kVA	0%	0 kVA	STANDARD -	S	
NEC-220.84-					LOCKOUT -	L	

PANEL 4-BED UNIT 3

SUPPLY FROM: | VOLTS: 120/208 Wye | A.I.C. RATING: 65,000
MOUNTING: RECESSED | PHASES: 3 | MAINS TYPE: MLO
ENCLOSURE: NEMA 1 | WIRES: 4 | MAINS RATINGS: 400 A

CIRCUIT DESCRIPTION	LT	TRIP	P	BT		A		B			BT	P	TRIP	LT	CIRCUIT DESCRIPTION
BEDROOM #1 RECEPTS	--	20	1	A	1	0	0			2	AG	1	20	--	KITCHEN RECEPTS
BEDROOM #2 RECEPTS	--	20	1	A	3			0	0	4	AG	1	20	--	KITCHEN RECEPTS
BEDROOM #3 RECEPTS	--	20	1	A	5	0	0			6	AG	1	20	--	DISH / DISPOSAL
LIVING RM RECEPTS	--	15	1	A	7			0	0	8	A	1	20	--	MICRO / HOOD
LIVING RM RECEPTS / SPARE	--	20	1	A	9	0	0			10	AG	1	20	--	REFRIG / ISLAND RECEPTS
BATHROOM GFCI	--	20	1	AG	11			0	0	12	AG	1	20	--	WASHER
LTG CKT - BATHROOM	--	15	1	A	13	0	0			14	A	1	20	--	DATA / TELECOM
LTG CKT - EXT	--	15	1	A	15			0	0	16	S	2	70	--	COOKTOP
EXTERIOR GFCI	--	20	1	AG	17	0	0			18					
DRYER	--	35	2	S	19			0	0	20		1	20	--	SPARE
					21	0	0			22	S	2	20	--	CU 1.5
BED #4/BUNK RECEPTS	--	20	1	A	23			0	0	24					
OFFICE RECEPTS/BED #5	--	20	1	A	25	0	0			26	S	1	20	--	GRILL / SPARE
HALLWAY RECEPTS	--	20	1	A	27			0	0	28	AG	1	20	--	BATHROOM GFCI
2X EUH-1	--	30	2	S	29	0	0			30	S	2	20	--	AH 1.5
					31			0	0	32					
BATHROOM GFCI	--	20	1	AG	33	0	0			34	S	2	35	--	EWH
BATHROOM GFCI	--	20	1	AG	35			0	0	36					
EWH	--	35	2	S	37	0	0			38	S	2	20	--	ERV DUCT HEAT
					39			0	0	40					
HUMIDIFIER	--	20	2	S	41	0	0			42	AG	1	20	--	RADIANT FLOOR KITCHEN/BUNK
					43			0	0	44	AG	1	20	--	RADIANT FLOOR BATH 1/2
FIREPLACE	--	20	1	A	45	0	0			46	AG	1	20	--	RADIANT FLOOR BATH 3
ERV & AH 4	--	20	2	S	47			0	0	48	AG	1	20	--	RADIANT FLOOR PRIM BATH
					49	0	0			50	S	2	35	--	WALL OVEN 2
WALL OVEN 1	--	35	2	S	51			0	0	52					
					53	0	0			54	S	2	35	--	AH 1.5 DUCT HEATER
AH 4 DUCT HEATER	--	50	2	S	55			0	0	56					
					57	0	0			58	AG	1	20	--	BATHROOM GFCI
EV CHARGER	--	40	2	S	59			0	0	60	AG	1	20	--	BATHROOM GFCI/SPARE
					61	0	0			62	S	1	20	--	BH1
GARAGE DOOR OPENER	--	20	1	S	63			0	0	64		1	20	--	SPARE
CU 4	--	20	2	S	65	0	0			66	S	1	20	--	TOWEL WARMER
					67			0	0	68		1	20	--	SPARE
STEAMER 1	--	60	2	S	69	0	0			70	A	1	20	--	LTG CKT - EAST
					71			0	0	72	A	1	20	--	LTG CKT - WEST
STEAMER 2	--	60	2	S	73	0	0			74	A	1	20	--	GARAGE
					75			0	0	76	A	1	20	--	FA (120V)
STEAMER 3	--	60	2	S	77	0	0			78	AG	1	20	--	GARAGE GFCI
					79			0	0	80	S	3	80	--	FOR FUTURE SOLAR ELECTRIC
SPARE	--	20	1		81	0	0			82					
SPARE	--	20	1		83			0	0	84					

TOTAL LOAD: 25.56 kVA 25.56 kVA

TOTAL AMPS: 213 A 213 A

LOAD TYPE		CONN.LOAD	DEMAND FACT.	EST. DEMAND	BREAKER TYPE		PANEL TOTALS
LIGHTING / EV -	L	0 kVA	0%	0 kVA	SHUNT TRIP -	ST	
RECEPTACLE -	R	0 kVA	0%	0 kVA	GFCI -	G	TOTAL CONN. LOAD: 76.67 kVA
MOTOR -	M	0 kVA	0%	0 kVA	HANDLE BLOCK -	H	TOTAL EST. DEMAND: 76.67 kVA
KITCHEN -	K	0 kVA	0%	0 kVA	HANDLE TIE -	T	TOTAL CONN.: 213 A
OTHER -	O	0 kVA	0%	0 kVA	AFCI -	A	TOTAL EST. DEMAND: 213 A
EXISTING -	E	0 kVA	0%	0 kVA	STANDARD -	S	
NEC-220.84-					LOCKOUT -	L	

