

LIGHTING DEVICE SCHEDULE		
Family and Type	Switch Tag	Comments
Occ Sensor - Wall: Switched	a	REFER TO DETAIL ON SHEET E301 FOR OCCUPANCY SENSRO WIRING
Lighting Switches: Switch	b	CONFIGURE LIGHTING IN THIS AREA TO BE MANUAL ON AND AUTO OFF
Lighting Switches: Switch	EMS	ENERGY MANAGEMENT SYSTEM SWITCH

ELECTRIC INVERTER SCHEDULE					
INVERTER ID	125% LOAD	PANEL	CIRCUIT NUMBER	VOLTAGE	INVERTER SIZE
INV	674 VA	L	8	120 V	720 VA

LIGHTING CONTROL PANEL (LCP) SCHEDULE				
SUPPLY	CIRCUIT NUMBER	NUMBER OF POLES	CURRENT	LOAD NAME
L	2	1	3 A	SHOW WINDOW / RECEPTACLE SALES AREA A 11
L	4	1	2 A	LIGHTING
L	7	1	6 A	LIGHTING SALES AREA A 11
L	8	1	10 A	(L) INV
S/S				
L	9	1	10 A	SIGNAGE
SALES				
L	3	1	8 A	LIGHTING ROOM 10, 2, 11
L	5	1	12 A	LIGHTING SALES AREA C 10
L	6	1	7 A	LIGHTING SALES AREA C 10

- ### LIGHTING GENERAL NOTES
- LIGHTING CIRCUIT HOMERUNS SHALL BE RUN IN A COMMON CONDUIT TO THE EMS PANEL. PROVIDE APPROPRIATELY SIZED CONDUIT AND JUNCTION BOXES. PROVIDE DEDICATED NEUTRAL FOR EACH LIGHTING CIRCUIT. PROVIDE HANDLE TIES IN ACCORDANCE WITH NEC 210.4B. ALL LIGHTING CIRCUITS SHALL BE ROUTED THROUGH THE LIGHTING CONTROL PANEL AS SHOWN.
 - EXIT FIXTURES SHALL BE INSTALLED AND CIRCUITED PER LOCAL AND LATEST NATIONAL ELECTRICAL CODES. ALL EMERGENCY AND EXIT FIXTURES SHALL BE DUAL-VOLTAGE (120/277 VOLT INPUT), CONNECT TO THE LINE SIDE OF LOCAL SWITCHING AND CONTACTOR OR CONNECT TO DESIGNATED NIGHT LIGHT CIRCUIT. IN STOCKROOM INSTALL WALL MOUNTED TYPE ON WALL CENTERED 1'0" ABOVE THE DOOR OPENING. IN SALES AREA, MOUNT ON CEILING 1'0" FROM THE WALL.
 - "EM" EMERGENCY LIGHTING: CONNECT BOTH SWITCHED AND UNSWITCHED CIRCUIT LEG FROM SAME CIRCUIT. SEE DETAIL. MODIFY FIXTURE WIRING HARNESS AS NEEDED TO CONNECT ONLY ONE LAMP TO INVERTER.
 - "EM-BATT" EMERGENCY LIGHTING: FIXTURE EQUIPPED WITH 90 MINUTE INTEGRAL BATTERY INVERTER. CONNECT TO BOTH SWITCHED AND UNSWITCHED HOT UNLESS INDICATED AS NL.
 - MAKE ALL FINAL CONNECTIONS AS REQUIRED FOR A FULLY COMPLETE AND OPERABLE SYSTEM.

- ### KEYED NOTES
- L01 SURFACE MOUNT LIGHTING IN THIS AREA FROM THE BOTTOM OF EXISTING STRUCTURE. PROVIDE ALL MATERIALS AS REQUIRED. FIXTURES SHALL BE SEISMICALLY RESTRAINED WHERE REQUIRED BY LOCAL CODE AUTHORITY.

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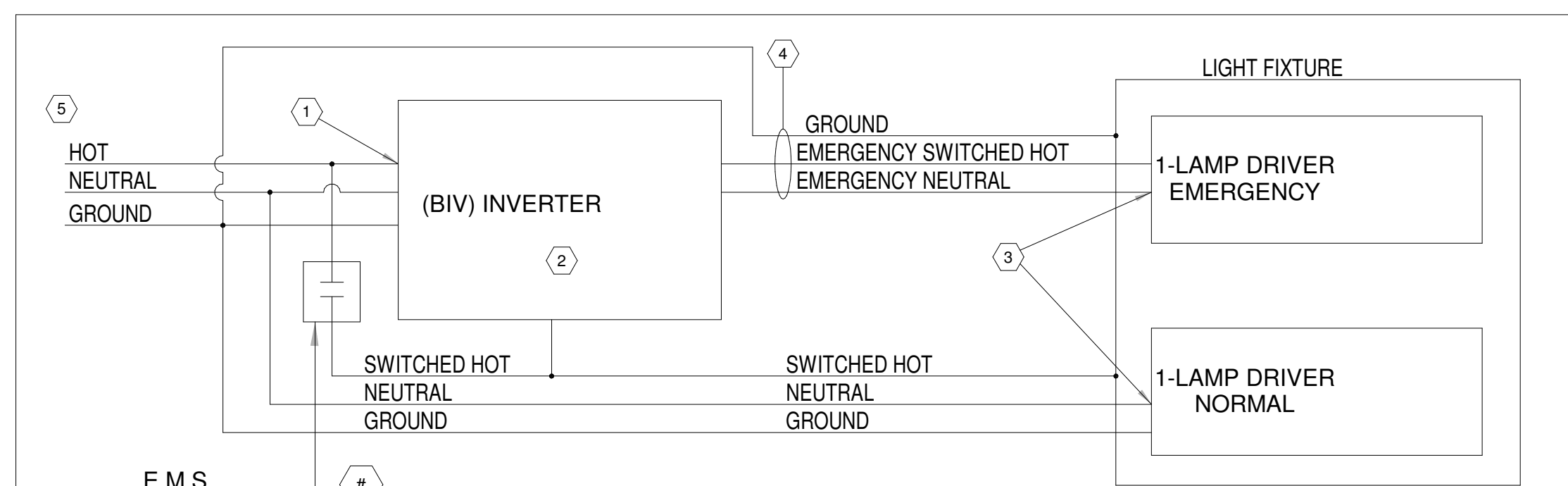
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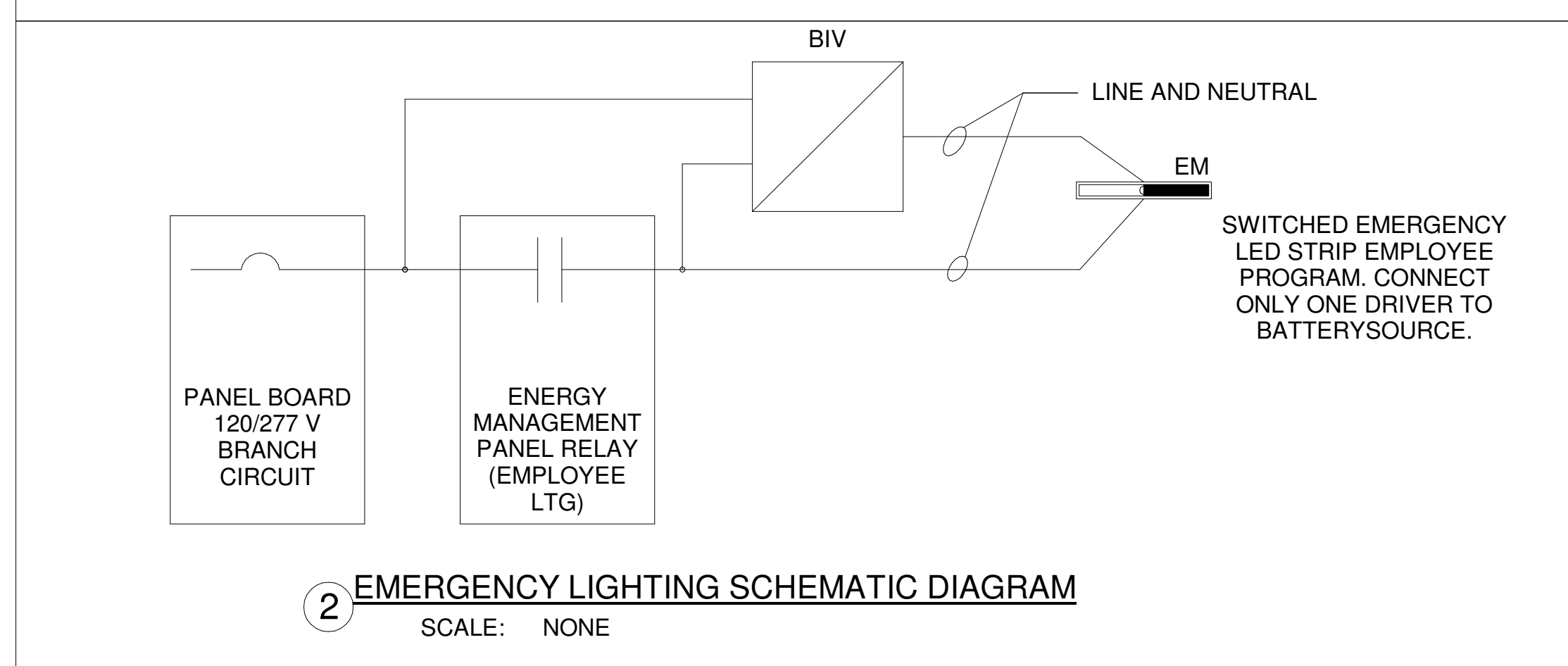
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ELECTRICAL LIGHTING PLAN

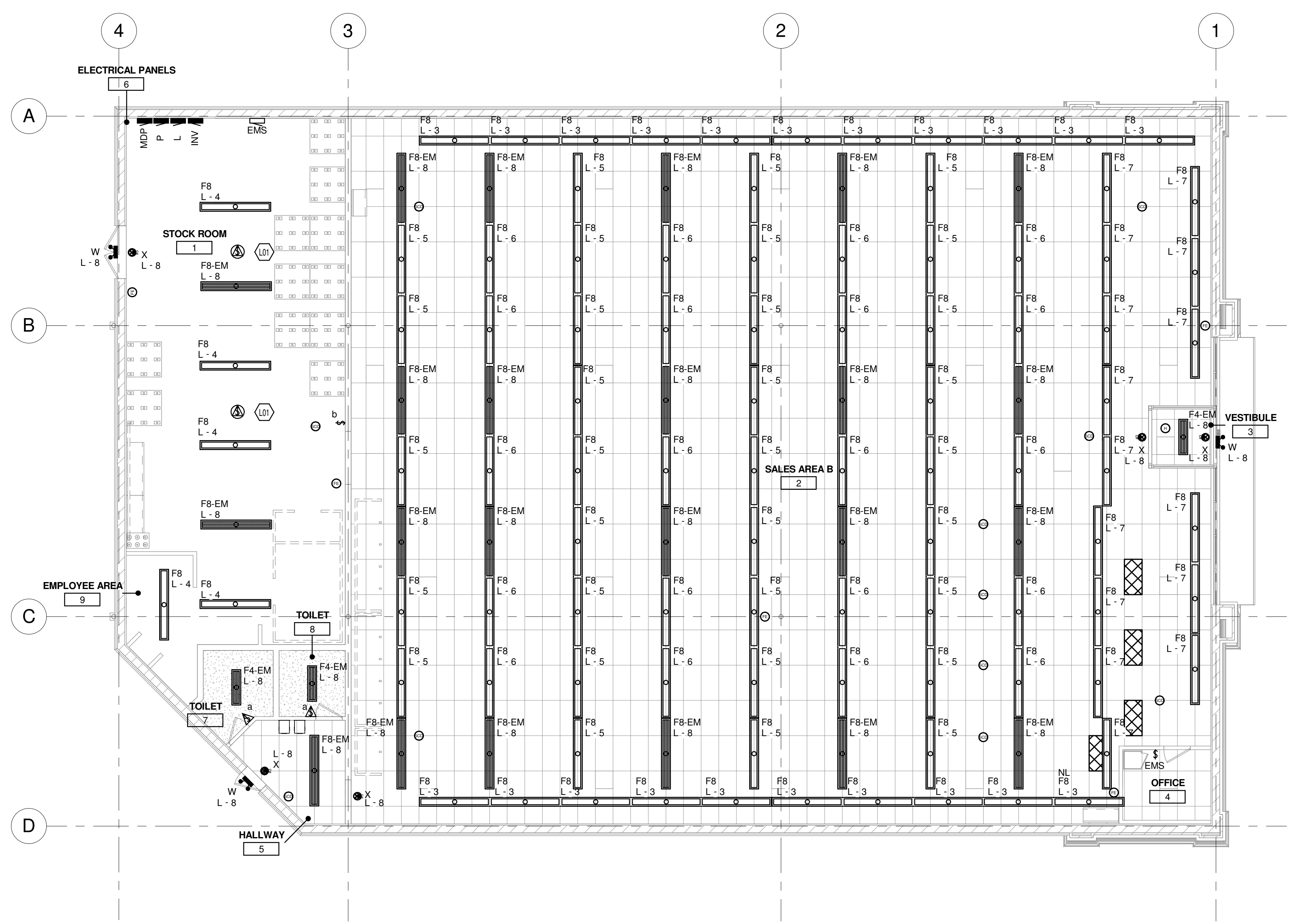
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1 SCHEMATIC DIAGRAM: INVERTER WIRING (BIV)
 SCALE: NONE FOR EMPLOYEE LIGHTING CIRCUIT



2 EMERGENCY LIGHTING SCHEMATIC DIAGRAM
 SCALE: NONE



1 ELECTRIC LIGHTING - FIRST FLOOR
 1/8" = 1'-0"

2" REFERENCE LINE

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HVAC ELECTRICAL COORDINATION SCHEDULE

ABBREVIATIONS		CONTRACTOR TYPE		MOTOR CONTROL TYPE		CONTROL TYPE	
DC	LOCAL DISCONNECT	EC	ELECTRICAL CONTRACTOR	CS	COMBINATION STARTER	TC	TIMECLOCK
MC	MOTOR CONTROL (POWER)	EX	EXISTING	MCC	MOTOR CONTROL STARTER	CPT	CONTROL POWER TRANSFORMER
SD	DUCT SMOKE DETECTOR	FC	FIRE PROTECTION CONTRACTOR	MG	MAGNETIC STARTER OR CONTACT	BAS	BUILDING AUTOMATION SYSTEM
CN	CONROLS	GC	GENERAL CONTRACTOR	MS	MANUAL STARTER	LOW	LOW VOLTAGE CONTROLS
TS	TOSGLE SWITCH	HC	HVAC CONTRACTOR	VFD	VARIABLE FREQUENCY DRIVE	LINE	LINE VOLTAGE CONTROLS
C/B	H.A.C.R. CIRCUIT BREAKER AT SOURCE PANELBOARD	MFR	MANUFACTURER	MSR	MANUAL STARTER W/ CONTROL RELAY	RLINE	REVERSE ACTING LINE VOLTAGE THERMOSTAT
FUSE	FUSE AT LOCAL DISCONNECT (VERIFY FIELD RATING)	PC	PLUMBING CONTRACTOR	OV	OVERCURRENT PROTECTION	MAN	MANUAL
FLA	OPERATING FULL LOAD AMPS	OR	OWNER OR OTHERS			FA	FIRE ALARM
MCA	MINIMUM CIRCUIT AMPACITY					CO	CARBON MONOXIDE SENSOR
CP	CORD AND PLUG CONNECTION					INT	INTEGRAL TO EQUIPMENT

EQUIPMENT MARK	DESCRIPTION	VOLTS (V)	PHASE	EMERGENCY	BHP (HP)	HP (HP)	HTG KW (KW)	WATTS	FLA (A)	MCA (A)	OC (A)	DC TYPE	DC FURN	DC INST	DC WIRE	MC TYPE	MC FURN	MC INST	MC WIRE	CN TYPE	CN FURN	CN INST	CN WIRE	SD TYPE
EF-1	INLINE CENTRIFUGAL FAN	120	1				203						EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	
RTU-1	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						50.3	60			EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	DUCT SMOKE
RTU-2	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						58.9	70			EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	DUCT SMOKE
RTU-3	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						58.9	70			EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	DUCT SMOKE
RTU-4	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						23.7	30			EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	
VH-1	WALL AND CEILING HEATER	208	1			3		14.4					EC	EC	EC	---	---	---	---	INT	MFR	MFR	MFR	

PLUMBING ELECTRICAL COORDINATION SCHEDULE

ABBREVIATIONS		CONTRACTOR TYPE		MOTOR CONTROL TYPE		CONTROL TYPE	
DC	LOCAL DISCONNECT	EC	ELECTRICAL CONTRACTOR	CS	COMBINATION STARTER	TC	TIMECLOCK
MC	MOTOR CONTROL (POWER)	EX	EXISTING	MCC	MOTOR CONTROL STARTER	CPT	CONTROL POWER TRANSFORMER
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FUSE	FUSE AT LOCAL DISCONNECT (VERIFY FIELD RATING)	PC	PLUMBING CONTRACTOR	OV	OVERCURRENT PROTECTION	MAN	MANUAL
FLA	OPERATING FULL LOAD AMPS	OR	OWNER OR OTHERS			FA	FIRE ALARM
MCA	MINIMUM CIRCUIT AMPACITY					CO	CARBON MONOXIDE SENSOR
CP	CORD AND PLUG CONNECTION					INT	INTEGRAL TO EQUIPMENT