1

COLORADO LICENSED
38983
05/02/2024
PROFESSIONAL ENGINEER

REVISIONS

No.	Description	Date
1	Revision 1	Date 1

ASTRID BUILDING 7
STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23035-7
Date:	03/21/24
Drawn By:	Author
Checked By:	EM

Project Phase
PERMIT

1

Sheet Title
ELECTRICAL SCHEDULE

Sheet Number
E6.3

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DIVISION 26 - ELECTRICAL

SECTION 26 01 00 - GENERAL PROVISIONS

1.01 WORK INCLUDED:

A. The work included by this division of the specifications includes furnishing all labor, materials, equipment, and services, including minor items omitted but necessary to construct and install the complete systems described by the Contract Documents and specified below. "Contractor" refers to the Electrical Contractor. The general conditions of the specifications apply and are included in this part of this section.

1. Power Distribution System
2. Interior and Exterior Lighting System
3. Telephone Raceway System
4. Data Raceway System
5. Fire Alarm System
6. Emergency Lighting System
7. Electric Heating System

1.02 CODES AND REGULATIONS:

A. Comply with state and local codes, and utility company regulations. Final interpretations will be made by the local inspection authority. The Contractor to verify the governance of the following Codes, including any local amendments and supplementary codes such as the Codes of the National Fire Protection Association:

1. Building Code: 2021 International Building Code
2. Plumbing Code: 2021 International Plumbing Code
3. Mechanical Code: 2021 International Mechanical Code
4. Fire Code: 2021 International Fire Code
5. Gas Code: 2021 International Fuel Gas Code
6. Energy Code: 2021 International Energy Conservation Code
7. Electrical Code 2023 National Electrical Code

1.03 EQUIPMENT AND MATERIALS STANDARDS:

A. Equipment and materials shall be new, UL-listed for the use intended, and free from damage or defect. They shall comply with the latest industry standards.

1.04 CONTRACT DRAWINGS:

A. Illustrate the general design and extent of performance required. All dimensions and locations shall be taken from the Architectural drawings. Consult with Architectural plans and locate all ceiling equipment where indicated on reflected ceiling plans.

1.05 SHOP DRAWINGS

A. Submit products data and/or shop drawings as required by the Architect for the following:

1. Switches, dimmers, receptacles and coverplates
2. Switchboards, Panelboards/Loadcenters
3. Disconnect switches
4. Fuses
5. Light fixtures
6. Fire alarm system and equipment

B. Quality of specific equipment is established by manufacturer's catalog number. Alterations caused by any Substitution shall be accomplished at no additional expense to the Owner

C. Manufacturers not listed may submit for acceptance as an "approved equivalent." Requests for an "equivalent" means "approved equivalent". Four copies of such submittal must be received by the Engineer seven (7) working days prior to bid date.

1.06 WARRANTY:

A. The contractor shall be responsible for the successful operation of electrical systems, equipment, and materials installed under this Contract for a period of one year from the date of final acceptance. Defective equipment or materials shall be repaired or replaced at no expense to the Owner.

1.07 PRODUCT HANDLING AND CLEAN UP:

A. Equipment shall be left clean and undamaged, to the satisfaction of the Owner. The General Conditions take precedence.

1.08 CUTTING AND REPAIRING:

A. The contractor shall be responsible for all cutting, drilling, welding, and repair required for his portion of the work. Coordinate with the Architect. The General Conditions take precedence.

1.09 OPERATING AND MAINTENANCE DATA:

A. Provide the Owner with operating and maintenance instructions(four copies) required for operation of all electrical systems. Bind the written instructions in a notebook. The General Conditions take precedence.

1.10 PERMITS:

A. The contractor shall pay for all fees, taxes, secure permits, licenses, and inspections required for the project.

1.11 TEMPORARY SERVICES:

A. Provide temporary power and lighting as required by the General Contractor, in accordance with OSHA and N.E.C. standards.

1.12 COORDINATION

A. Coordinate outlet device and equipment locations with the Architectural Plans and work of other trades. Locate on horizontal and vertical lines to avoid interference and to provide functional use of all equipment. Verify electrical power characteristics before ordering fixtures, equipment, etc.

B. Mechanical work performed by this contractor will conform to the standards of Division 21-23. Mechanical equipment motors and controls shall be furnished, set in place, and wired according with the following schedule unless otherwise noted or specified. MC = Division 21-23 EC = Division 26-28

Item	Furn By	Set By	Power Wiring	Control Wiring
Combination starters	MC	EC	EC	MC
Equipment motors	MC	MC	EC	--
Motor starters & O.L. relays	MC	EC	EC	MC
Disconnect switches	EC	EC	EC	MC
Thermal overload heaters (1)	EC	EC	EC	--
Variable Speed Drives	MC	EC	EC	MC
Control relays/transformers	MC	MC	EC	MC
Temperature control panels	MC	MC	EC	MC
Temp. Controls conduit/wiring	MC	MC	--	MC
Actuator and solenoid wiring	MC	MC	--	MC
Pushbuttons & pilot lights	MC	MC	--	MC
Room thermostats	MC	MC	--	MC
Thermostats: line voltage	EC	EC	EC	--

C. The general guideline for the division between control(by MC) wiring and power wiring(by EC) is that power wiring carries the current which energizes a motor, control wiring does not. Control wiring may be 120V, which would be the responsibility of the MC. Control motors are wired by the MC.

D. Examine the site and become aware of existing conditions, utilities, and other issues affecting the satisfactory completion of the project.

1.13 DELIVERY, STORAGE, HANDLING:

A. Provide necessary hauling and hoisting equipment. Protect the materials of this Division before, during, and after installation.

1.14 AS-BUILT DRAWINGS:

A. Keep a current set of "as-built" drawings on site. Upon completion of the work, furnish engineer with a reproducible prints showing the "as-built" installation.

1.15 PROJECT/SITE CONDITIONS:

A. Visit the site to become familiar with location and the various conditions affecting the work, including existing utilities.

2.01 ACCESS PANELS:

A. The electrical Contractor shall furnish and General Contractor shall install access panels where required for access to equipment. The electrical Contractor shall include the cost of installation in his bid. Access panels shall be adequately sized, of a type approved by the Architect and shall be fire or smoke-rated as required.

3.01 EXCAVATION AND BACKFILLING:

A. Verify the location of underground utilities before excavation; the contractor is responsible for any damage to underground utilities. Provide excavating and backfilling for electrical work. Backfill in 12" layers, mechanically tamp to 95% proctor standards. Protect according to OSHA standards. The General Conditions take precedence.

B. Provide marker tape 12" above exterior underground service conduits(power, telephone, television).

3.02 START-UP PROCEDURES:

A. Follow manufacturer's recommended procedures in starting up the equipment; damage caused during start-up shall be replaced at no expense to the owner.

3.03 HANGERS AND SUPPORTS:

A. Support conduit and equipment from the structure to prevent sagging, pocketing, swaying, and vibrations, and arranged to provide for expansion and contraction. Brackets, clamps, and hangers shall be steel or copper of a type, acceptable to the Engineer. Chain, perforated iron or wire hangers are not permitted.

B. Conduit on the roof will be supported above the roof on roof pads. The pads shall be approximately 6"Wide by 6" high by the length as required. They shall be made of recycled rubber, rated for 500lbs/ft loading each. The pads will have galvanized steel "C" channel attached to the top, which can accommodate pipe clamps to secure the conduit. This configuration of individual piping pads may be expanded to include two pads supporting a trapeze style support where multiple conduits are racked together. The pads are C-series manufactured by Cooper B-line or approved equivalent.

3.04 SLEEVES AND PLATES

A. Provide sleeves and inserts for all conduit. The contractor shall be responsible for the cost of cutting and patching required for piping where sleeves and inserts were not installed or where incorrectly located. Sheetrock joint compound may be used to seal openings in non-rated walls(insulation to be continuous through walls.

B. Drill holes as required for the installation of hangers required for the mechanical work.

C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be made completely water-tight.

D. Seal all piping passing through fire-rated construction with approved material to maintain air-tight, fire-rated integrity, with a U.L. listed assembly compatible with the wall or floor assembly being penetrated.

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

1.01 GENERAL:

A. Provide complete systems of conductors and raceways using conduit and/or cable assemblies appropriate to the function and location, and specifically approved in chapter three of the N.E.C..

2.01 CONDUIT:

A. The following raceways are approved for use on this project, where approved by the N.E.C.:

1. EMT: Electrical metallic tubing, galvanized
2. GRC: Rigid steel conduit, galvanized
3. PVC: Polyvinyl chloride conduit, schedule 40
4. IMC: Intermediate metal conduit, galvanized

2.02 CABLE ASSEMBLIES:

A. The following cable assemblies may be used in the power distribution system in concealed locations, where approved by the N.E.C.:

1. MC: Metal clad cable
2. NM/NMC: Non-metallic sheathed cable
3. SE/SER: Service entrance cable (From MDC to residences)

2.03 BOXES:

A. Provide galvanized steel outlet and junction boxes, except where otherwise indicated. Boxes shall be a minimum 4" square or octagonal, depth as required. Provide weather-proof type cast boxes with gasket and cast coverplate for exterior outlets or wet locations. Outlet boxes shall be of the proper type and design for the fixture or device to be installed. Through the wall boxes are not permitted. Provide plaster or tile rings for all flush outlets installed where required. Boxes shall be manufactured by Raco, Steel City, National or equivalent.