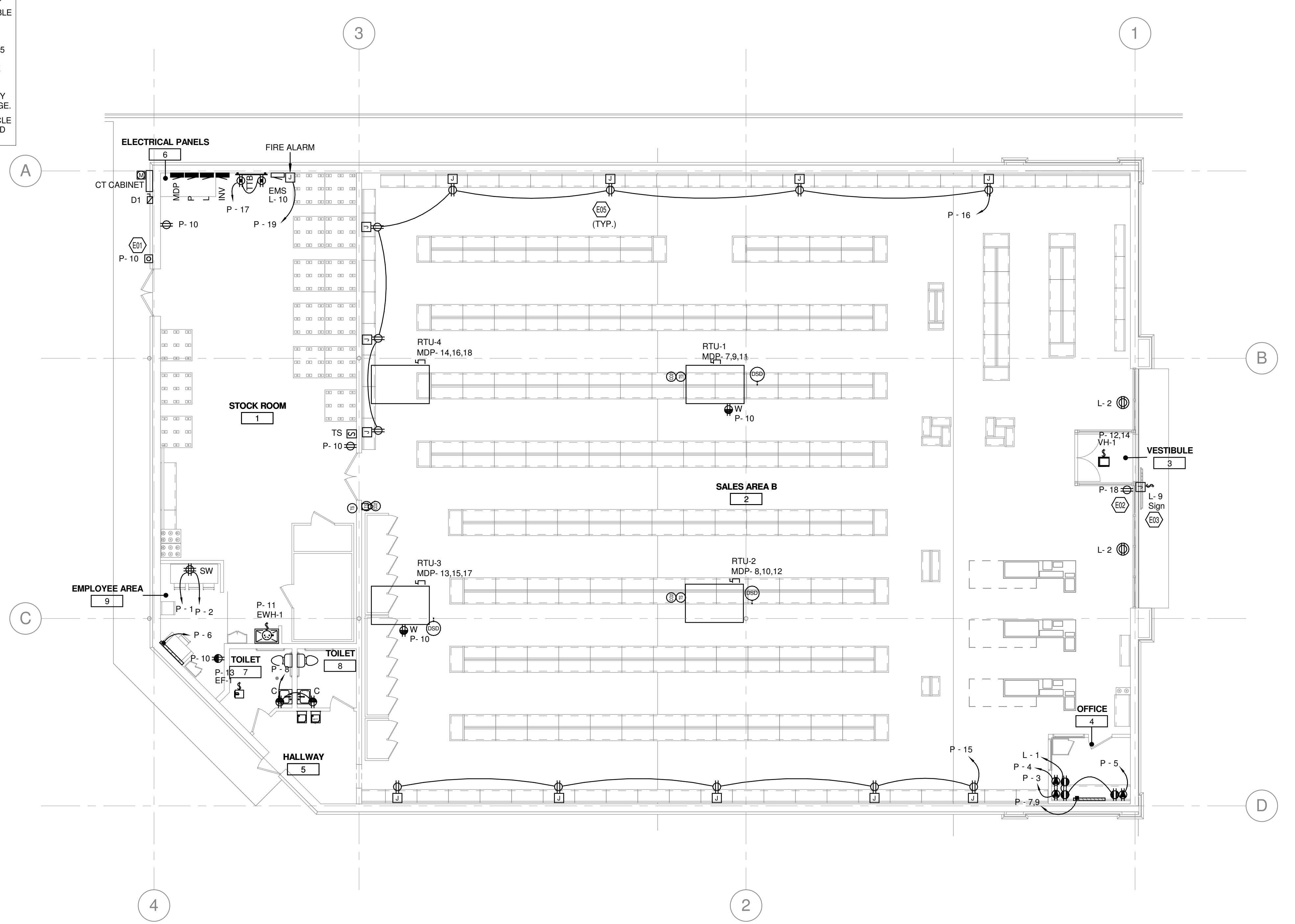
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EW-1	ELECTRIC DOMESTIC WATER HEATER	120	1				1.5						EC	EC	EC	---	---	---	---	---	MFR	MFR	INT	MFR

GENERAL ELECTRIC NOTES

- BEFORE SUBMITTING THE BID PROPOSAL, THE CONTRACTOR SHALL VISIT THE JOB SITE AND FULLY ACQUAINT THEMSELVES WITH THE JOB CONDITIONS AND VERIFY SERVICE CONNECTIONS, INCLUDING ALL NECESSARY PULL BOXES, SIZE AND NUMBER OF CONDUITS AND CONDUCTORS, SWITCH GEAR, METERING, ANY ASSOCIATED FEES, ETC., WHETHER SHOWN ON DRAWINGS OR NOT BUT REQUIRED BY SERVICE UTILITY CO. TO MAKE A COMPLETE AND OPERATING ELECTRICAL SERVICE WITHOUT ADDITIONAL COST TO THE TENANT. VERIFY SERVICES AND CHARGES WITH POWER AND TELEPHONE COMPANIES.
- CONTRACTOR SHALL VERIFY ALL REQUIREMENTS OF MECHANICAL EQUIPMENT WITH MECHANICAL DRAWINGS AND SPECIFICATIONS AND SHALL FURNISH AND INSTALL ALL ITEMS, INCLUDING LOCAL DISCONNECTS AS DETAILED IN THE MECHANICAL ELECTRICAL COORDINATION SCHEDULE, REQUIRED BY THE CONTRACTOR FOR COMPLETE INSTALLATION.
- VERIFY LOCATION AND REQUIREMENTS OF MECHANICAL EQUIPMENT WITH CONTRACTOR (DOOR HEATERS, UNIT HEATERS, ROOF TOP UNITS, TRANSFER FANS, ETC.)
- ELECTRICAL WORK AND MATERIALS SHALL COMPLY WITH LATEST NEC AND ALL LOCAL CODES AND ORDINANCES. IN CASES OF CONFLICT AMONG REQUIREMENTS, THE MOST RESTRICTIVE SHALL APPLY.
- ALL CONDUCTORS SHALL BE #12 AWG COPPER EXCEPT AS OTHERWISE NOTED OR AS REQUIRED FOR VOLTAGE DROP (SEE SPECS). ALL CONDUIT SHALL BE 1/2" MINIMUM EXCEPT AS OTHERWISE NOTED OR AS REQUIRED FOR CONDUCTORS.
- TENANT'S ELECTRICAL EQUIPMENT SHALL BE RELOCATED AS REQUIRED TO MINIMIZE LENGTH OF CONDUIT/CONDUCTOR BETWEEN SERVICE DISCONNECT SWITCH AND PANEL "MDP". OBTAIN APPROVAL FROM TENANT'S ARCHITECTURAL DEPARTMENT OR PROPOSED LOCATION PRIOR TO INSTALLATION. COST CLAIMS FOR CONDUIT/CONDUCTOR IN EXCESS OF BASE BID WILL NOT BE CONSIDERED IF PANEL RELOCATION IS NOT PROPOSED TO MINIMIZE THESE COSTS PRIOR TO INSTALLATION.
- TELEPHONE: FURNISH AND INSTALL ALL NECESSARY CONDUIT, DEVICE BOXES AND PLATES.
 - PROVIDE NEW TELEPHONE SERVICE TO TENANT'S SPACE AND NEW TELEPHONE EQUIPMENT BOARD. COORDINATE WITH LANDLORD AND TELEPHONE CO. AS REQUIRED FOR INSTALLING THIS SERVICE.
 - FURNISH AND INSTALL 3/4" CONDUIT FROM EACH TELEPHONE OUTLET 1'-0" INTO CEILING CAVITY, OR UP TO JOIST WHERE NO CEILING IS INSTALLED.
 - FURNISH AND INSTALL TELEPHONE CABLE FROM EACH OUTLET BOX BACK TO TENANT'S TELEPHONE SERVICE LOCATION. CABLE SHALL BE LISTED AS COMMUNICATIONS PLENUM CABLE WHEN INSTALLED IN AN AIR HANDLING PLENUM.
 - ATTACH TELEPHONE CABLES TO PHONE JACKS AND TO TELEPHONE COMPANY SERVICE CONNECTION DEVICE. COORDINATE WITH TELEPHONE COMPANY. AS REQUIRED TELEPHONE: FURNISH AND INSTALL ALL NECESSARY CONDUIT, DEVICE BOXES AND PLATES
- FIRE ALARM SYSTEM: IF THERE IS NO EXISTING FIRE ALARM SYSTEM AND THE NATIONAL, STATE OR LOCAL FIRE AUTHORITY HAVING JURISDICTION NOW REQUIRES A FIRE ALARM SYSTEM, FURNISH AND INSTALL DEVICES, COMPONENTS, ETC. AS DIRECTED BY ENFORCING AGENCY. INCLUDE COST FOR DEVICES AND INSTALLATION IN BASE BID.
 - CONNECT ALARM CONTACT(S) OF SPRINKLER SYSTEM FLOW SWITCH AND SUPERVISED VALVE AND AIR DUCT DETECTORS TO FIRE ALARM SYSTEMS AS REQUIRED.
 - IF REQUIRED, CONNECT FIRE ALARM DEVICES (AIR DUCT DETECTORS, ETC) AND ANY OTHER ASSOCIATED EQUIPMENT TO DEDICATED 120V CIRCUIT.
 - PROVIDE LOCAL STATUS INDICATOR AND ALARM SYSTEM FOR ALARM DEVICES WHERE NOT CONNECTED TO FIRE ALARM SYSTEM.
 - VERIFY ALL REQUIREMENTS AND INSTALL IN ACCORDANCE WITH NFPA, NATIONAL, STATE, LOCAL CODES, LOCAL FIRE AUTHORITY HAVING JURISDICTION AND LANDLORD REQUIREMENTS.
- IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO REVIEW ALL ARCHITECTURAL DRAWINGS, ELECTRICAL DRAWINGS AND NOTES TO ENSURE THAT ALL ELECTRICAL REQUIREMENTS ARE MET.
- ALL POWER AND ALARM WIRING FOR EXIT DOORS SHALL BE CONCEALED IN DOOR FRAME.
- DUCTWORK AND PIPING SHALL NOT BE ROUTED OVER ELECTRIC PANELS OR TRANSFORMERS
- ALL CONDUITS SHALL BE CONCEALED IN WALLS AND OUTLET BOXES SHALL BE FLUSH WITH FINISHED WALL UNLESS OTHERWISE NOTED. DISCONNECT AND DISCARD ALL EXISTING ELECTRICAL EQUIPMENT AND DEVICES, WIRING, CONDUIT, LIGHT FIXTURES, ETC. NOT BEING REUSED.
- ANY PENETRATIONS THROUGH FIRE-RESISTANT/RATED WALLS, PARTITIONS, FLOORS, AND CEILINGS SHALL BE FIRESTOPPED USING APPROVED METHODS TO MAINTAIN THE FIRE RESISTANCE RATING.
- ELECTRICAL CONTRACTOR SHALL PROVIDE JUNCTION BOX AND RACEWAY FOR THERMOSTATS AND HVAC LOW VOLTAGE CONTROLS AT 48" A.F.F. TO TOP OF DEVICE. THERMOSTATS AND HVAC LOW VOLTAGE CONTROLS INSTALLED AND WIRED BY MECHANICAL CONTRACTOR. COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTRACTOR. TYPICAL OF ALL.
- WHERE OPEN-AIR INSTALLATION METHODS (EITHER EXPOSED ABOVE THE CEILINGS, IN BRIDLE RINGS OR IN CABLE TRAYS) ARE PERMITTED, PROVIDE PLENUM-RATED CABLES WHEREVER PLENUM CEILINGS (IF ANY) EXIST AND INSTALL PER NEC.
- ACCESS TO LANDLORD'S JUNCTION BOXES MUST BE MAINTAINED. PROVIDED ACCESS PANELS AS REQUIRED.
- WIRING DEVICES: UNLESS OTHERWISE NOTED, MOUNT EACH OUTLET BOX SO THE BOTTOM IS LOCATED AS FOLLOWS: SWITCH +44" - RECEPTACLE +16". ADJUST TO COORDINATE WITH MASONRY IF REQUIRED. REFER TO ARCHITECTURAL DRAWINGS BEFORE STARTING WORK.
- PROVIDE LABELED CIRCUIT(S) FOR COOLER/FREEZER EQUIPMENT AS INDICATED. ALL ADDITIONAL DISCONNECTS AND REQUIRED EQUIPMENT TO BE PROVIDED BY INSTALLER.
- CASH REGISTER AND COMPUTER WIRING: DO NOT CONNECT "ISOLATED" GROUND WIRE TO RACEWAY OR BOX. CONDUIT AND BOX SHALL BE METAL AND METAL-TO-METAL CONNECTORS SHALL BE USED (NO FLEX CONDUIT) TO ESTABLISH GROUND PATH FOR BOX AND RACEWAY. DO NOT RUN ANY OTHER CIRCUIT IN SAME CONDUIT WITH CASH REGISTER OR COMPUTER (C) CIRCUITS. CASH REGISTER DATA SYSTEM CABLE SHALL BE FURNISHED AND INSTALLED BY OTHERS.

KEYED NOTES

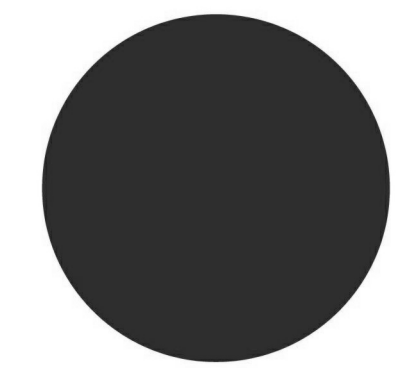
- SIGNAL SYSTEMS: REAR DOOR BELL AND PUSH-BUTTON: FURNISH AND INSTALL AN EDWARDS #65-6G5, 24V AC "ADAPT-A-BELL" ABOVE CEILING AND A #652 WEATHERPROOF PUSH-BUTTON IN FLUSH (NEW CONST.) SWITCH BOX AT TENANT SPACE BACK DOOR. CONNECT SO THAT BELL SOUNDS WHEN PUSH-BUTTON IS PRESSED.
- GATEKEEPER CART RECEPTACLE. MOUNT 12" BELOW CEILING.
- PROVIDE ROUGH IN FOR TENANT STOREFRONT SIGN(S) WHERE APPLICABLE. FINAL CONNECTIONS WILL BE FURNISHED AND INSTALLED BY TENANT'S SIGN CONTRACTOR. FURNISH AND INSTALL DISCONNECT AND JUNCTION BOXES W/6 WHIP ON INTERIOR WALL ABOVE ACCESSIBLE CEILING. WHERE INSTALLED OUTDOORS PROVIDE WEATHERPROOF, INSULATED JUNCTION BOX AND WEATHERPROOF DISCONNECT. CONTRACTOR SHALL COORDINATE FINAL EXTERIOR JUNCTION BOX LOCATION WITH SIGN VENDOR. JUNCTION BOXES NEED TO BE WITHIN 5 FEET OF SIGN FOR SIGN VENDOR TO MAKE FINAL ELECTRICAL CONNECTION. IF STORE HAS ADDITIONAL SIDE OR REAR SIGNAGE THE CONTRACTOR SHALL COORDINATE WITH THE SIGN VENDOR FOR ANY ADDITIONAL EXTERIOR SIGNAGE AND THE ASSOCIATED ELECTRICAL REQUIREMENTS. AFTER THE ELECTRICAL DESIGN IS COMPLETE, IT MAY BE DETERMINED THAT CERTAIN SITES REQUIRE SIDE OR REAR SIGNAGE.
- MOUNT ON FLOOR AND MAKE MC CONNECTION TO DUPLEX RECEPTACLE INSTALLED IN FIXTURE KICK PLATE. ASSEMBLE JUNCTION BOX AROUND INSTALLED FIXTURE.