B. Interior floor boxes shall be non-metallic or cast steel in concrete or slab on grade installations, and shall be rated for the use. Floor boxes above grade shall be non-metallic or stamped steel, rated for the use. Multi-gang boxes shall be used where specified. Coverplates shall be polished brass with 'flip lids' for receptacles and connectors. Provide carpet flanges where appropriate.

2.04 CONDUCTORS:

A. Provide a complete set of power conductors, rated 600 volts, of the quantity, size and type required for the function.

1. Conductors shall be copper, except where specifically noted. Conductors shall be solid for wire sizes No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
2. Aluminum conductors will be accepted only where specifically indicated by the Contract Documents. Aluminum conductors must be terminated according to the manufacturers instructions, including use of proper joint compound, use with aluminum rated lugs, and proper torqueing of the lugs.

2.05 INSULATION:

A. Provide wire with the following minimum insulation standards:

1. Branch circuits, panelboard feeders, service entrance conductors: THWN-2, XHHW(90C). The conductors shall be applied using the 75C rating.
2. Connections to fixture ballasts, and wiring runs in or through fixture wiring channels: Insulations listed in table 402.5 of the N.E.C., except for wiring made with asbestos.
3. Cord connections: Cords listed in table 400.4 of the N.E.C., except for wiring made with asbestos.

2.06 LUGS:

A. Lugs for all equipment will be rated for the use. Lugs will be suitable for copper or aluminum conductors, rated for 75C.

2.07 SWITCHES AND RECEPTACLES:

A. Provide specification grade devices throughout. Switches and duplex receptacles may be commercial grade. Devices shall be manufactured by Hubbell, Leviton, General Electric, Bryant, Slater, Pass & Seymour, Inc., Sierra, or Arrow-Hart.

B. Except where noted, plates shall be plastic, color to match the devices with matching screws for receptacles, switches, telephone, and TV outlets. Provide blank coverplates for unused outlets. Coverplates for multi-gang boxes shall be sized for the box it covers.

C. Devices and their coverplates colors shall be coordinated with Architect and Owner. In mechanical rooms, etc, the coverplates may be galvanized steel

2.08 DIMMERS:

A. Incandescent dimmers shall be the linear slide-type with aluminum fins. Dimmers shall be Lutron Nova series or equivalent.

B. Fluorescent dimmers shall be the linear slide-type with aluminum fins. The dimmers shall be closely coordinated with the ballast type of the specific fixture being controlled and must be field coordinated before ordering. Dimmers shall be Lutron Nova series or equivalent.

C. LED dimmers must be selected by, or specifically approved by, the specific fixture manufacturer or supplier. Slide type dimmers are preferred where available.

D. When switches and dimmers are located side by side, switches shall have identical appearance as dimmers. Dimmers shall in no case have heat fins removed or modified.

E. Dimmers shall be manufactured by Lutron, Hunt, Prescolite, or equivalent

3.01 WIRING:

A. The drawings are schematic in nature; alternative wiring paths, different conduit fill, etc, installed in conformance with the N.E.C. are allowed. Conductors must be derated per code.

B. Branch circuits shall use minimum No. 12 AWG wiring for branch circuits, protected by 20 ampere circuit breakers. Control wiring may be No. 14 minimum. If distance from panel to first outlet is 75 feet or greater (for 120-volt circuits) or 150 feet or greater (for 277-volt circuits), provide No. 10 AWG.

C. Use PVC in earth or in slabs in contact with earth. Outside the building, install a minimum of 30" below finished grade.

D. Where mechanical damage occur, use galvanized rigid steel or intermediate metal conduit.

E. Electric metallic tubing may be used in all applications, except where prohibited by code or otherwise noted.

F. Do not install exposed conduit in areas open to the public. Exposed conduit may be installed at surface-mounted equipment and other locations acceptable to the Architect. Run exposed conduit parallel to, and at right angles with, the building lines.

G. Direct burial wiring shall not be used.

H. Use flexible metallic conduit for connections to motors, fixtures, or other equipment where vibration is encountered. Provide sealtite flexible metallic conduit in wet areas such as kitchens, equipment rooms, on roofs, etc.

I. Provide a ground wire in non-metallic conduit and flexible conduit. Ground wires shall be increased in size where circuit wiring is increased for voltage drop.

J. Circuits fed through AFCI breakers shall have separate neutrals with no cross or ground connections; wiring shall be installed per the breaker manufacturers instructions.

K. Multi-wire branch circuits shall utilize handle ties on breakers, or other grouped disconnecting means per NEC 210.4(B).

3.02 OUTLET BOXES, DEVICES AND FITTINGS:

A. Install receptacle and telephone outlets 18" to center-line above floor in general locations; install at switch height where shown in combination; install 46"to center-line in mechanical equipment rooms.

B. Install receptacles vertically, ground pole down.

C. Install switch outlets 46" to center-line above floor on latch side of door. Verify door swing prior to installation. Use gang boxes for multiple-device installation as required.

D. Install outlets shown on the drawings "back-to-back" with a minimum of 6" lateral separation between them.

SECTION 26 20 00 - SERVICE AND DISTRIBUTION

1.01 SERVICE ENTRANCE:

A. Power will be available from the secondary side of transformer(s) provided by the utility company. This service shall be 120/208 volt, 3 phase, 4 wire, 60 hertz A.C. for normal power and lighting requirements. General arrangement of the service equipment is shown on the drawings. Load balance the entire system to within 15% per phase.

1.02 GROUNDING:

A. Provide a complete grounding system in accordance with Section 250 of the N.E.C.

B. Supplemental electrode to be installed unless resistance of 25 ohms to earth can be documented.

2.01 PANELBOARDS:

A. Provide circuit breaker-type panelboards as detailed on the drawings. Provide separate ground bus. Provide fronts with door and latch with locks keyed alike. Install panels 6'6" above finished floor to top of trim. Where panels are mounted side by side, align tops of panels. Mount a typed directory, identifying each circuit, in a directory frame. Provide typed source label identifying source of power for each panel. Install trims and doors with primer coats in finished areas. Provide one spare 3/4" conduit for each 3 unused poles in flush-mounted panelboards; extend from to an accessible point above a hung ceiling; cap and identify.

B. Breakers shall be full width, thermal magnetic, bolt-on type. Provide multi-pole breakers with common trip and single operating handle; handle ties are acceptable for multi-wire branch circuits.

1. Breakers serving restaurant kitchens and bars, or where required by code, shall be GFCI breakers. GFCI receptacles may be used only where the receptacles are not located behind equipment.
2. HACR breakers shall be used for HVAC equipment in accordance with the equipment manufacturer.

C. Lugs on mains and branch breakers shall be rated for 75C or 60C, copper or aluminum wiring.

D. Panelboards(240VAC) shall be Square D type NQOD or equivalent by I.T.E., G.E., or Cutler Hammer.

2.02 FUSIBLE DISTRIBUTION SWITCHGEAR:

A. Provide free-standing, floor-mounted, fusible type switchboard as shown on the plans.

B. Switchboard shall be 90" high, depth as indicated, constructed so rear sections align, with internal components removable from the front.

C. Buses shall be copper or tin-plated aluminum, braced for short- circuit currents of 100,000 RMS symmetrical amperes. Horizontal bars shall be tape-wrapped and insulated. Maximum temperature rise shall be 55C over 25C ambient. Provide full length and sized horizontal busses, including neutral and ground. Vertical sections shall be fully bussed. All lugs shall be rated for 75C or 60C copper or aluminum wiring.

D. Manufacturers shall be General Electric "AV line" with QMR construction or equivalent by Square D, I.T.E., or Westinghouse.

2.03 CURRENT TRANSFORMER CABINETS:

A. Provide current transformer cabinets, including interior lugs and bussing, as required to accommodate the requirements of the utility company. The cabinets shall be U.L. listed, weatherproof as required. All lugs shall be rated for 75C or 60C wiring.

2.04 METER STACK:

A. Provide wall mounted modular meter stacks where shown on the plans. The unit shall be NEMA 3(NEMA 1), made of galvanized steel. The incoming section shall use a fused switch.

B. The busses shall be copper or tin-plated aluminum, braced for short-circuit currents of 65,000AIC symmetrical amperes. Vertical sections shall be fully bussed top to bottom. Provide full length and sized horizontal busses, including neutral and ground. All lugs shall be rated for 75C or 60C copper or aluminum wiring.

C. Meter stack shall accommodate both single phase and three phase, 100Amp and 200Amp meters and breakers. Additional sections shall be capable of simple connection.

D. The meter stack shall be manufactured by American Midwest Power (AMP), Square D, G.E., Westinghouse ITE or equivalent.

2.05 SAFETY SWITCHES:

A. Provide normal duty, enclosed, fusible and non-fusible safety switches as indicated on the plans. All lugs shall be rated for 75C or 60C copper or aluminum wiring. Provide enclosures suitable for the surrounding area and conditions. Label switches for feeder or motor supplied. The switches shall be manufactured by Square D, I.T.E., G.E., Cutler Hammer, or equivalent.

2.06 FUSES:

A. Provide power fuses of the time-delay type unless otherwise indicated. Fuses shall be manufactured by Bussman, Gould Shawmut, or equivalent. Provide one (1) complete set of fuses for fuse-holding devices, sized according to the motor and/or conductor to be protected. Provide a hinged cover cabinet for storage of spare fuses: three spare fuses of each fuse size.

3.01 WIRING FOR EQUIPMENT:

A. Provide branch circuits, feeders, junction boxes, disconnect switches, etc as required for a complete system; make power connections to motors and controls for heating, ventilating, air conditioning, plumbing, owner furnished and fire protection equipment as required.

B. Kitchen equipment. Refer to the Kitchen Equipment Contractor's drawings for final sizing, locations, and rough-in heights. The Electrical Contractor shall provide final circuits and connections to kitchen electrical equipment. Sealtite conduit and fittings shall be used on runs inside refrigerated bases and at dish tables.

C. Provide connections to hood fire suppression system(s). The electrical contractor is responsible for wiring the interlock controls for hood related air handling equipment, including low voltage interlocks, and interlocks within building HVAC equipment where required.