1 ELECTRIC POWER - FIRST FLOOR
1/8" = 1'-0"

2" REFERENCE LINE

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ELECTRICAL POWER
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GENERAL ELECTRICAL INSTALLATION NOTES	
A.	EQUIPMENT GROUNDING CONDUCTORS SHALL BE PROVIDED IN STRICT COMPLIANCE WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA 70), INCLUDING ARTICLE 250 AND TABLE 250.122. THESE CONDUCTORS MAY OR MAY NOT BE INDICATED ON SINGLE-LINE DIAGRAMS, BUT SHALL BE PROVIDED UNDER BASE BID NEVERTHELESS.
B.	LAYOUT AND INSTALL ALL ELECTRICAL WORK IN STRICT COMPLIANCE WITH CHAPTER ONE, PART B, SECTION 110.26(a) OF THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA 70), IF EXISTING CONDITIONS VIOLATE MANDATED CLEARANCES, CONTACT ELECTRICAL ENGINEER FOR INSTRUCTIONS BEFORE PROCEEDING. LOCATIONS AND ROUTING THAT MAY BE SHOWN ON PLANS ARE SCHEMATIC AND DIAGRAMMATIC IN NATURE. MAINTAIN CLEARANCES THROUGH ALL STAGES OF CONSTRUCTION.
C.	HOLD ALL NEW OVERHEAD ELECTRICAL WORK AS TIGHTLY AS POSSIBLE TO THE BOTTOM OF THE OVERHEAD STRUCTURE. DO NOT INSTALL ANY ELECTRICAL WORK WITHIN SIX INCHES OF ROOF DECKING.
D.	PROVIDE FLUSH MOUNTED EQUIPMENT FOR APPLICATIONS IN FINISHED AREAS AND COORDINATE THESE LOCATIONS AND INSTALLATIONS WITH ARCHITECT, OWNER AND AFFECTED TRADES. ELSEWHERE PROVIDE SURFACE MOUNTED EQUIPMENT UNLESS FLUSH MOUNTED EQUIPMENT IS NEEDED TO ACCOMMODATE UNUSUAL CONDITIONS.
E.	IF NOT EXISTING, PROVIDE LABELS ON ALL ELECTRICAL EQUIPMENT TO UNIQUELY IDENTIFY IT AS INDICATED ON PLANS. LABELS SHALL BE BLACK WITH 1" HIGH WHITE LETTERING.
F.	PROVIDE NEW BREAKERS IN EXISTING PANELS AS REQUIRED FOR NEW CONSTRUCTION. NEW BREAKERS SHALL MATCH THE MANUFACTURER, HIGHEST INTERRUPTING RATING, TYPE, ETC. OF EXISTING BREAKERS IN PANEL TO ENSURE COMPATIBILITY WITH EXISTING SYSTEM. IT IS ASSUMED THAT EXISTING BREAKERS MADE AVAILABLE BY DEMOLITION WILL BE UTILIZED FOR NEW CONSTRUCTION WHEREVER POSSIBLE, AND THAT ALL BIDS WILL REFLECT THEIR REUSE EVEN WHEN DRAWINGS DO NOT SPECIFICALLY INDICATE THEM AS SUCH.
G.	PRIOR TO PROJECT CLOSEOUT PROVIDE AN UPDATED, TYPED PANEL SCHEDULE AFFIXED TO INSIDE OF PANEL DOOR FOR ALL PANELS AFFECTED BY NEW CONSTRUCTION.
H.	BALANCE PHASE LOADS TO WITHIN 10% OF EACH OTHER PRIOR TO PROJECT CLOSEOUT.
I.	PROVIDE HACR RATED CIRCUIT BREAKERS FOR ALL MOTOR LOADS.
J.	POWER DISTRIBUTION EQUIPMENT SUPPLIER SHALL PROVIDE EQUIPMENT APPROPRIATELY RATED AND BRACED TO ACCOMMODATE THE AVAILABLE FAULT CURRENT AT THE UTILITY COMPANY TRANSFORMER SECONDARIES. THIS SUPPLIER SHALL ACCORDINGLY PROVIDE ANY RELATED CALCULATIONS SO THAT THEIR EQUIPMENT IS PROPERLY COORDINATED FOR THE AVAILABLE FAULT CURRENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THIS SUPPLIER WITH COPIES OF THE ELECTRICAL DOCUMENTS AS REQUIRED SO THAT PROPERLY RATED/BRACED EQUIPMENT IS PROVIDED UNDER BASE BID.
K.	UNLESS INDICATED OTHERWISE, PROVIDE FULLY-RATED OR SERIES-RATED OVERCURRENT PROTECTION (OCP) AS REQUIRED TO COMPLY WITH ALL APPLICABLE REQUIREMENTS OF NFPA 70. IF FAULT CURRENT VALUES ARE NOT INDICATED AT NODES ON THE SINGLE-LINE DIAGRAM, ALSO PROVIDE FAULT CURRENT CALCULATIONS AND FURNISH RESULTS WITH EQUIPMENT SUBMITTALS. PROVIDE EQUIPMENT AND OCP RATED TO MEET OR EXCEED THE CALCULATED AVAILABLE SERIES-RATED FAULT CURRENT AT THE RESPECTIVE NODE IN THE POWER DISTRIBUTION SYSTEM. FURNISH ELECTRONIC COPIES OF THE ELECTRICAL DOCUMENTS TO THE MANUFACTURER'S REPRESENTATIVE AND/OR EQUIPMENT SUPPLIER SO THAT PROPERLY RATED AND BRACED EQUIPMENT IS PROVIDED UNDER BASE BID.

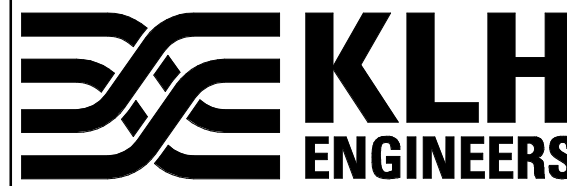
ELECTRIC LUMINAIRE SCHEDULE									
TYPE	DESCRIPTION	MANUFACTURER / SERIES	Housing / Mounting	LAMP QTY	LAMP TYPE	LAMP BASE	COMMENTS	FIXTURE LOAD	VOLTAGE
F4-EM	4' EM STRIP FIXTURE		SURFACE	(1) 18 W LED		FURNISHED W/FIXTURE	EMERGENCY LIGHT LUMEN OUTPUT IS 1200. CONTROLLED BY EMS UNLESS NL.	22 VA	120 V
F8	8' STRIP FIXTURE		SURFACE	(2) 18 W LED		FURNISHED W/FIXTURE	4-WIRE HARNESS. NOTES A.C.D.F.A.G.	44 VA	120 V
F8-EM	8' EM STRIP FIXTURE		SURFACE	(2) 18 W LED		FURNISHED W/FIXTURE	EMERGENCY LIGHT WIRED TO REMOTE BATTERY INVERTER AND CONTROLLED CIRCUIT. 4 WIRE HARNESS. NOTES: A.C.D.E.F.A.G.	44 VA	120 V
W	REMOTE EMERGENCY LIGHTS MOUNTED 10' AFF ABOVE EXIT DOORS. NORMALLY ON OPERATION		SURFACE	12 LED EACH HEAD		FURNISHED W/FIXTURE	EXTERIOR EMERGENCY LIGHT WITH MOUNT AT 10'-0" ABOVE FINISHED GRADE	30 VA	120 V
X	LED EXIT SIGN		SURFACE	LED ARRAY		FURNISHED W/FIXTURE	90 MINUTE EMERGENCY BATTERY BACKUP. NOTES: D	2 VA	120 V

LIGHT FIXTURE SCHEDULE GENERAL NOTES	
A.	DESIGNATED FIXTURE SHALL HAVE LED LAMPS 48" LED T8 LAMPS WITH 4 WIRE HARNESS AND DISCONNECT.
B.	CUT INSULATION (WHEN BATT TYPE IS USED) OR PROVIDE SHIELD AROUND FIXTURE (WHEN BLOWN-IN IS USED) TO KEEP INSULATION A MINIMUM OF 3" AWAY FROM RECESSED FIXTURE.
C.	ATTACH FIXTURE TO I-BAR PER NEC 410.36 WHERE APPLICABLE. PROVIDE "CADDY" CLIP MOUNTS WHERE REQUIRED BY LOCAL AUTHORITY AND SEISMIC INSTALLATION REQUIREMENTS.
D.	FIXTURE PROVIDED WITH DUAL VOLTAGE 120/277V POWER SUPPLY. VERIFY VOLTAGE FOR EACH FIXTURE LOCATION.
E.	CONNECTED TO REMOTE BATTERY INVERTER FOR FULL LUMEN OUTPUT DURATION OF 90 MINUTE MINIMUM. EMERGENCY (EM) LIGHT SHALL BE CONNECTED AHEAD OF SWITCHES, CONTACTORS, ETC. LIGHT FIXTURES DENOTED BY "NL" SHALL REMAIN ON DURING NON-BUSINESS WORKING HOURS.
F.	WITH NO FINISHED CEILING, LIGHT FIXTURES IN THE SALES AREA SHALL BE SUSPENDED @ 12'-0" AFF AND LIGHT FIXTURES IN THE PRESALES AREA SHALL BE SUSPENDED @ 10'-0" AFF
G.	EXTERIOR FIXTURES SHALL BE SUITABLE FOR WET/DAMP LOCATION AND COLD WEATHER OPERATION.

ELECTRIC LEGEND			
SYMBOL	DESCRIPTION		
ABBREVIATIONS			
(R)	RELOCATE FIXTURE, EQUIPMENT OR DEVICE	IG	ISOLATED GROUND
42"	DISTANCE ABOVE FINISHED FLOOR / GRADE / PAVEMENT	LR	LEGALLY REQUIRED STANDBY
AF	AMP FRAME OF FUSED SWITCH OR CIRCUIT BREAKER	LSI	LONG - SHORT - INSTANTANEOUS
AFCI	ARC-FAULT CIRCUIT INTERRUPTER	LSIG	LONG - SHORT - INSTANTANEOUS - GROUND FAULT
AIC	SHORT CIRCUIT AMPS INTERRUPTING RATING	MCB	MAIN CIRCUIT BREAKER
AT	AMP TRIP OF FUSED SWITCH OR CIRCUIT BREAKER	MFR	MANUFACTURER
ATS	AUTOMATIC TRANSFER SWITCH	MLO	MAIN LUGS ONLY
BAS	BUILDING AUTOMATION SYSTEM	MTS	MANUAL TRANSFER SWITCH
C.T.C.	WORK UNDER DIVISION 27 OR 28 AS APPLICABLE	MW	MICROWAVE OVEN
C/B	CIRCUIT BREAKER	NIC	NOT IN CONTRACT (SHOWN FOR REFERENCE ONLY)
CH	COUNTER HEIGHT OR SPECIAL HEIGHT DEVICE	NTS	NOT TO SCALE
DW	DISHWASHER	OFE	OWNER-FURNISHED EQUIPMENT - INSTALLED AND WIRED BY E.C.
E	EMERGENCY	OS	OPTIONAL STANDBY
E.C.	WORK UNDER DIVISION 26	P.C.	WORK UNDER DIVISION 22
EMS	ENERGY MANAGEMENT SYSTEM	S.C.	WORK UNDER DIVISION 21
EPO	EMERGENCY POWER OFF	SPD	SURGE PROTECTIVE DEVICE
ER	EQUIPMENT ROOM	ST	SHUNT TRIP
ERM	ENERGY REDUCTION MAINTENANCE SWITCH	TAAC	TO ABOVE ACCESSIBLE CEILING
ETR	EXISTING TO REMAIN	TR	TAMPER RESISTANT
EW	ELECTRIC WATER COOLER	TB	TELEPHONE TERMINAL BOARD
EX	EXISTING	TYP	TYPICAL
FBO	FURNISHED BY OTHERS - INSTALLED AND WIRED BY E.C.	UCR	UNDER COUNTER REFRIGERATOR
FIBO	FURNISHED AND INSTALLED BY OTHERS - WIRED BY E.C.	UL	UNDERWRITER'S LABORATORY
FP	RECEPTACLE TO BE USED FOR A FLAT PANEL DISPLAY.	U.L.S.E.	UL LISTED FOR SERVICE ENTRANCE UNLESS NOTED OR INDICATED OTHERWISE ON DRAWINGS OR IN SPECIFICATIONS
FWE	FURNISHED WITH EQUIPMENT BY OTHERS - INSTALLED AND WIRED BY E.C.	UNO	
GD	GARBAGE DISPOSAL	VFD / VSD	VARIABLE FREQUENCY / SPEED DRIVE
GFEP	GROUND FAULT EQUIPMENT PROTECTION	VIF	VERIFY IN FIELD
GFI / GFCI	GROUND FAULT CIRCUIT INTERRUPTER DEVICE	VM	VENDING MACHINE
GND	GROUND	VP	VANDAL PROOF
H.C.	WORK UNDER DIVISION 23	WG	WIRE GUARD
H.O.A.	*HAND - OFF - AUTO* SWITCH	WR	WEATHER RESISTANT
PLAN-VIEW AND GRAPHIC LINE TYPES			
WORK SHOWN BOLD-CONTINUOUS INDICATES NEW WORK (UNLESS OTHERWISE INDICATED)			
WORK SHOWN FADED INDICATES EXISTING WORK TO REMAIN OR NEW WORK BY OTHERS AS APPLICABLE (UNLESS OTHERWISE INDICATED)			
WORK SHOWN BOLD-DASHED INDICATES SELECTIVE DEMOLITION WORK (UNLESS OTHERWISE INDICATED)			

ELECTRIC LEGEND	
SYMBOL	DESCRIPTION
LIGHTING/LIGHTING CONTROLS	
	LUMINAIRE (REFER TO THE LUMINAIRE SCHEDULE) NOTE THAT OTHER SHAPES MAY ALSO BE USED TO REPRESENT LUMINAIRES
	SHADED LUMINAIRES DENOTE THOSE CONNECTED TO EMERGENCY OR STANDBY POWER AS APPLICABLE (UNSWITCHED LUMINAIRES ARE EGRESS LIGHTS AND/OR NIGHT-LIGHTS THAT OPERATE 24/7)
	SINGLE / DOUBLE SIDED EXIT SIGN CONNECT AHEAD OF SWITCHING & CONFIGURE ARROWS TO INDICATE DIRECTION OF EGRESS TRAVEL
	EMERGENCY LIGHTING UNIT WITH 90-MINUTE BATTERY BACKUP AND ASSOCIATED REMOTE HEADS WHERE APPLICABLE. CONNECT TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING
	A = LUMINAIRE TYPE (REFER TO THE LUMINAIRE SCHEDULE), NL = NIGHT-LIGHT (UNSWITCHED), a = SWITCHING DESIGNATION, EL = EGRESS LUMINAIRE (UNSWITCHED OR AUTO-ON DURING UTILITY OUTAGE)
	LIGHTING SWITCH (KEYS: 2 = 2-POLE, 3 = 3-WAY, 4 = 4-WAY, D=DIMMER, K=KEYED, LV = LOW VOLTAGE M = MOMENTARY-CONTACT 1PDT W/CENTER-REST, P = SWITCH W/PILOT LIGHT, T = TIMER SWITCH)
	CEILING-MOUNTED OCCUPANCY SENSOR. DUAL TECHNOLOGY UNLESS OTHERWISE NOTED BY TYPE. TYPE "IR" = INFRARED, TYPE "US" = ULTRASONIC
	WALL-MOUNTED OCCUPANCY SENSOR SWITCH. DUAL TECHNOLOGY UNLESS OTHERWISE NOTED BY TYPE. TYPE "IR" = INFRARED, TYPE "US" = ULTRASONIC, "V" = VACANCY SENSOR, "F" = CONTROLLED CIRCUITS.
RECEPTACLES/MISCELLANEOUS OUTLETS	
	SINGLE ("SIMPLEX"), DUPLEX, AND DOUBLE DUPLEX ("QUAD") RECEPTACLE RESPECTIVELY
	GFI / GFCI RECEPTACLES
	SURGE PROTECTIVE DEVICE RECEPTACLES
	ISOLATED GROUND RECEPTACLES
	FULL SWITCHED RECEPTACLES
	CEILING MOUNTED RECEPTACLES
	RECEPTACLE ATTRIBUTES 42" = MOUNT RECEPTACLE AT THIS HEIGHT ABOVE GRADE / FINISHED FLOOR C = INSTALL ABOVE COUNTER AND BACKSPASH H = INSTALL RECEPTACLE HORIZONTALLY L = LIT (PROVIDE ILLUMINATED FACE OR INDICATOR LIGHT TO INDICATE THERE IS POWER TO RECEPTACLE) SW = SPLIT WIRED T = TAMPER RESISTANT W = WEATHER PROOF WHILE IN USE COVER AND WEATHER RESISTANT RECEPTACLE
DOOR OPERATORS/DEVICES	
	DOOR BELL WITH TRANSFORMER & PUSHBUTTONS
	FLUSH PUSHBUTTON FOR DOOR CHIME OR BELL
FIRE ALARM DEVICES	
	FIRE ALARM SYSTEM DUCT SMOKE DETECTOR AND SAMPLING TUBE
	FIRE ALARM SYSTEM KEYED TEST SWITCH AND ANNUNCIATOR
MISCELLANEOUS	
	INDICATES DIRECT CONNECTION TO EQUIPMENT
	MOTOR RATED TOGGLE SWITCH, MANUAL STARTER WITH PILOT LIGHT, AND MANUAL STARTER WITH PILOT LIGHT WITH EXTERNAL RELAY FOR CONTROL OR MONITORING RESPECTIVELY - ALL MAY BE KEYED "K"
	HEAVY DUTY DISCONNECT SWITCH (NON-FUSED) (LEFT) HEAVY DUTY DISCONNECT SWITCH (FUSED) (RIGHT)
	PLYWOOD EQUIPMENT BOARD
	ELECTRICAL PANELBOARD OR DISTRIBUTION BOARD (DIMENSIONS MAY VARY / FLUSH OR SURFACE MOUNTED AS INDICATED)
	OIL FILLED TRANSFORMER
SINGLE LINE DIAGRAM	
	ELECTRIC UTILITY COMPANY METER AND ASSOCIATED CURRENT TRANSFORMERS
	CUSTOMER ELECTRIC METER AND ASSOCIATED CURRENT TRANSFORMERS HD = HIGH DENSITY METERING CABINET/BANK MOUNTED TO TIGHTLY GROUP ALL METERS TOGETHER
	HEAVY DUTY DISCONNECT SWITCH (NON-FUSED)(LEFT) (FUSED)(RIGHT) SIZES MAY BE SHOWN ONLY IN SCHEDULE
	ELECTRICAL PANELBOARD OR DISTRIBUTION BOARD
	SURGE PROTECTIVE DEVICE
WIRE / CABLE / RACEWAY	
	BRANCH CIRCUIT HOME RUN WITH PANEL NAME AND CIRCUIT NUMBER(S)
	CABLE / RACEWAY INSTALLED CONCEALED IN WALLS OR ABOVE CEILING
	CABLE / RACEWAY INSTALLED BELOW FLOOR OR GRADE
	CABLE TRAY
	FLUSH MOUNTED JUNCTION BOX OR PULL BOX AS APPLICABLE FOR APPLICATION
	FLUSH MOUNTED PULL BOX
	SINGLE-SERVICE SURFACE RACEWAY (ONE COMPARTMENT - POWER)
	MULTI-SERVICE SURFACE RACEWAY (TWO COMPARTMENT - POWER AND TECHNOLOGY)
	CONDUIT UP OR DOWN

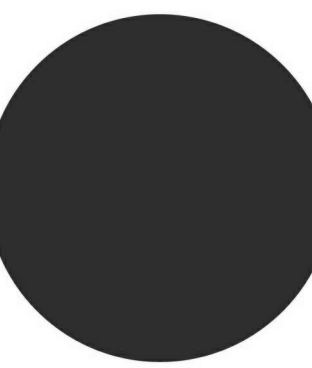
2" REFERENCE LINE



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REVISION

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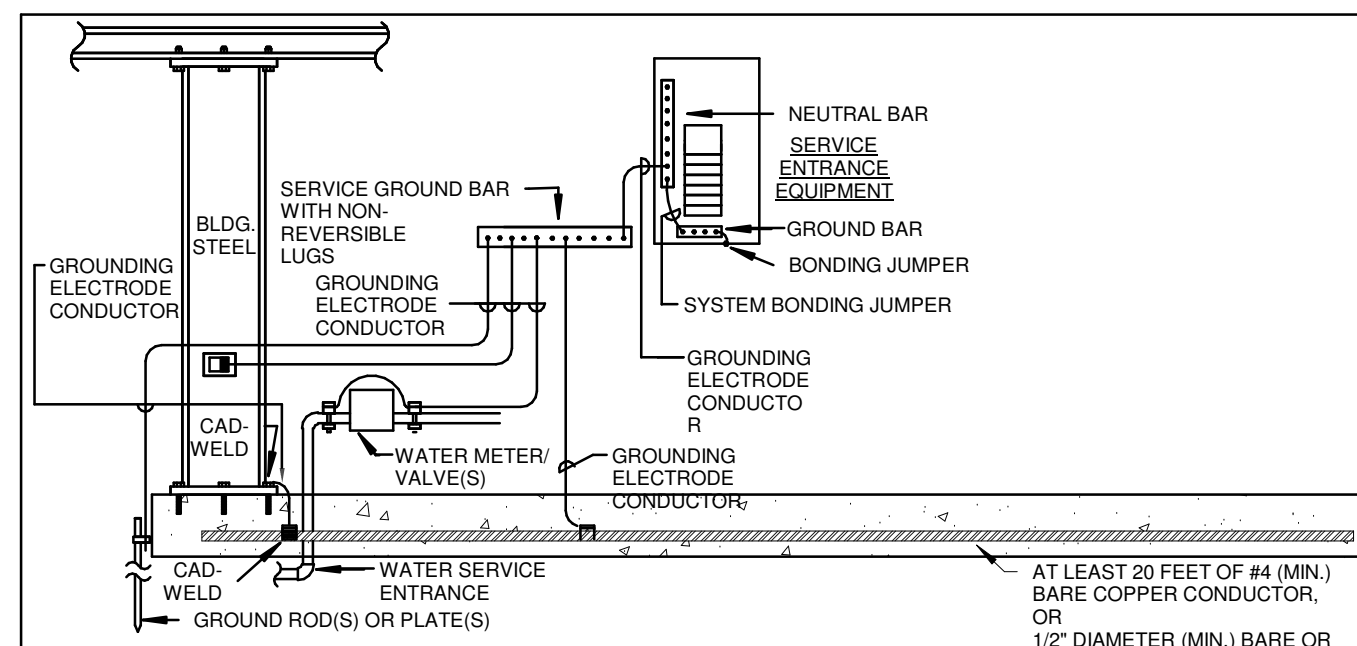
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SCHEDULES AND
DETAILS

E-201

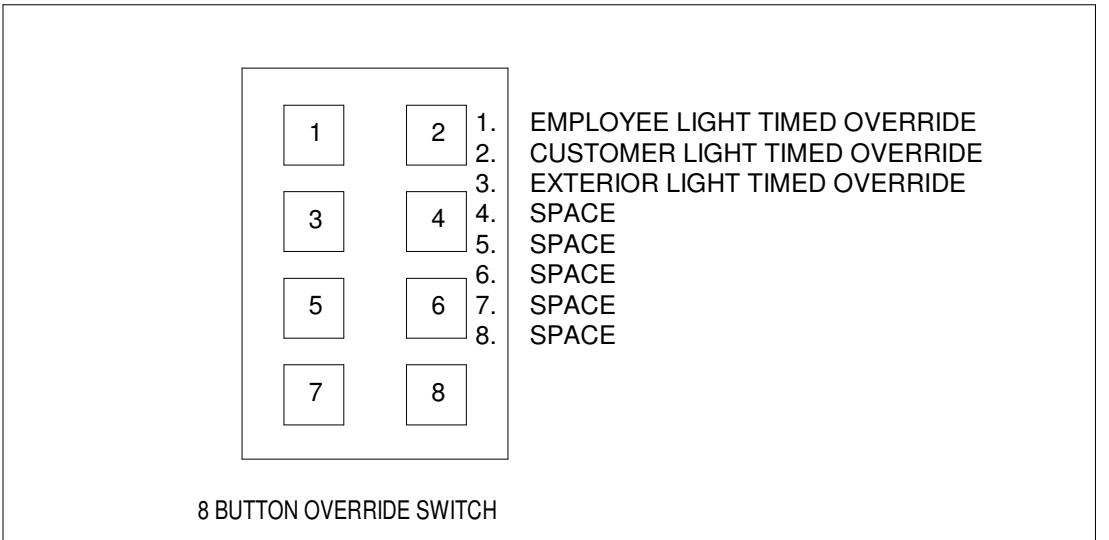


GENERAL NOTES:

- A. THIS DETAIL APPLIES AT EACH SERVICE ENTRANCE. REFER TO FLOOR PLANS FOR GROUND BAR LOCATIONS, AND IF NOT SHOWN IN PLAN VIEW INSTALL AS CLOSE AS POSSIBLE TO SERVICE ENTRANCE EQUIPMENT.
- B. PROVIDE ALL GROUNDING ELECTRODE CONDUCTORS PER NEC TABLE 250.66 UNLESS NOTED OTHERWISE.
- C. PROVIDE SERVICE GROUND BAR EQUAL TO ERICO EQUIPMENT GROUND BAR W/INSULATORS AND BRACKET (1/4" THICK, 4" WIDE, 24" LONG WITH HOLE PATTERN TYPE "CC").
- D. SIZE GROUND CONDUCTORS BETWEEN ROOM GROUND BARS AS GROUND ELECTRODE CONDUCTORS.
- E. SIZE ALL BONDING JUMPERS PER NEC TABLE 250.122 UNLESS NOTED OTHERWISE.
- F. PROVIDE ALL WORK COMPLIANT WITH APPLICABLE REQUIREMENTS OF ARTICLE 250 OF NFPA 70 AS A MINIMUM.
- G. COORDINATE WITH ELECTRICAL INSPECTOR. MODIFY SPECIFIC MEANS & METHODS IF SO DIRECTED. COORDINATE WITH WORK OF ALL CONSTRUCTION DIVISIONS.
- H. PROVIDE A CONCRETE ENCASED ELECTRODE PER NEC 250.52. ELECTRODE SHALL CONSIST OF 20'-0" OF CONTINUOUS BARE OR ZINC GALVANIZED 1/2" DIAMETER STEEL REINFORCING BARS OR RODS (OR MULTIPLE PIECES CONNECTED BY STEEL TIE WIRES, WELDING OR EXOTHERMIC WELDING TO EFFECTIVELY CREATE 20'-0" OR GREATER LENGTH) OR 20' OF A BARE COPPER CONDUCTOR NO SMALLER THAN #4 AWG. ELECTRODE SHALL BE ENCASED BY AT LEAST 2" OF CONCRETE. ONE OR MORE METAL IN-GROUND SUPPORT STRUCTURES MAY BE USED AS GROUNDING ELECTRODE CONDUCTORS IF EXTENDED VERTICALLY AT LEAST 10 FEET BELOW GRADE WITH OR WITHOUT CONCRETE ENCASEMENT, AND IF UTILIZED COMPLIANT WITH ARTICLE 250.52(A)(2) OF NFPA 70.

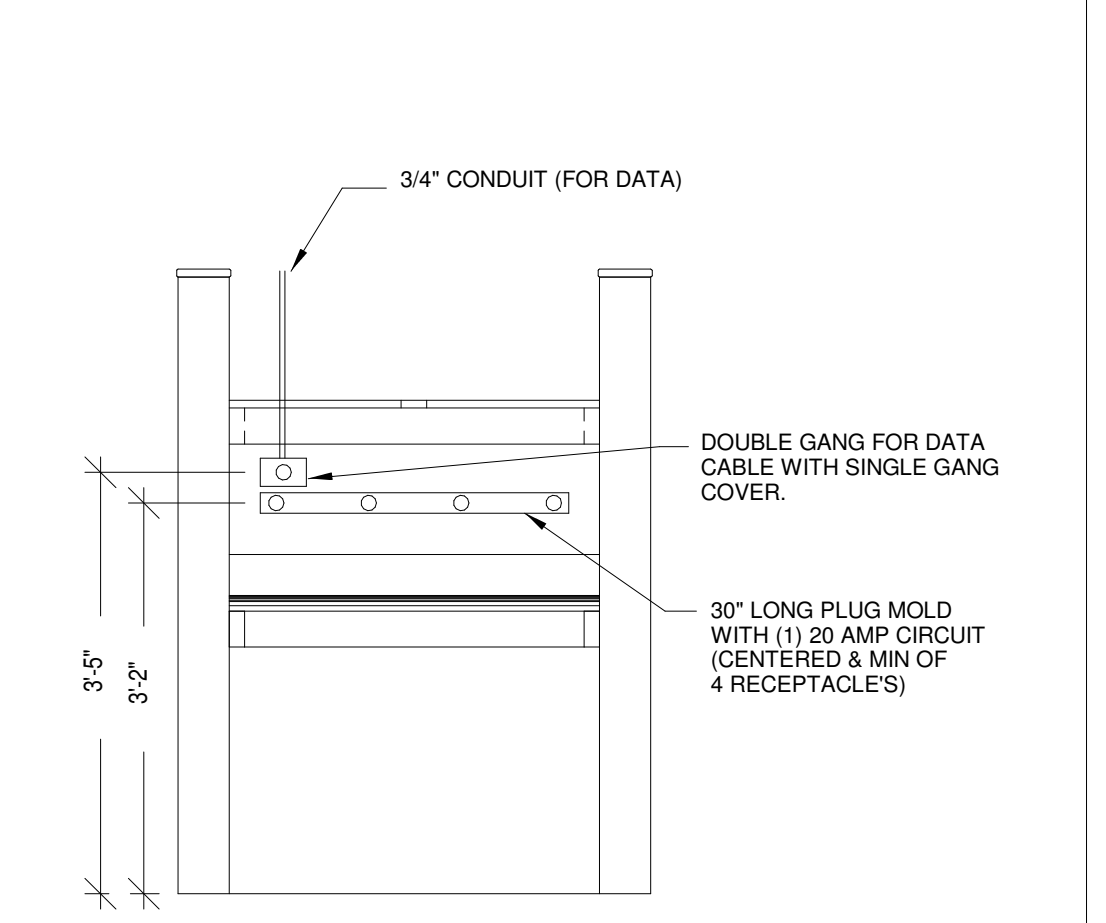
260526.00-01 - GROUND DETAIL - SERVICE

SCALE: NONE



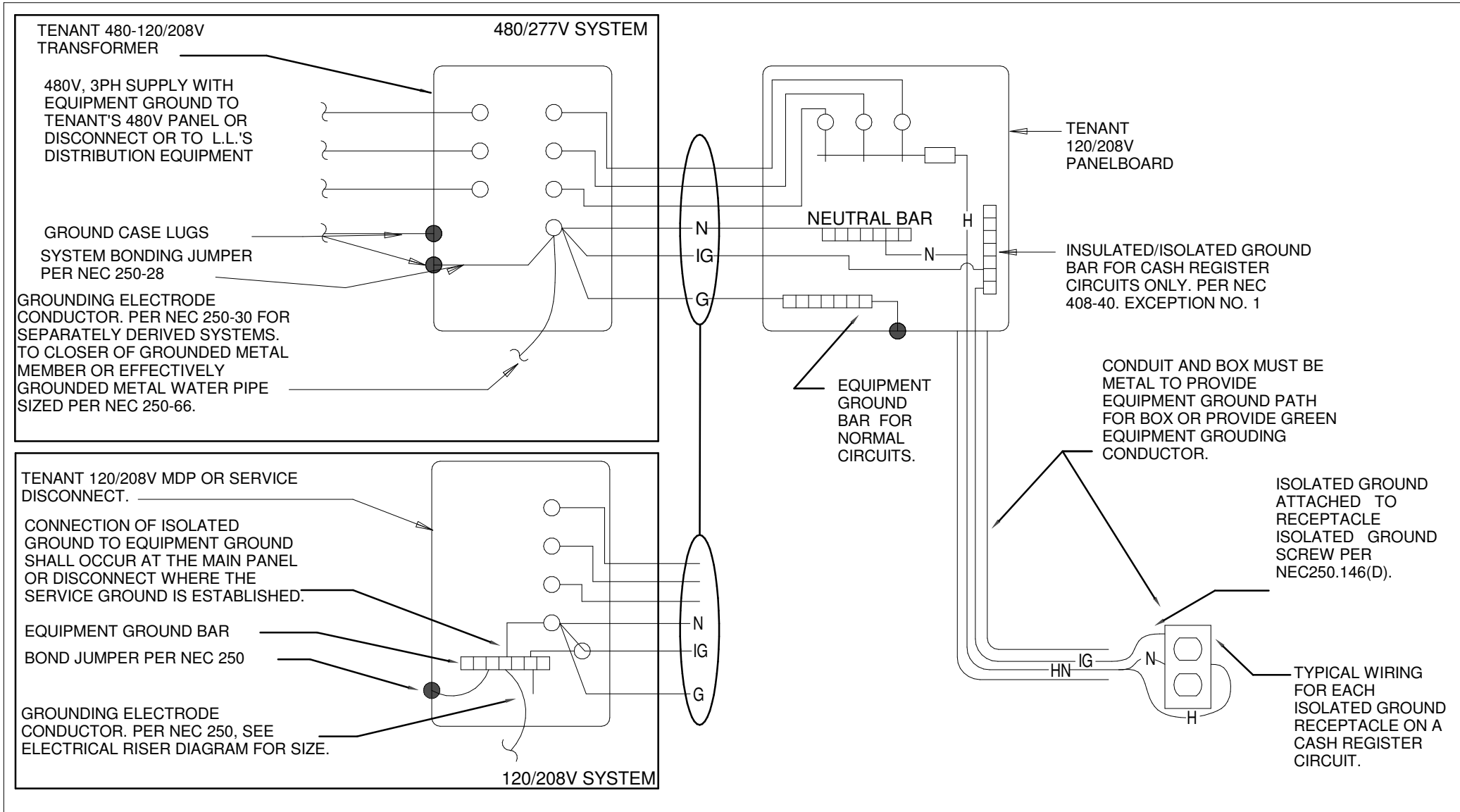
1 **MANAGER OFFICE EMS OVERRIDE SWITCH**

SCALE: NONE
SEE ENERGY MANAGEMENT SYSTEM FOR WIRING REQUIREMENTS



3 **EMPLOYEE ROOM DESK ELEVATION**

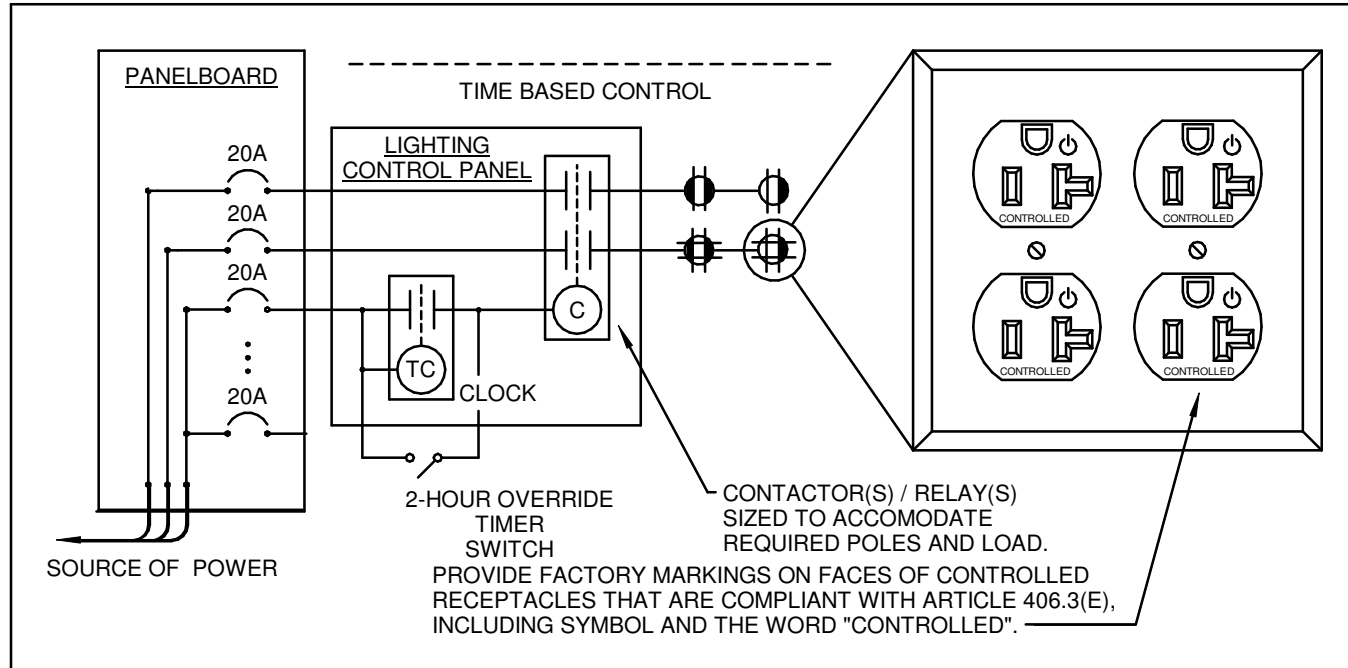
SCALE: NONE



- A. FURNISH AND INSTALL AN INSULATED, ISOLATED GROUND BAR IN PANEL. INSTALL AN INSULATED "ISOLATED" GROUND WIRE IN EACH BRANCH CIRCUIT "HOMERUN" TO PANELBOARD. CONNECT GROUND WIRE FOR CASH REGISTER AND COMPUTER CIRCUITS TO ISOLATED GROUND BAR IN PANELBOARD AND DIRECTLY TO ISOLATED GROUND LUG/SCREW ON ISOLATED GROUND RECEPTACLES.
- B. DO NOT CONNECT "ISOLATED" GROUND WIRE TO RACEWAY OR BOX. CONDUIT AND BOX SHALL BE METAL AND METAL-TO-METAL CONNECTORS SHALL BE USED (NO FLEX CONDUIT) TO ESTABLISH GROUND PATH FOR BOX AND RACEWAY.
- C. CASH REGISTER DATA SYSTEM CABLE SHALL BE FURNISHED AND INSTALLED BY OTHERS. FURNISH AND INSTALL JUNCTION BOX IN OFFICE AND 1" CONDUIT WITH PULL WIRE TO SALES AREA CEILING CAVITY.
- D. DO NOT RUN CASH REGISTER CIRCUITS WITH OTHER CIRCUITS.