SECTION 26 50 00 - LIGHTING

1.01 RECESSED LED:

A. Recessed LED luminaires shall be pre-wired. Openings shall be neatly made so they are completely concealed after the trim is installed. Luminaires installed in a grid ceiling shall be supported by the framing system, not by ceiling panels. Install metal plaster frames in plaster ceilings. Fixtures shall have thermal protection where required by the N.E.C. and local codes.

1.02 EXTERIOR LIGHTING FIXTURES:

A. Provide weather-proof luminaires for mounting as shown. Provide lamps of size and wattage as indicated on the drawings. Provide underground wiring to exterior lighting as shown on the drawings.

2.01 INTERIOR LIGHTING FIXTURES:

A. Securely support and anchor fixtures and outlet boxes. Where lighting fixtures are installed in a lay-in grid ceiling system, secure fixtures to tees by installing earthquake clips at each corner of the fixture. Provide supports required, including structural members if needed. Provide separate junction boxes and wire to recessed fixtures in flexible conduit with Type AF wire, unless acceptable pre-wired fixtures are used. Conceal openings cut in ceilings for recessed fixtures with fixture trim installed. Coordinate installation of recessed fixtures with ceiling installer.

2.02 EXTERIOR LIGHTING FIXTURES:

A. Exterior lighting fixtures, raceways, equipment, etc. shall be weather-proof and suitable for temperatures down to -20F.

B. Ballast type, lamp wattage, and rated voltage shall be as indicated on the plans. Each ballast shall be of the separate- component type, capable of reliable lamp starting down to -20F, and shall have a minimum power factor of .90.

2.03 LAMPS:

A. Incandescent and LED replacement lamps shall be rated at 130V. H.I.D. and fluorescent lamps shall be as specified on plans with ballasts as specified in the following specifications. Lamp codes listed are ANSI. All lamps shall be Sylvania, General Electric, or approved equivalent.

B. In porcelain keyless fixtures, provide medium base, self ballasted, A-line shape, fluorescent lamps, GE FLE15/2/A21 or equivalent.

2.04 DRIVERS:

A. LED drivers shall be electronic-type, labeled as compliant with radio frequency interference (RFI) requirements of FCC Title 47 Part 15, and comply with NEMA SSL 1 "Electronic Drivers for LED Devices, Arrays, or Systems". LED drivers shall have a sound rating of "A", have a minimum efficiency of 85%, and be rated for a THD of less than 20 percent at all input voltages.

B. Dimmable LED drivers shall be 0-10V type. Dimmable LED drivers shall be capable of dimming without LED strobing or flicker across their full dimming range.

C. Ballasts and drivers shall be rated for the ambient temperatures in which they are located. Outdoor fixtures shall be equipped with ballasts or drivers rated for reliable starting to -20 degrees F. Indoor fixtures located in areas with direct sunlight or above normal ambient temperatures shall have ballasts or drivers rated at 65 degrees C minimum.

2.05 OUTDOOR LIGHTING CONTROLS:

A. Provide astronomical time switch, lighting control system as shown on drawings. Include contactors, time switches, transformers, selector switches, relays, wiring, etc. as required.

B. Set time clock(s) to operate contacts as scheduled hours by Owner.

C. Time clock shall be astronomical seven-day programable type. Provide contacts as shown on plans. Time clock shall be readily adjustable.

DIVISION 27 - COMMUNICATIONS

SECTION 27 20 00 - COMPUTER SYSTEM

3.01 DESCRIPTION:

A. Provide a complete system of raceways, pull boxes, outlet boxes, and terminals. Raceways shall form a complete path up walls and across inaccessible ceilings. Computer wiring may be run wild above accessible ceiling.

4.01 CONDUIT:

A. Conduit in the building shall be galvanized EMT, with plastic bushings on ends which are not terminated in a box.

4.02 WALL OUTLETS:

A. Wall outlets shall be 4" square pressed steel boxes, with single gang plaster ring. Connectors and coverplates are to be provided by the computer system installer.

B. Provide an alternate price for plaster rings at outlet location, and pullstrings in wall up to accessible ceiling, in lieu of conduit and boxes.

4.03 WIRING:

A. Wiring shall be provided by the computer system installer. Wiring run wild in air plenums shall be teflon coated or similarly rated for the application.

4.04 EXECUTION:

A. Provide pull strings in all conduit.

B. Field verify all computer outlet locations. Final locations and heights shall be as designated by the Architect or Owner's representative.

SECTION 27 30 00 - TELEPHONE SYSTEM

1.01 DESCRIPTION:

A. Provide a complete system of raceways, pull boxes, outlet boxes, and terminals. Raceways shall form a complete path up walls and across inaccessible ceilings. Telephone wiring may be run wild above accessible ceiling.

B. System will include exterior underground conduit routed to a point of connection(usually a pedestal or a power pole) as directed by the telephone company. Exterior conduit shall be sized and installed as directed by the telephone company.

2.01 CONDUIT:

A. Conduit in the building shall be galvanized EMT, with plastic bushings on ends which are not terminated in a box. Exterior underground conduit shall be schedule 40 PVC with solvent joints.