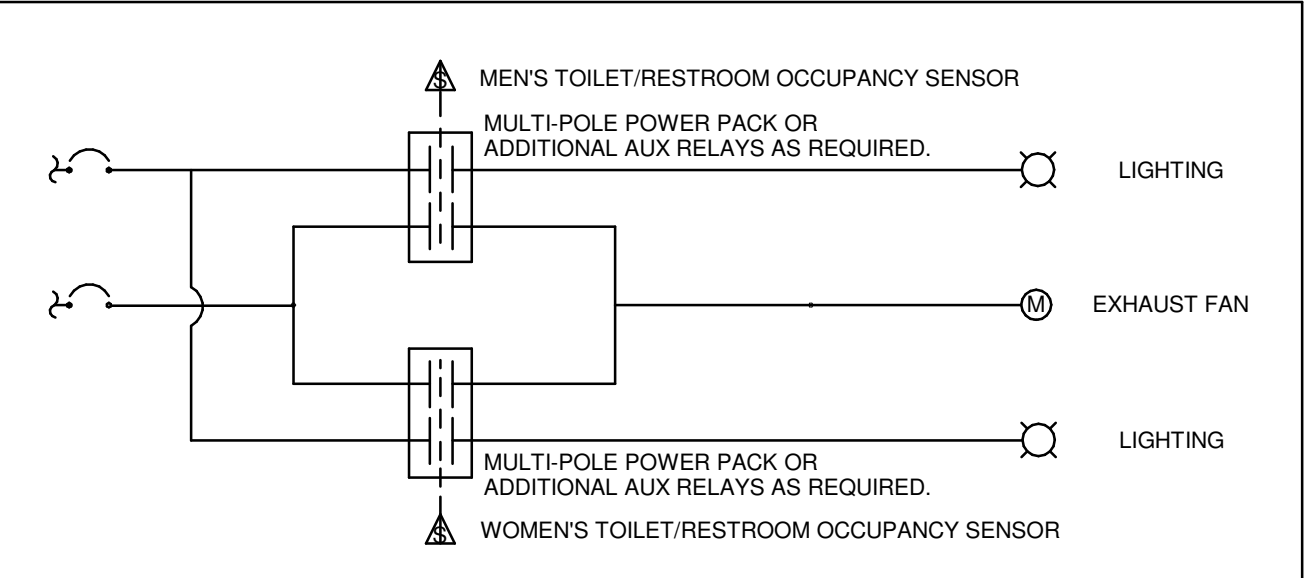
6 **CASH REGISTER GROUNDING DIAGRAM**

SCALE: NONE



262726.00-03 - SWITCHED RECEPTACLE DETAIL

SCALE: NONE

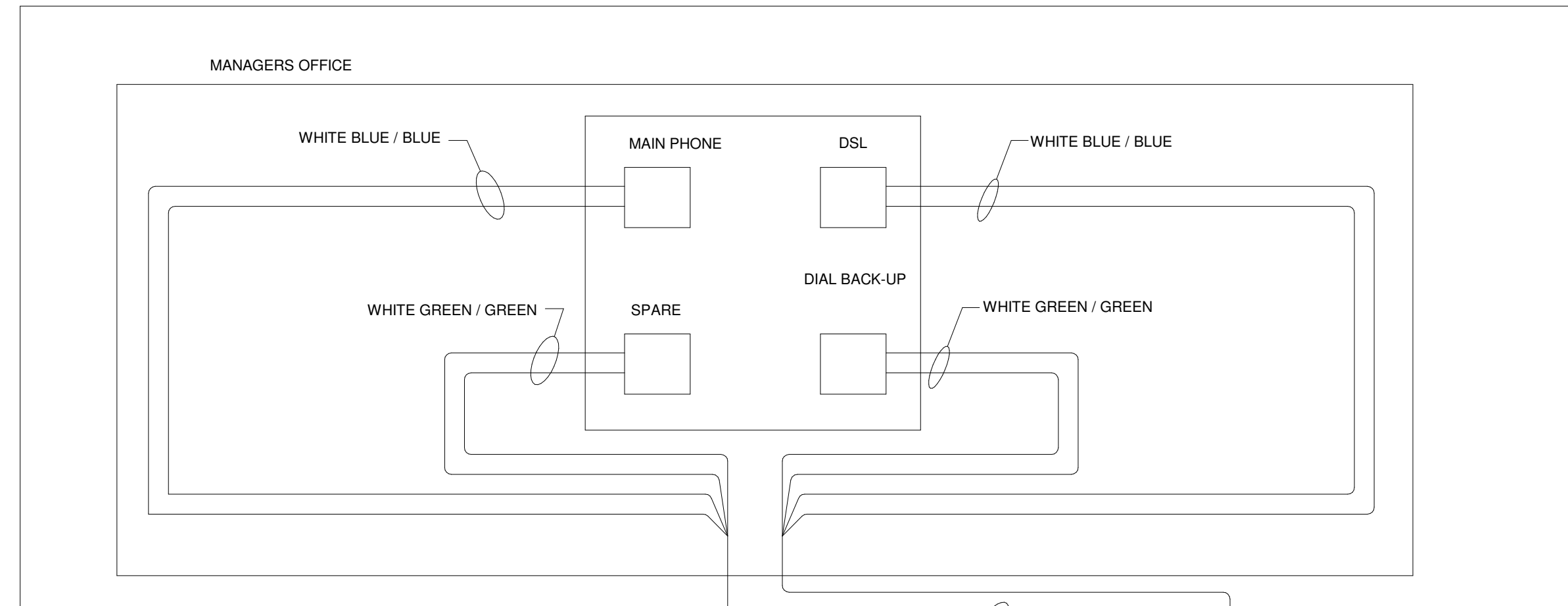


GROUP TOILETS/RESTROOMS

- GENERAL NOTES:
- A. PROVIDE LOCAL DISCONNECT SWITCH AT EACH EXHAUST FAN IS NOT FURNISHED BY FAN MANUFACTURE.
 - B. PROVIDE MANUAL STARTER FOR EACH EXHAUST FAN IN NEARBY JANITOR CLOSET OR NEAR SOURCE PANELBOARD, WITH ENGRAVED PLATE IDENTIFYING EXHAUST FAN NUMBER.

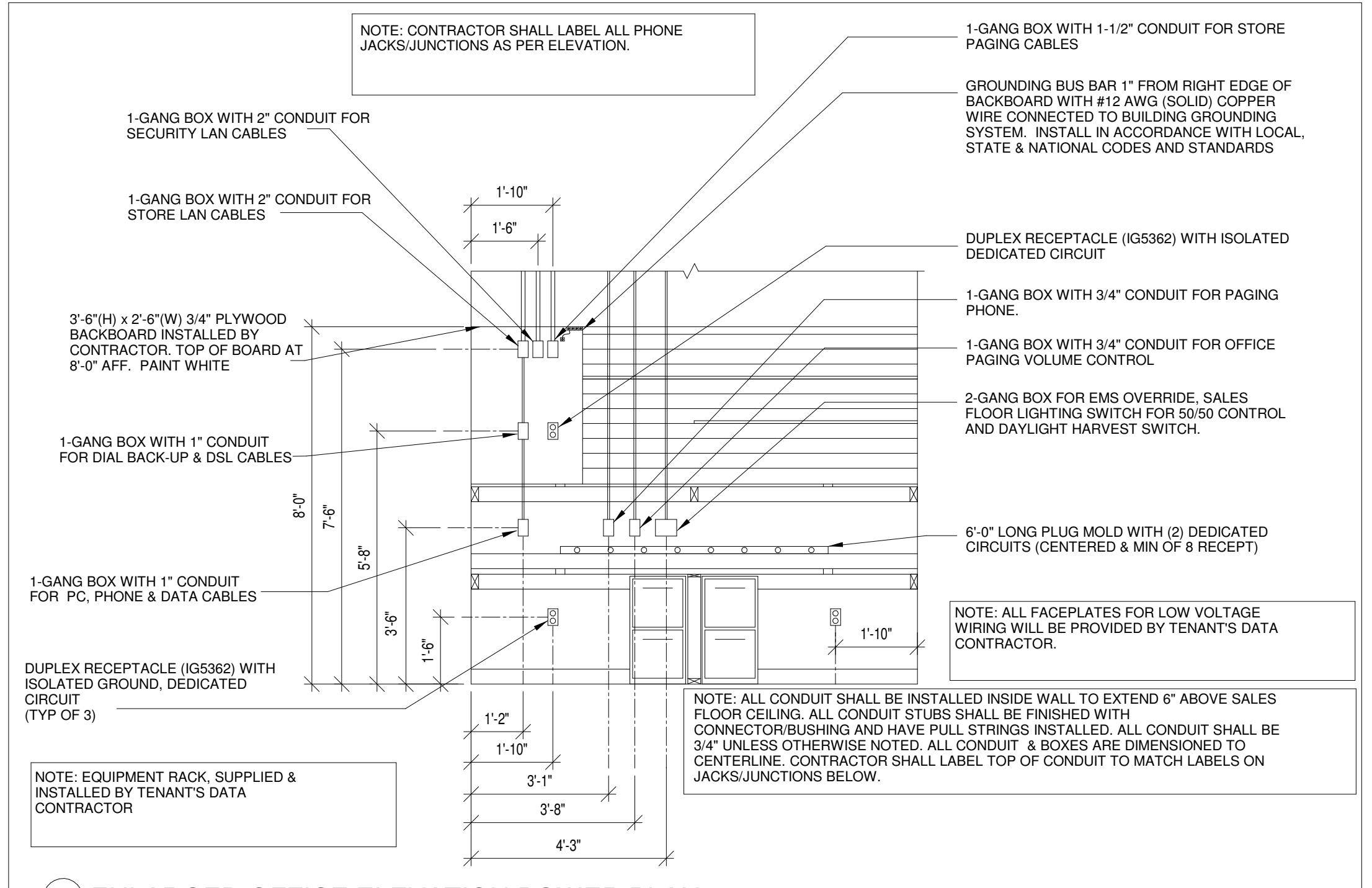
5 **TYPICAL RESTROOM EXHAUST FAN CONTROL DETAIL**

SCALE: NONE



4 **TELCO BACKBOARD**

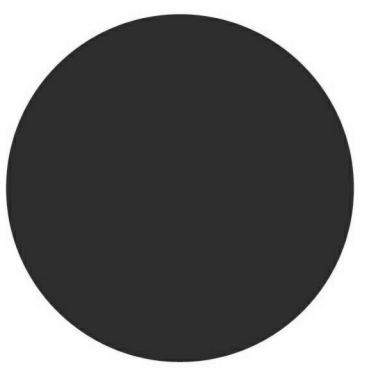
SCALE: NONE



2 **ENLARGED OFFICE ELEVATION POWER PLAN**

SCALE: NONE

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PERMIT #:

ELECTRICAL DETAILS

E-301

2" REFERENCE LINE

OWNERSHIP OF INSTRUMENTS OF SERVICE. Notes and other documents and instruments prepared by the Consultant as instruments of service shall remain the property of the Consultant. The Consultant shall retain all common law, statutory and other reserved rights, including, without limitation, the copyright thereto.

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [F17]¹	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.4.1 [F18]¹	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Interior Lighting fixture schedule for values.
C408.2.5.1 [F16]¹	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.3 [F133]¹	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.1 [EL15]¹	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.1 [EL18]¹	Occupancy sensors installed in required spaces.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.1, C405.2.2.3 [EL23]¹	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.2.1 [EL22]¹	Automatic controls to shut off all building lighting installed in all buildings.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.3 [EL16]¹	Daylight zones provided with individual controls that control the lights independent of general area lighting.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.3.1, C405.2.3.2 [EL20]¹	Primary sidelighted areas are equipped with required lighting controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.3.1, C405.2.3.3 [EL21]¹	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped with required lighting controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.4 [EL4]¹	Separate lighting control devices for specific uses installed per approved lighting plans.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.4 [EL8]¹	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.3 [EL6]¹	Exit signs do not exceed 5 watts per face.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

FUNCTIONAL TESTING NOTE

Lighting control devices and systems shall be tested to ensure the hardware and software is calibrated, programmed, and in proper working order. Installing contractor shall be responsible for any/all required installation certificates and shall provide manuals for lighting control devices to owner prior to project close-out. Installing contractor shall be responsible for contracting with appropriate parties to arrange for testing/ commissioning of the lighting control systems and shall be responsible for ensuring any/all required functional testing forms are completed and submitted to the owner and local AHJ prior to project close-out.

Project Title: DOLLAR TREE STORES Report date: 02/26/18
Data filename: G:\20000-20999\20100-20199\20151\Project Data\Energy\20151.cck Page 6 of 6

1 | High Impact (Tier 1) | 2 | Medium Impact (Tier 2) | 3 | Low Impact (Tier 3)
Project Title: DOLLAR TREE STORES Report date: 02/26/18
Data filename: G:\20000-20999\20100-20199\20151\Project Data\Energy\20151.cck Page 5 of 6

1 | High Impact (Tier 1) | 2 | Medium Impact (Tier 2) | 3 | Low Impact (Tier 3)
Project Title: DOLLAR TREE STORES Report date: 02/26/18
Data filename: G:\20000-20999\20100-20199\20151\Project Data\Energy\20151.cck Page 4 of 6

COMcheck Software Version 4.0.7.0 Inspection Checklist

Energy Code: 2015 IECC

Requirements: 100.0% were addressed directly in the COMcheck software. Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4]¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C406 [PR9]¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 | High Impact (Tier 1) | 2 | Medium Impact (Tier 2) | 3 | Low Impact (Tier 3)
Project Title: DOLLAR TREE STORES Report date: 02/26/18
Data filename: G:\20000-20999\20100-20199\20151\Project Data\Energy\20151.cck Page 3 of 6

A	B	C	D	E
Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	Lamps/ Fixture	# of Fixtures	Fixture Watt.	(C X D)
9-STOCK ROOM 1 (Common Space Types:Storage >=1000 sq.ft.)				
10-SALES AREA C 10 (Retail:Sales Area)				
F8: F8: 8' STRIP FIXTURE: Other:	2	32	44	1408
F8-EM: F8-EM: 8' EM STRIP FIXTURE: Other:	2	12	44	528
11-SALES AREA A 11 (Retail:Sales Area)				
F8: F8: 8' STRIP FIXTURE: Other:	2	24	44	1056
F8-EM: F8-EM: 8' EM STRIP FIXTURE: Other:	2	4	44	176
Total Proposed Watts = 4708				

Interior Lighting PASSES: Design 61% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.0.7.0 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title Signature Date

Project Title: DOLLAR TREE STORES Report date: 02/26/18
Data filename: G:\20000-20999\20100-20199\20151\Project Data\Energy\20151.cck Page 2 of 6

COMcheck Software Version 4.0.7.0 Interior Lighting Compliance Certificate

Project Information

Energy Code: 2015 IECC
Project Title: DOLLAR TREE STORES
Project Type: New Construction

Construction Site: 995 E BELVIDERE RD GRAYSLAKE, IL 60030
Owner/Agent:
Designer/Contractor: KLH Engineers 1538 Alexandria Pike Fort Thomas, KY 41075

Additional Efficiency Package

Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.

Allowed Interior Lighting Power

A	B	C	D
Area Category	Floor Area (ft2)	Allowed Watts / ft2	Allowed Watts (B X C)
1-EMPLOYEE AREA 9 (Common Space Types:Storage >=50 - <=1000 sq.ft.)	113	0.57	64
2-TOILET 8 (Common Space Types:Restrooms)	56	0.88	49
3-OFFICE 4 (Common Space Types:Office - Enclosed)	80	1.00	80
4-SALES AREA B 2 (Retail:Sales Area)	3000	1.43	4290
5-VESTIBULE 3 (Common Space Types:Corridor/Transition >=8 ft wide)	49	0.59	29
6-HALLWAY 5 (Common Space Types:Corridor/Transition >=8 ft wide)	113	0.59	67
7-TOILET 7 (Common Space Types:Restrooms)	71	0.88	62
8-ELECTRICAL PANELS 6 (Common Space Types:Storage <=50 sq.ft.)	21	1.12	24
9-STOCK ROOM 1 (Common Space Types:Storage >=1000 sq.ft.)	1372	0.57	782
10-SALES AREA C 10 (Retail:Sales Area)	3003	1.43	4294
11-SALES AREA A 11 (Retail:Sales Area)	1683	1.43	2407
Total Allowed Watts = 12148			

Proposed Interior Lighting Power

A	B	C	D	E
Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	Lamps/ Fixture	# of Fixtures	Fixture Watt.	(C X D)
1-EMPLOYEE AREA 9 (Common Space Types:Storage >=50 - <=1000 sq.ft.)				
2-TOILET 8 (Common Space Types:Restrooms)				
3-OFFICE 4 (Common Space Types:Office - Enclosed)				
4-SALES AREA B 2 (Retail:Sales Area)				
F8: F8: 8' STRIP FIXTURE: Other:	2	31	44	1364
F8-EM: F8-EM: 8' EM STRIP FIXTURE: Other:	2	4	44	176
5-VESTIBULE 3 (Common Space Types:Corridor/Transition >=8 ft wide)				
6-HALLWAY 5 (Common Space Types:Corridor/Transition >=8 ft wide)				
7-TOILET 7 (Common Space Types:Restrooms)				
8-ELECTRICAL PANELS 6 (Common Space Types:Storage <=50 sq.ft.)				

Project Title: DOLLAR TREE STORES Report date: 02/26/18
Data filename: G:\20000-20999\20100-20199\20151\Project Data\Energy\20151.cck Page 1 of 6

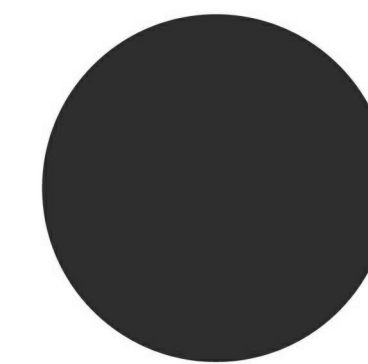


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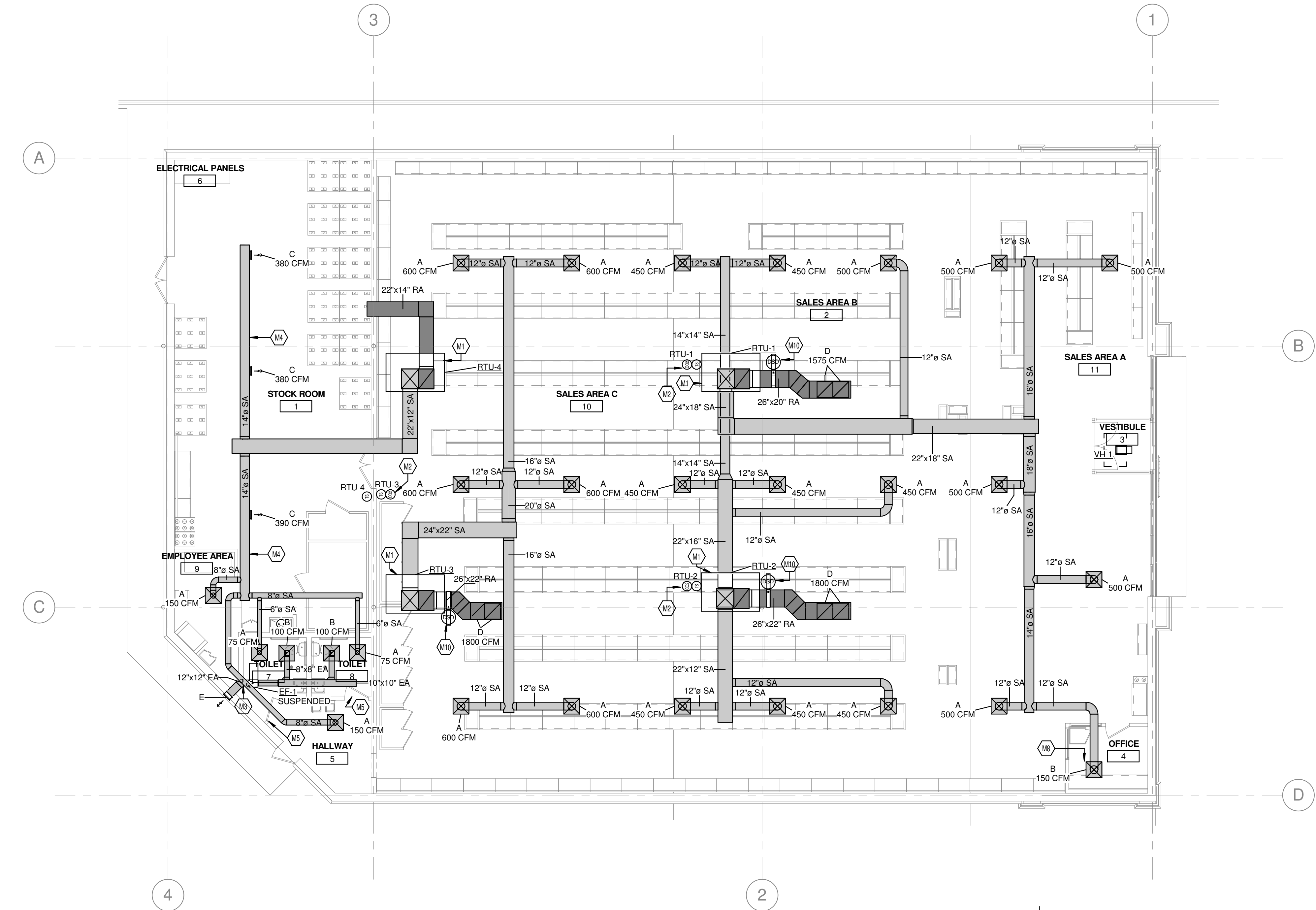
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LIGHTING COMPLIANCE

EN101

2" REFERENCE LINE



1 MECHANICAL DUCTWORK - FIRST FLOOR
1/8" = 1'-0"

KEYED NOTES

- M1 CONTRACTOR SHALL INSTALL NEW HVAC UNIT AND CONTRACTOR PROVIDED ROOF CURB AS INDICATED ON PLANS, SCHEDULE AND NOTES. PROVIDE NEW OPENING AND STRUCTURAL SUPPORT AS SHOWN ON STRUCTURAL DRAWINGS. PROVIDE FULL SIZE DUCT DROPS TO BOTTOM CHORD OF STRUCTURE. CONTRACTOR MAY CONTACT TENANT VENDOR FOR PRICING ON UNITS.
- M2 CONTRACTOR SHALL PROVIDE CO2 SENSOR 7'-0" A.F.F. THESE SENSOR SHALL CONTROL RTU-1,2,3.
- M3 EXTEND EXHAUST DUCT THRU WALL AND TERMINATE WITH WALL CAP 10'-0" MIN. ABOVE WALKWAY. PAINT WALL CAP TO MATCH ADJACENT SURFACES.
- M4 CONTRACTOR SHALL LOCATE BOTTOM OF STOCK ROOM DUCTWORK ABOVE LIGHTING. ANY DEVIATION TO THIS DIMENSION DUE TO INTERFERENCE WITH ANY BUILDING OBSTRUCTIONS SUCH AS STRUCTURE, OVERHEAD DOORS, ETC. SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO FABRICATING THE DUCTWORK.
- M5 PROVIDE 1" AIRSPACE BETWEEN BOTTOM OF DOOR AND FINISHED FLOOR FOR AIRFLOW.
- M8 ADJUST DIFFUSER FOR FULL VERTICAL DISCHARGE INTO OFFICE BELOW.
- M10 FURNISH AND INSTALL SMOKE DUCT DETECTOR (SYSTEM SENSOR #04120) IN RETURN AIR DROP FROM UNIT. WIRE SMOKE DUCT DETECTOR TO BUILDING FIRE ALARM CONTROL PANEL OR FURNISH AND INSTALL A REMOTE AUDIBLE/VISUAL ALARM DEVICE WITH A REMOTE TEST SWITCH (SYSTEM SENSOR #RTS2-AOS) LOCATED IN AN APPROVED LOCATION. FIELD VERIFY EXACT REQUIREMENTS. CONTRACTOR SHALL TEST SYSTEM TO INSURE PROPER FUNCTION PRIOR TO TENANT OCCUPANCY SPACE.

GENERAL NOTES

- A. PROVIDE PROPER CONDENSATE TRAP AND TERMINATE AS REQUIRED BY LOCAL CODE.
- B. ANY PENETRATION THROUGH THE ROOF SHALL BE COORDINATED WITH THE LANDLORD'S FIELD REPRESENTATIVE AND SHALL BE DONE BY A LANDLORD APPROVED ROOFING CONTRACTOR IN ORDER TO MAINTAIN THE ROOFING WARRANTY. ALL VENTS SHALL EXTEND A MINIMUM OF 12 INCHES ABOVE ROOF AND SHALL BE A MINIMUM OF 10 FEET FROM ANY OUTSIDE AIR INTAKE.
- C. ALL DUCT SIZES SHOWN ARE CLEAR INSIDE AIR FLOW DIMENSIONS. DO NOT PROVIDE AIR EXTRACTORS OR SPLITTER DAMPERS WHICH PROTRUDE INTO RECTANGULAR TRUNK DUCTS (WHERE USED). PROVIDE ROUND SPIR-IN FITTINGS FOR ROUND BRANCH DUCTS. ROUND BRANCH DUCTS WHERE INDICATED ARE SAME SIZE AS ATTACHED DIFFUSER NECK SIZE.
- D. DO NOT SUSPEND ANY ITEMS FROM DECK OR SLAB ABOVE. ALL ITEMS SHALL SUSPEND FROM STRUCTURE UNLESS OTHERWISE NOTED. PROVIDE MISCELLANEOUS STEEL AS REQUIRED.
- E. WHERE CEILING SPACE IS NOT SUFFICIENT TO PERMIT TOP CONNECTION TO CEILING DIFFUSER WITH PROPER BEND RADIUS FOR FLEXIBLE DUCT, CONTRACTOR SHALL FABRICATE AND/OR PROVIDE AN ADAPTER BOX FOR DIFFUSER TO PERMIT SIDE CONNECTION OF FLEXIBLE DUCT.
- F. CONTRACTOR SHALL COORDINATE AND SCHEDULE ALL WORK WITH LANDLORD'S FIELD REPRESENTATIVE.
- G. PROVIDE SUPPORT FOR PIPING ON ROOF PER LANDLORD'S ROOFING CONTRACTORS RECOMMENDATIONS.
- H. ALL CONCEALED SUPPLY AND RETURN DUCTWORK SHALL BE INSULATED TO CODE MINIMUM VALUE.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
PLAN-VIEW LINE TYPES	
	WORK SHOWN FADED INDICATES EXISTING WORK TO REMAIN OR NEW WORK BY OTHERS AS APPLICABLE
	WORK SHOWN BOLD-CONTINUOUS INDICATES NEW WORK
MECHANICAL STATS & SENSORS	
	TEMPERATURE SENSOR
	LOW VOLTAGE THERMOSTAT
	CARBON DIOXIDE SENSOR
MECHANICAL DUCTWORK ACCESSORIES	
	DUCT MOUNTED SMOKE DETECTOR (HARD WIRE INTERLOCK TO FAN MOTOR BY E.C.) FURNISHED BY E.C., INSTALLED BY M.C.
MECHANICAL AIR DEVICES	
	SUPPLY REGISTER
	RETURN REGISTER
	EXHAUST REGISTER
	CEILING DIFFUSER
MECHANICAL DUCTWORK	
	SUPPLY DUCT WITH ELBOW TURNED UP
	SUPPLY DUCT WITH ELBOW TURNED DOWN
	RETURN DUCT WITH ELBOW TURNED UP
	RETURN DUCT WITH ELBOW TURNED DOWN
	EXHAUST DUCT WITH ELBOW TURNED UP
	EXHAUST DUCT WITH ELBOW TURNED DOWN
	SUPPLY DUCT
	RETURN DUCT
	EXHAUST DUCT
	OUTSIDE AIR DUCT
	BRANCH TAKEOFF
	REDUCER, CONCENTRIC

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MECHANICAL
DUCTWORK - FIRST
FLOOR

M-100

2" REFERENCE LINE

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HVAC ELECTRICAL COORDINATION SCHEDULE

ABBREVIATIONS		CONTRACTOR TYPE		MOTOR CONTROL TYPE		CONTROL TYPE	
DC	LOCAL DISCONNECT	EC	ELECTRICAL CONTRACTOR	CS	COMBINATION STARTER	TC	TIMECLOCK
MC	MOTOR CONTROL (POWER)	EX	EXISTING	MCC	MOTOR CONTROL STARTER	CPT	CONTROL POWER TRANSFORMER
SD	DUCT SMOKE DETECTOR	FC	FIRE PROTECTION CONTRACTOR	MG	MAGNETIC STARTER OR CONTACT	BAS	BUILDING AUTOMATION SYSTEM
CN	CONTROLS	GC	GENERAL CONTRACTOR	MS	MANUAL STARTER	LV	LOW VOLTAGE CONTROLS
TS	TOGGLE SWITCH	HC	HVAC CONTRACTOR	VFD	VARIABLE FREQUENCY DRIVE	LINE	LINE VOLTAGE CONTROLS
C/B	H.A.C.R. CIRCUIT BREAKER AT SOURCE PANELBOARD	MFR	MANUFACTURER	MSR	MANUAL STARTER W/ CONTROL RELAY	RLINE	REVERSE ACTING LINE VOLTAGE THERMOSTAT
FUSE	FUSE AT LOCAL DISCONNECT (VERIFY FIELD RATING)	PC	PLUMBING CONTRACTOR	OV	OVERCURRENT PROTECTION	MAN	MANUAL
FLA	OPERATING FULL LOAD AMPS	OR	OWNER OR OTHERS			FA	FIRE ALARM
MCA	MINIMUM CIRCUIT AMPACITY					CO	CARBON MONOXIDE SENSOR
CP	CORD AND PLUG CONNECTION					INT	INTEGRAL TO EQUIPMENT

EQUIPMENT MARK	DESCRIPTION	VOLTS (V)	PHASE	EMERGENCY	BHP (HP)	HP (HP)	HTG (kW)	WATTS	FLA (A)	MCA (A)	OCF (A)	DC TYPE	DC FURN	DC INST	DC WIRE	MC TYPE	MC FURN	MC INST	MC WIRE	CN TYPE	CN FURN	CN INST	CN WIRE	SD TYPE
EF-1	INLINE CENTRIFUGAL FAN	120	1					203				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC		
RTU-1	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						50.3	60		EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	DUCT SMOKE	
RTU-2	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						58.9	70		EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	DUCT SMOKE	
RTU-3	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						58.9	70		EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR	DUCT SMOKE	
RTU-4	PACKAGED OUTDOOR ROOFTOP UNIT	208	3						23.7	30		EC	EC	EC	MG	MFR	MFR	MFR	BAS	OR	OR	OR		
VH-1	WALL AND CEILING HEATER	208	1				3		14.4			EC	EC	EC	---	---	---	---	INT	MFR	MFR	MFR		

HVAC LOAD SCHEDULE

THE HEATING AND COOLING LOAD CALCULATIONS ARE BASED ON THE CLTD/CLF (COOLING LOAD TEMPERATURE DIFFERENCE/COOLING LOAD FACTOR) METHOD. ASSUMPTIONS AND EXECUTION OF THESE METHODS ARE PER ASHRAE 183-2007...