B. Wall outlets shall be 4" square pressed steel boxes, with single gang plaster ring. Connectors and coverplates are to be provided by the telephone system installer.

C. Provide an alternate price for plaster rings at outlet location, and pullstrings in wall up to accessible ceiling, in lieu of conduit and boxes.

2.02 TERMINALS:

A. Telephone terminals shall be constructed of 1/2" thick, fire resistant, interior finish plywood, painted white, sized as shown or required. Provide power and ground connection as required or shown on the plans.

2.03 WIRING:

A. Wiring shall be provided by the telephone system installer. Wiring run in air plenums shall be teflon coated or similarly rated for the application.

3.01 EXECUTION:

A. Provide pull strings in all conduit.

B. Exterior underground conduit shall use long radius, sweep ells. These elbows shall be schedule 80 PVC, or PVC coated GRC conduit.

C. Field verify all telephone outlet locations. Final locations and heights shall be as designated by the Architect or Owner's representative.

SECTION 27 40 00 - VIDEO SYSTEM

1.01 DESCRIPTION:

A. Provide a complete system of raceways, pull boxes, outlet boxes, and terminals. Raceways shall form a complete path up walls and across inaccessible ceilings. Video wiring may be run wild above accessible ceiling.

2.01 CONDUIT:

A. Conduit in the building shall be galvanized EMT, with plastic bushings on ends which are not terminated in a box. Exterior underground conduit shall be schedule 40 PVC (schedule 80 PVC radius elbows) with solvent joints.

2.02 WALL OUTLETS:

A. Wall outlets shall be 4" square pressed steel boxes, with single gang plaster ring. Connectors and coverplates are to be provided by the video system installer. Provide an alternate price for plaster rings at outlet location, and pullstrings in wall up to accessible ceiling, in lieu of conduit and boxes.

B. Terminal shall contain one type F connector mounted on a brushed aluminum plate. "CATV" will be engraved on plate above each connector in 1/"4 high black letters.

2.03 WIRING:

A. Wiring shall be provided by the video system installer. Wiring run in air plenums shall be teflon coated or similarly rated for the application.

3.01 EXECUTION:

A. Provide pull strings in all conduit.

B. Exterior underground conduit shall use long radius, sweep ells. These elbows shall be schedule 80 PVC conduit.

C. Field verify all television outlet locations. Final locations and heights shall be as designated by the Architect or Owner's representative.

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

SECTION 28 10 00 - SECURITY ALARM SYSTEM

1.01 DESCRIPTION:

A. Provide a complete door security alarm system to audibly and visually annunciate door entry/exit at a master control panel. The door alarms may be individually reset at the master control panel as well as by-passed during certain hours of the day.

2.01 ANNUNCIATOR PANEL:

A. The annunciator panel shall be comprised of (3) 4 door modules each with individual door reset/bypass pushbuttons with associated LED's. The annunciator shall contain a common call placed LED, and alarm tone speaker, momentary action tone silencing push button. The tone silencing circuitry shall automatically reset after the alarm is reset. Each button cap shall be marked with the door identity. The panel shall be constructed of anodized aluminum, supplied with a recessed mounting frame.

2.02 CONTROL UNIT:

A. The control unit shall include a volume control and be configured for pulsating alarm signal. A power supply shall be provided in conjunction with the control unit.

2.03 DOOR CONTACTS:

A. Door contacts shall be normally closed mechanical door contacts.

2.04 WIRING:

A. Wiring shall be low voltage 18 AWG, run per the manufacturers instructions. Wiring may be run wild above accessible ceilings, in raceways in inaccessible locations.

2.05 MANUFACTURER:

A. The equipment shall be manufactured by Auth-Florence, Dukane or approved equivalent.

3.01 EXECUTION:

A. Install the security alarm system in accordance with the manufacturers instructions.

SECTION 28 30 00 - FIRE ALARM SYSTEM

1.01 GENERAL:

A. Provide an electronically-operated, double-supervised, closed-circuit, addressable type fire alarm system consisting of a control unit, manual-pull stations, alarm signals, automatic smoke and heat detectors, sprinkler monitor modules, and control relays as required, located as shown on the drawings and wired in accordance with the manufacturer's instructions to make a complete and workable system as hereinafter described.

B. Provide equipment manufactured by Simplex Time Recorder Company (System 4000), or equivalent by Fire Lite, Notifier, or Silent Knight.

1.02 CODES AND REGULATIONS:

A. Fire Alarm system shall comply with NFPA 72(2013 edition).

2.01 CONTROL PANEL:

A. The control panel shall be modular with solid state, microprocessor based electronics. Panel shall contain an 80-character LCD display to indicate panel status. The panel shall include initiation device circuits, alarm indicating appliance circuit, supervised annunciator circuits, automatic battery charger and standby batteries.

B. The fire alarm control panel shall be Simplex Series 4010 or equivalent.

2.02 ANNUNCIATOR:

A. The annunciator shall be flush mounted and back lit using LED lights for power on, trouble and alarm indication. Remote annunciator shall have an 80-character LCD display. Units may be stacked within one enclosure to accommodate the proper number of zones. The annunciator shall include trouble silence, alarm silence, and system reset switches. The remote annunciator shall be electrically supervised from the control panel.