HVAC LOADS		COOLING LOAD BREAKDOWN												HEATING LOAD BREAKDOWN												
EQUIPMENT MARK	DESCRIPTION	CROOF	CWALL	CPART	CGLASS	CSOLAR	CLIGHTS	CEQUIP	CPSNS	CSSNS	CFAN	COAS	CTSNS	CPLAT	COAL	CTLAT	CTOT	HROOF	HWALL	HPART	HGLASS	HSLAB	HSPACE	HOA	HTOT	HCU
RTU-1		6.4	4	0	3.2	5.2	18.5	12.9	7.5	58.1	2.1	10.7	76	6.3	13.9	20.2	96.2	16	16.3	0	18.7	6	57.2	48.4	105.6	
RTU-2		10.6	2.5	0	0	30.7	11.8	10.5	86	2.4	16.4	90.8	8.8	21.1	29.9	120.7	26.5	10.2	0	0	6.4	43.2	73.8	117		
RTU-3		10.6	2.5	0	0	30.7	11.6	10	85.5	2.4	16.4	91	8.4	21.1	29.5	120.5	26.5	10.2	0	0	6.4	43.2	73.8	117		
RTU-4		6.1	4	0	0	17.8	0	1.7	29.7	1	4.8	37.9	1.4	6.2	7.7	45.6	15.4	16.2	0	0	7.6	39.2	21.8	61.1		

HVAC ROOFTOP UNITS SCHEDULE

EQUIPMENT MARK	DESCRIPTION	LOCATION	STATUS	WEIGHT (lbs)	MANUFACTURE R	MODEL	MIN EER	PHASE	CFM (cfm)	ESP (in WC)	FAN RPM (rpm)	OACFM (cfm)	CLG MBH (mbh)	CLG SENS (mbh)	HTG MBH (mbh)	LAT HTG (Deg F)	GAS HTG IN (mbh)	GAS HTG OUT (mbh)	MIN GAS PRESSURE (in WC)	MAX GAS PRESSURE (in WC)	HTG KW (kW)	FLA (amps)	MCA (amps)	OCF (amps)	ACCESSORIES
RTU-1	PACKAGED OUTDOOR ROOFTOP UNIT	ROOF	NEW	1300	YORK	ZJ102	12	3	3150	0.5	0	567	96	76	111	92	180	144	4	14		50.3	60		2,3,4,5,7,10,20,22
RTU-2	PACKAGED OUTDOOR ROOFTOP UNIT	ROOF	NEW	1300	YORK	ZJ120	12.2	3	3600	0.5	0	864	121	91	121	86	240	182	4	14		58.9	70		2,3,4,5,7,10,20,22
RTU-3	PACKAGED OUTDOOR ROOFTOP UNIT	ROOF	NEW	1300	YORK	ZJ120	12.2	3	3600	0.5	0	864	121	91	121	86	240	182	4	14		58.9	70		2,3,4,5,7,10,20,22
RTU-4	PACKAGED OUTDOOR ROOFTOP UNIT	ROOF	NEW	1100	YORK	ZJ049	12.2	3	1600	0.5	0	256	46	38	64	99	120	97	4	14		23.7	30		2,3,4,5,7,10,20,22

HVAC ACCESSORIES

ACCESSORIES:

- | | | | | | |
|-----------------|------------------------|----------------------|------------------------|------------------|-----------------------------|
| 1. MOTOR DAMPER | 5. INTAKE HOOD | 9. ACCESS DOOR | 13. FACE/BYPASS DAMPER | 17. DUCT FLANGES | 21. ECON POWERED EXHAUST |
| 2. ECONOMIZER | 6. VIBRATION ISOLATION | 10. FLEX CONNECTIONS | 14. CONDENSATE PUMP | 18. BASE RAIL | 22. ECON BAROMETRIC RELIEF |
| 3. ROOF CURB | 7. FLAT FILTER | 11. MOUNTING COLLAR | 15. MOTOR GUARD | 19. HUMIDIFIER | 23. HOT GAS REHEAT COIL |
| 4. HAIL GUARDS | 8. FILTER/MIXING BOX | 12. HOT GAS BYPASS | 16. GREASE TRAP | 20. CO2 SENSORS | 24. SHAFT GROUNDING BRUSHES |

HVAC UNIT HEATERS SCHEDULE

EQUIPMENT MARK	DESCRIPTION	LOCATION	STATUS	WEIGHT (lbs)	MANUFACTURE R	MODEL	VOLTS	PHASE	HTG MBH (mbh)	HW EWT (Deg F)	HW LWT (Deg F)	HTG GPM (gpm)	MIN HTG AFUE	GAS HTG IN (mbh)	GAS HTG OUT (mbh)	HTG KW (kW)	MIN GAS PRESSURE (in WC)	MAX GAS PRESSURE (in WC)	FLA (amps)	MCA (amps)	OCF (amps)
VH-1	WALL AND CEILING HEATER	VESTIBULE	NEW		MARKEL	3480	208	1	0	0	0	0		0	0	3			14.4		

HVAC VENTILATION SCHEDULE

NUMBER	NAME	AREA	LEVEL	CEILING HEIGHT	AIR CHGS	OA CHGS	PEOPLE RED	OA PER PERSON	OA PER SQ FT.	REQ SUP	ACT SUP	REQ OA	ACT OA	ACT RET	ACT EXH	CRIT OA	PRESSURE	PCT OPERABLE	NATURAL VENTILATION
1	STOCK ROOM	1372 SF	FIRST FLOOR	8' - 0"	0	0	4		0.12	1131	1150	181	184	1150	0	0.1791	E	0	
2	SALES AREA B	3000 SF	FIRST FLOOR	12' - 0"	0	0	43	7.5	0.12	3550	3600	852	864	3600	0	0.2366	E	0	
3	VESTIBULE	49 SF	FIRST FLOOR	10' - 3 15/32"	0	0	0		0.06	0	0	0	0	0	0				
4	OFFICE	80 SF	FIRST FLOOR	12' - 0"	0	0	5		0.06	144	150	26	27	150	0	0.04	E	0	
5	HALLWAY	113 SF	FIRST FLOOR	8' - 0"	0	0	0		0.06	150	150	24	24	150	0	0.06	E	0	
6	ELECTRICAL PANELS	21 SF	FIRST FLOOR	8' - 0"	0	0	0			0	0	0	0	0	0				
7	TOILET	71 SF	FIRST FLOOR	8' - 0 1/8"	0	0	0			75	75	12	12	0	80	0	N	0	
8	TOILET	56 SF	FIRST FLOOR	8' - 0"	0	0	0			75	75	12	12	0	80	0	N	0	
9	EMPLOYEE AREA	113 SF	FIRST FLOOR	8' - 0 1/16"	0	0	3	5	0.06	150	150	24	24	150	0	0.1866	E	0	
10	SALES AREA C	3003 SF	FIRST FLOOR	12' - 0"	0	0	41	7.5	0.12	3479	3600	855	864	3600	0	0.2319	E	0	
11	SALES AREA A	1683 SF	FIRST FLOOR	12' - 0"	0	0	31	7.5	0.12	2939	3000	529	540	3000	0	0.1806	E	0	

HVAC FANS SCHEDULE

EQUIPMENT MARK	DESCRIPTION	LOCATION	STATUS	WEIGHT (lbs)	MANUFACTURE R	MODEL	VOLTS	PHASE	WATTS (Watts)	CFM (cfm)	ESP (in WC)	FAN RPM (rpm)	BHP (hp)	HP (hp)	FLA (amps)	MCA (amps)	OCF (amps)
EF-1	INLINE CENTRIFUGAL FAN	RESTROOM	NEW	50	COOK	GN184	120	1	203	200	0.25	0					

HVAC DIFFUSERS AND REGISTERS SCHEDULE

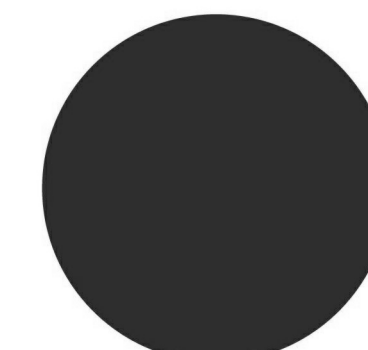
TAG	MANUFACTURER	MODEL	FACE	MOUNTING	MATERIAL	FINISH	DAMPER TYPE	BORDER STYLE
A	TITUS	TMS	24"x24"	CEILING	STEEL	STANDARD WHITE	BUTTERFLY	LAY IN MOUNTING
B	TITUS	TMSA	24"x24"	CEILING	STEEL	STANDARD WHITE	BUTTERFLY	LAY-IN PANEL, PROVIDE FRAME FOR CEILING MOUNTING
C	TITUS	S300FL	14"x6"	DUCT	STEEL	STANDARD WHITE	OPPOSED BLADE	SURFACE MOUNT
D	TITUS	50F	24"x24"	CEILING	STEEL	STANDARD WHITE	PARALLEL BLADE	LAY IN MOUNTING
E	TITUS	350RL	24"x24"	CEILING	STEEL	STANDARD WHITE	OPPOSED BLADE	SURFACE MOUNT



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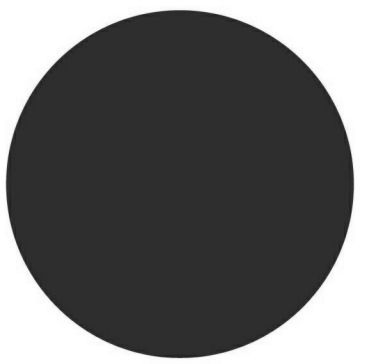
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MECHANICAL - SCHEDULES

M-201

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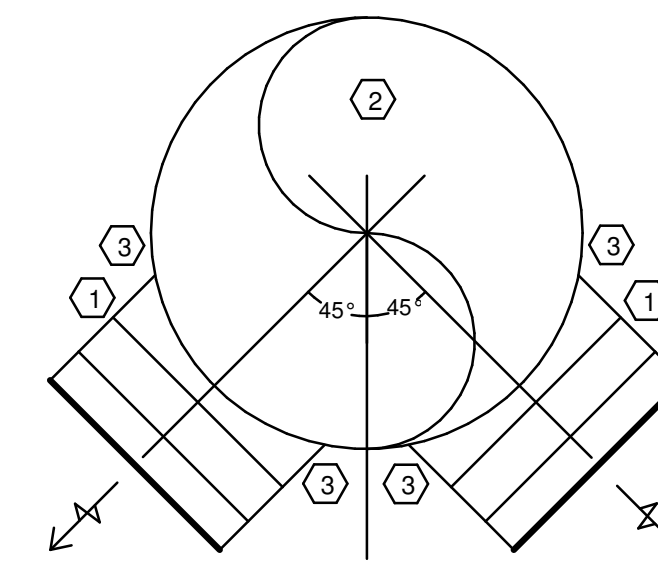
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MECHANICAL -
DETAILS

M-301

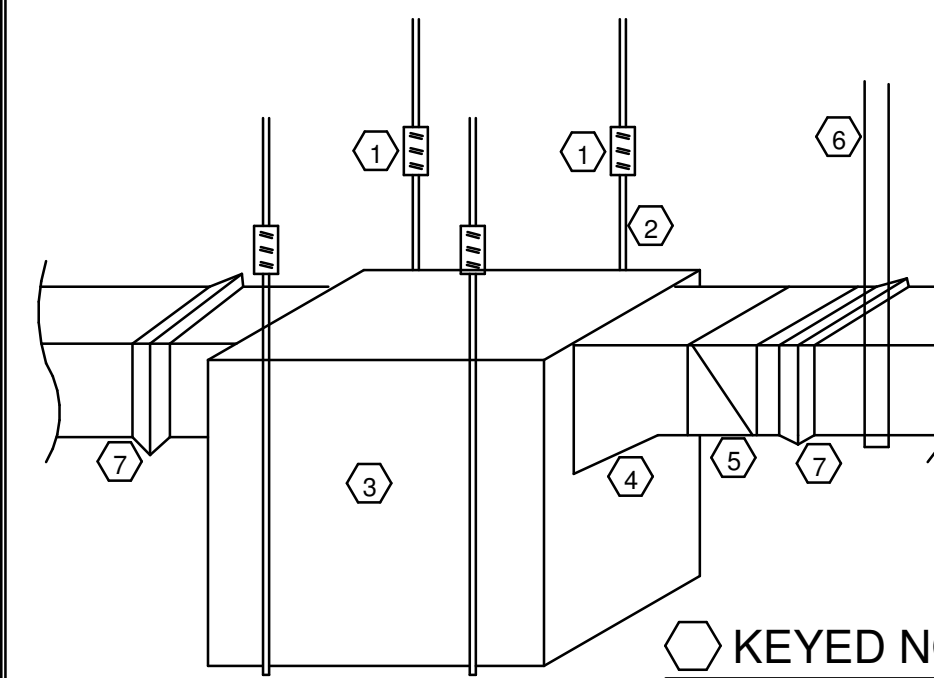
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- KEYED NOTES:**
- REGISTER WITH OPPOSED BLADE DAMPER (TO BE SIZED AS SHOWN ON PLAN)
 - SUPPLY DUCT
 - SEAL JOINTS BETWEEN COLLAR AND MAIN DUCT

233713.00-02 - ANGLED REGISTER INSTALLATION

SCALE: NONE

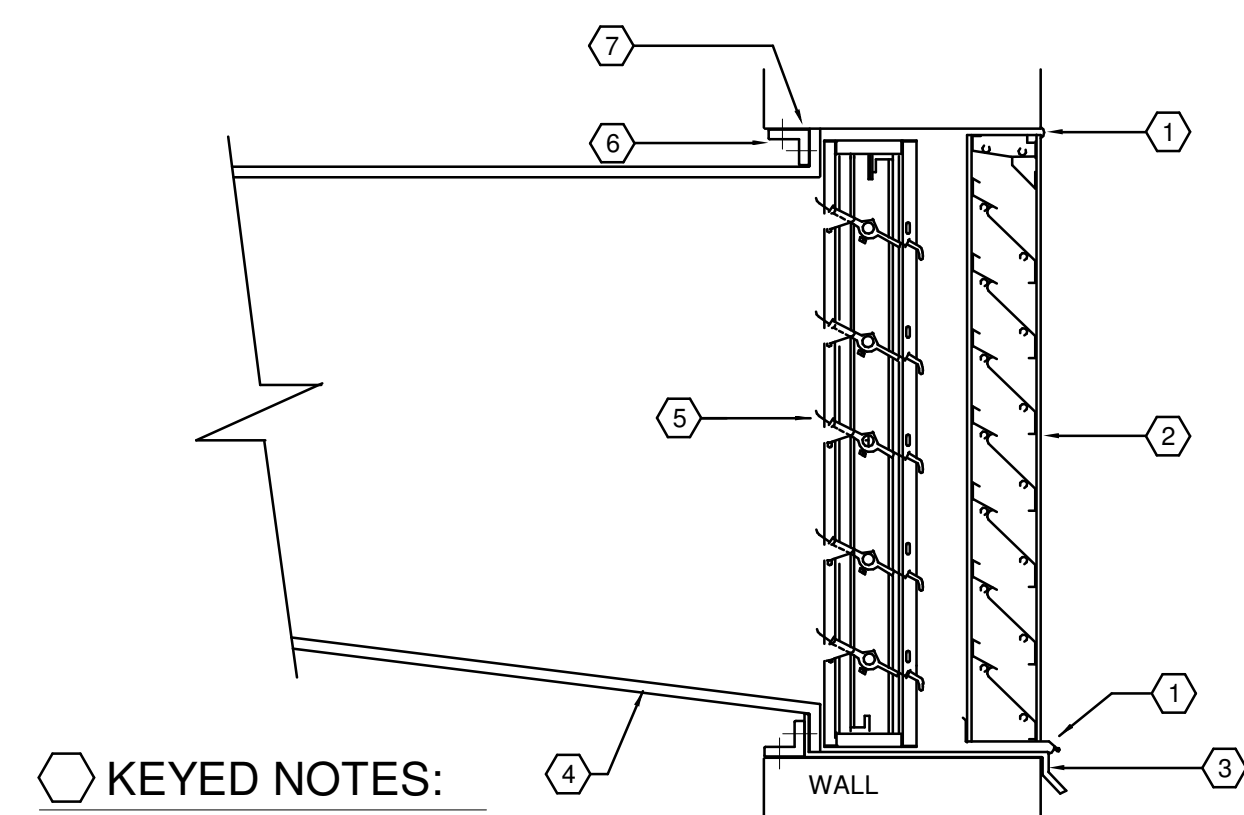


KEYED NOTES:

- SPRING ISOLATORS
- GALVANIZED ALL THREAD ROD SUSPEND FROM BUILDING STRUCTURE AND FROM FAN MOUNTING FLANGES. USE CHANNELS UNDER FAN AS AN ALTERNATIVE SUPPORT
- INLINE FAN
- OUTLET FLANGE
- BACKDRAFT OR MOTOR OPERATED DAMPER (SEE SCHEDULE SPECS)
- METAL HANGER, SECURE TO STRUCTURE AND TO DUCTWORK
- FLEXIBLE CONNECTION

233423.00-03 - CABINET INLINE FAN

SCALE: NONE



KEYED NOTES:

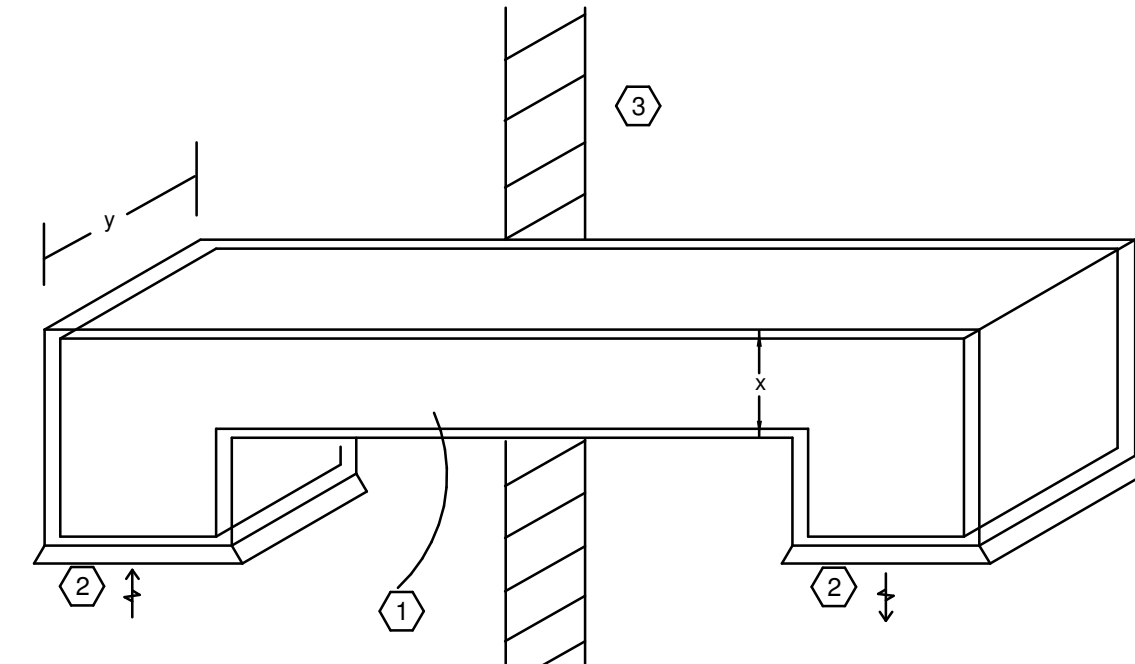
- CAULKING
- EXTERIOR WALL MOUNTED LOUVER
- EXTENDED SILL
- PITCH INSULATED DUCT 10 DEGREES TOWARD LOUVER AND SEAL WATERTIGHT
- MOTOR OPER. DAMPER
- CLIP ANGLE
- ANCHOR TO WALL AT 12" O/C

GENERAL NOTES:

WALL LOUVERS ARE FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR. REFER TO ARCHITECTURAL DRAWINGS FOR SIZES AND LOCATIONS, UNLESS SPECIFIED IN SECTION 23 37 13.00.