B. The annunciator shall be Simplex 4602 Series or equivalent.

2.03 MANUAL PULL STATIONS:

A. Manual pull stations shall be double action type made of red lexan with raised white letter; activation shall require two separate and distinct actions. Reset shall require a key common to the control panel.

B. Pull stations shall be Simplex 4099-series or equivalent.

2.04 SMOKE DETECTORS:

A. Smoke Detectors shall be a dual-chamber, photoelectric type detectors, complete with flashing status-indicating LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady and at full brilliance. The detector may be reset by actuating the control panel reset switch.

B. The detectors shall be Simplex 4098 Series or equivalent.

2.05 AUTOMATIC HEAT DETECTORS:

A. Automatic heat detectors shall be combination rate-of-rise and fixed-temperature type. When the fixed temperature portion is activated, the units shall be non-restorable and give visual evidence of the operation.

B. The detectors shall be Simplex 4098 Series or equivalent.

2.06 DUCT SMOKE DETECTORS:

A. Duct smoke detectors shall be solid-state photoelectric type and shall operate on the light scattering principle. Detector construction shall be of the split type, a mounting base with twist-lock detecting head. Removal of the detector head shall interrupt the supervisory circuit. Detector shall be compatible with normally open fire alarm detection devices. Detector shall have an alarm LED visible through a transparent front cover.

B. The detectors shall be Simplex 4098 Series or equivalent.

2.07 ALARM HORN/ STROBE:

A. Alarm horn/ strobe shall be combination devices. They shall be polarized and operated by 24VDC. Each horn shall include separate wire lead for in/out wiring. The strobe shall be a xenon flashtube. The lexan lens shall be pyramidal in shape. The units shall have panel module and wiring installed to operate strobes independently when horns are turned off.

B. The alarms shall be Simplex 4903 Series or equivalent.

2.08 ALARM STROBE:

A. Alarm strobe shall be a xenon flashtube. The lexan lens shall be pyramidal in shape.

B. The alarms shall be Simplex 4904 Series or equivalent.

2.09 DOOR HOLDERS:

A. Door Holders shall be low voltage magnetic type with a minimum holding force of 25 lbs. The holders will be flush mounted wherever possible. Coordinate the exact location, voltage, etc with the door supplier to assure compatibility if the holders are provided by others.

B. The holders shall be Simplex 2088 Series or equivalent.

2.10 REMOTE ALARM INDICATORS:

A. Remote alarm indicators shall be provided for detectors, which are concealed above ceilings or in locked rooms. The indicators shall include test station switch for detectors above ceilings or in areas difficult to access. The remote alarm or remote alarm/test stations shall be Simplex series 2098 or equivalent.

2.11 AUTODIALER:

A. Install and wire an auto dialer unit for communication to a central station over leased phone wires. Field coordinate exact details with the Owner or Owner's representative.

2.12 MONITOR MODULE:

A. Provide an addressable monitor module for supervision of waterflow and tamper switches.

B. Simplex IAM or equivalent.

2.13 WIRING:

A. Provide a complete system of raceways, pull boxes, and outlet boxes. Raceways shall form a complete path up walls and across inaccessible ceilings. Wiring may be run wild above accessible ceilings.

3.01 INITIATION:

A. Upon the operation of any manual pull station or automatic initiating device (smoke detector, sprinkler flow switch, etc.):

1. Sound a continuous, audible and visible alarm in the entire building
2. Provide description of alarm condition via LCD display at FACP and remote annunciator.
3. In addition, provide controls and wiring required for the following functions:
   a. Shut down all air handling units, except exhaust fans.
   b. Send a signal to a remote monitoring station.

3.02 SYSTEM REPRESENTATIVE:

A. All system representative shall be an authorized engineered systems distributor located within a 50 mile radius of the project.

3.03 REMOTE INDICATING LIGHTS:

A. Remote indicating lights shall be provided for existing detectors obscured from view in locked rooms.

3.04 COMPONENT PROTECTION:

A. Provide a wire guard over any detector or horn in an area susceptible to physical damage.

3.05 FLOW AND TAMPER SWITCHES:

A. Wire all flow switches and tamper switches installed by the fire sprinkler contractor to monitor modules. Determine exact quantity and location before bidding and include the costs of any wiring and conduit.

3.06 HORN LIGHT:

A. Wire the exterior fire protection horn light where shown on the plans or as required by the Fire Department.

REVISIONS

No.	Description	Date

ASTRID BUILDING 7

STEAMBOAT SPRINGS, COLORADO

ERIC SMITH ASSOCIATES, P.C.
1919 SEVENTH STREET
BOULDER, COLORADO, 80302
(303) 442-5458, (303) 442-4745 FAX

Job Number:	23055-7
Date:	05/21/24
Drawn By:	Author
Checked By:	EM

Project Phase
PERMIT

Sheet Title
ELECTRICAL SPECIFICATIONS

Sheet Number
E7.1