233713.00-07 - EXHAUST LOUVER DETAIL

SCALE: NONE



GENERAL NOTES:

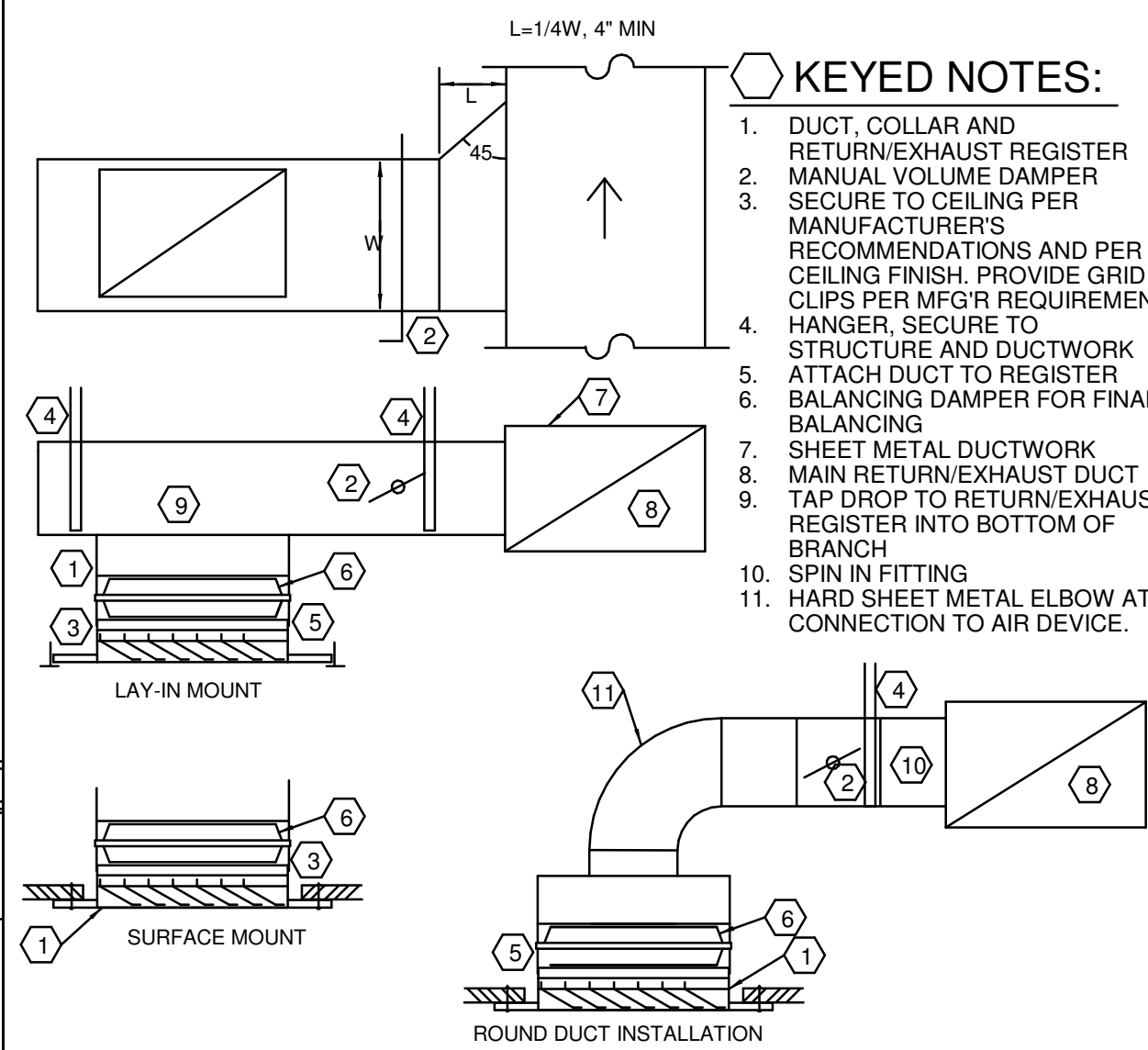
- SEE NEW WORK PLAN FOR DUCT SIZE
- x x y DIMENSIONS SHALL BE DETERMINED FROM FLOOR PLANS

KEYED NOTES:

- 3/4" ACOUSTIC LINING, SEAL AROUND ALL WALL PENETRATIONS
- SEE NEW WORK PLAN FOR REGISTER
- INTERIOR WALL/PARTITION

233713.00-19 - TRANSFER GRILLE

SCALE: NONE

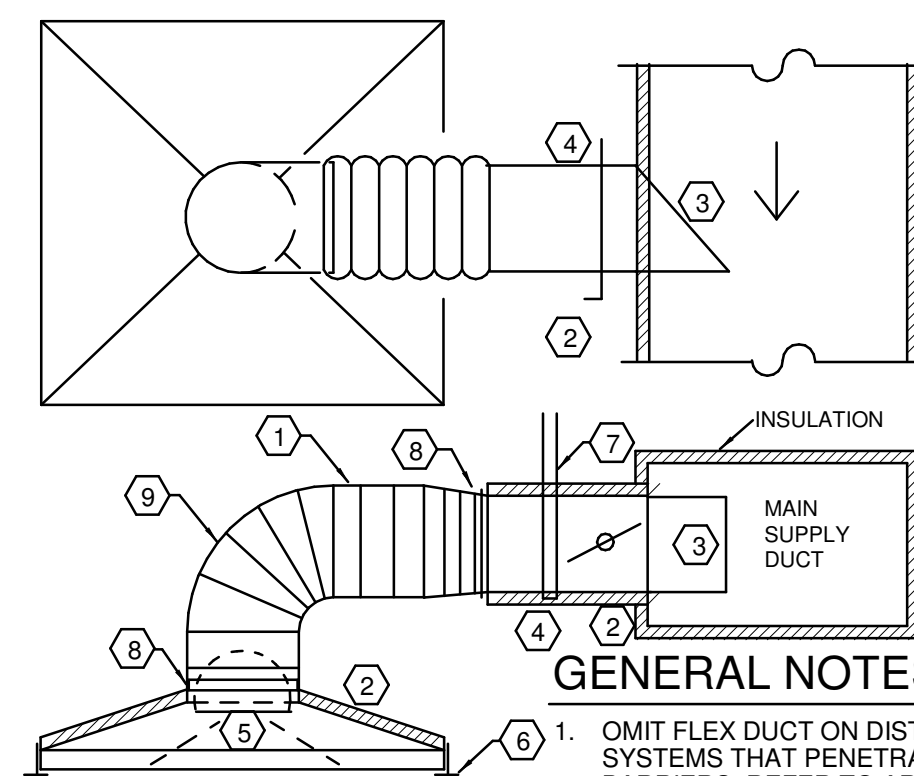


KEYED NOTES:

- DUCT, COLLAR AND RETURN/EXHAUST REGISTER
- MANUAL VOLUME DAMPER
- SECURE TO CEILING PER MANUFACTURER'S RECOMMENDATIONS AND PER CEILING FINISH. PROVIDE GRID CLIPS PER MFG'R REQUIREMENTS
- HANGER, SECURE TO STRUCTURE AND DUCTWORK
- ATTACH DUCT TO REGISTER
- BALANCING DAMPER FOR FINAL BALANCING
- SHEET METAL DUCTWORK
- MAIN RETURN/EXHAUST DUCT
- TAP DROP TO RETURN/EXHAUST REGISTER INTO BOTTOM OF BRANCH
- SPIN IN FITTING
- HARD SHEET METAL ELBOW AT CONNECTION TO AIR DEVICE.

233713.00-21 - RETURN/EXHAUST REGISTER INSTALLATION

SCALE: NONE



GENERAL NOTES:

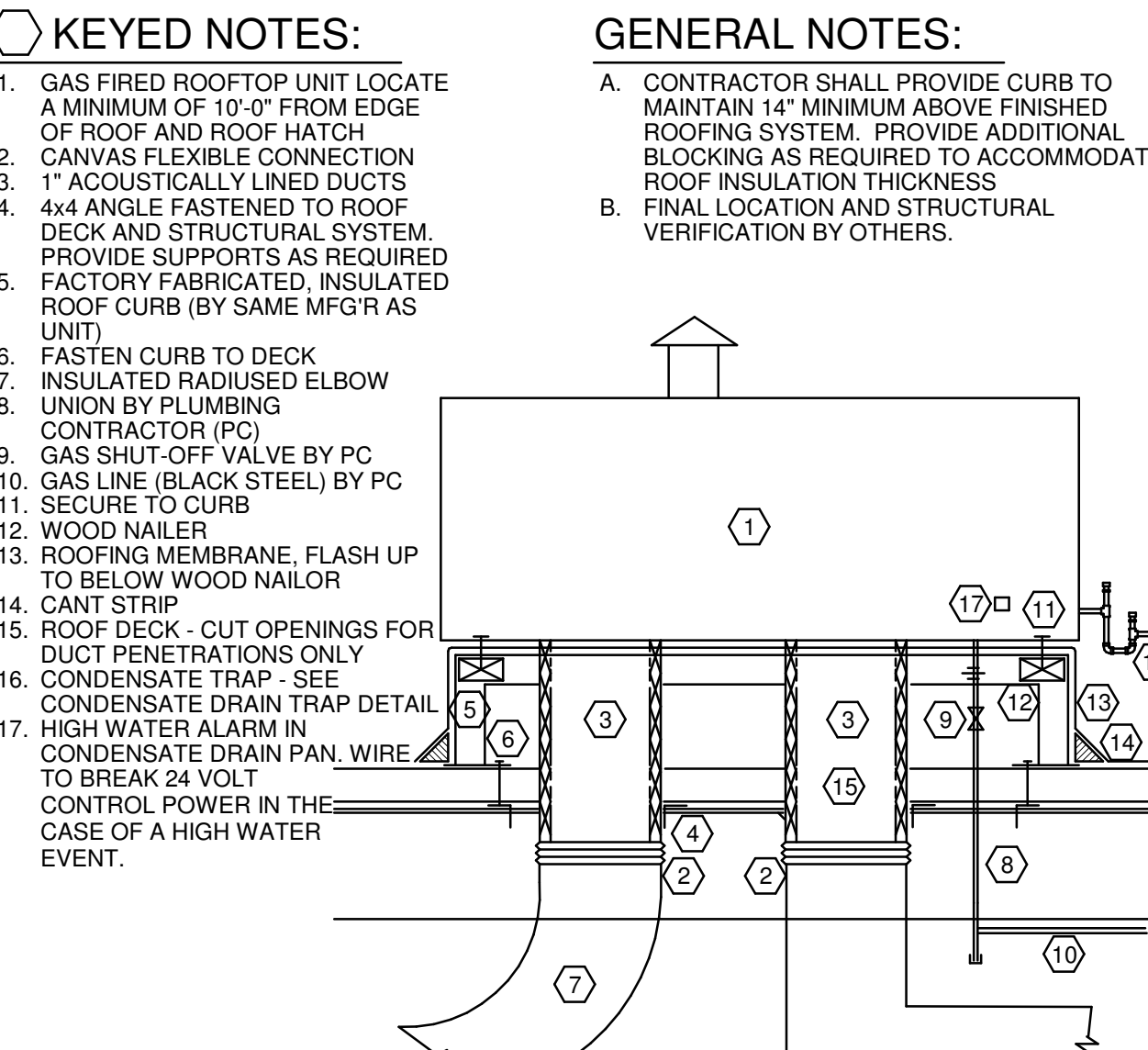
- OMIT FLEX DUCT ON DISTRIBUTION SYSTEMS THAT PENETRATE 1-HR FIRE BARRIERS. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF FIRE BARRIERS.

KEYED NOTES:

- MAXIMUM LENGTH OF INSUL. FLEX DUCT EQUALS 5 FEET. FLEX NOT PERMITTED IN INACCESSIBLE CEILING
- INSULATED DUCT, COLLAR AND DIFFUSER BY HVAC CONTRACTOR
- SCOOP
- SPIN IN FITTING WITH MANUAL VOLUME DAMPER
- INTERNAL BUTTERFLY DAMPER FOR DRYWALL APPLICATIONS ONLY. (PROVIDE KEY FOR ADJUSTMENT)
- SECURE TO CEILING PER MANUFACTURER'S RECOMMENDATIONS AND PER CEILING FINISH. PROVIDE GRID CLIPS PER MFG'R REQUIREMENTS. PROVIDE FRAMING FOR DRYWALL INSTALLATION.
- HANGER, SECURE TO STRUCTURE AND DUCTWORK
- PEEL BACK INSULATION AND PROVIDE STRAPPING AND SHEET METAL SCREWS AT FLEX CONNECTION TO DUCT. THEN PROVIDE STRAPPING AROUND INSULATION.
- SUPPORT FLEX TO PREVENT COLLAPSING

233713.00-04 - DIFFUSER INSTALLATION TYPICAL

SCALE: NONE



GENERAL NOTES:

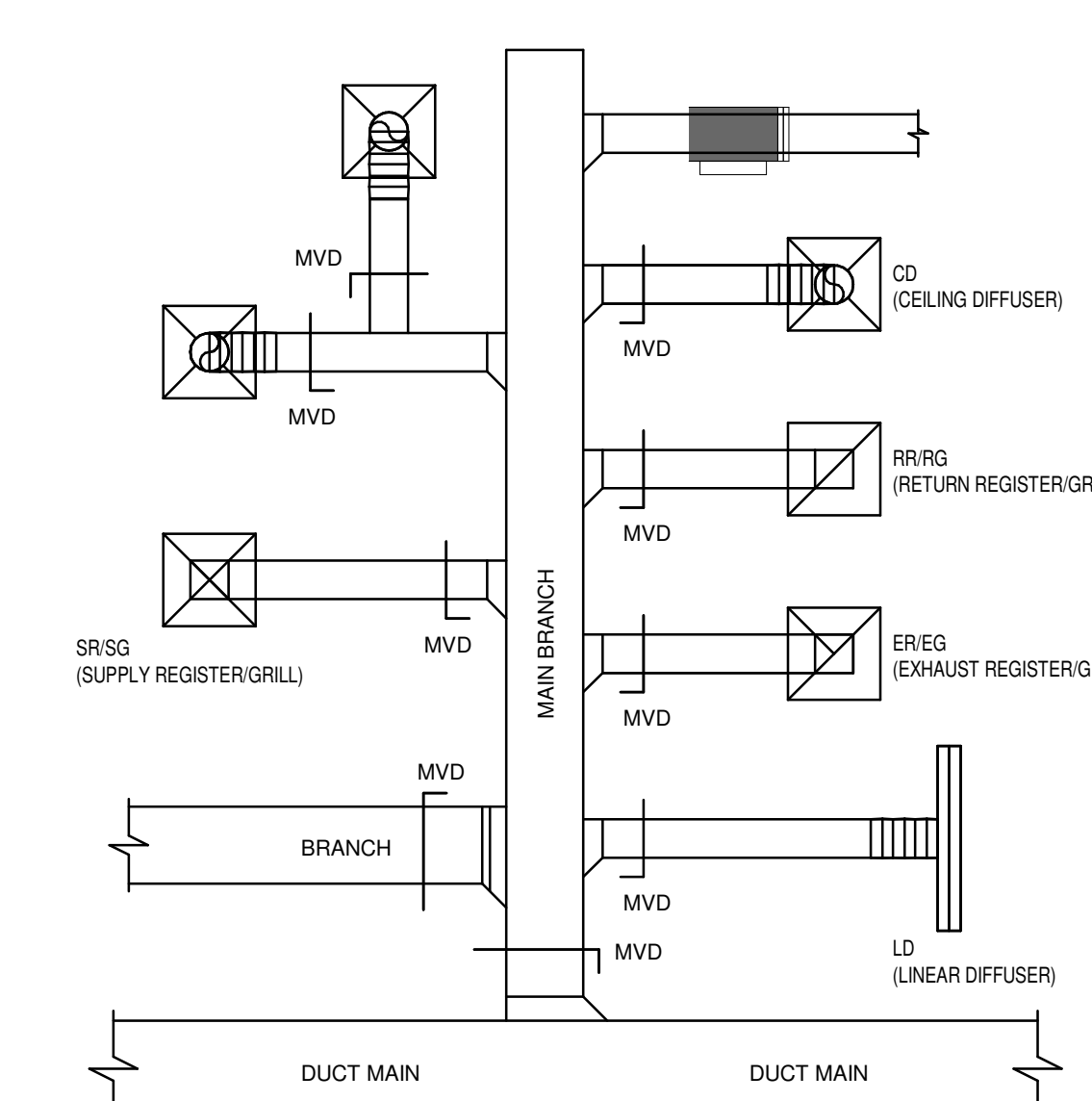
- CONTRACTOR SHALL PROVIDE CURB TO MAINTAIN 1" MINIMUM ABOVE FINISHED ROOFING SYSTEM. PROVIDE ADDITIONAL BLOCKING AS REQUIRED TO ACCOMMODATE ROOF INSULATION THICKNESS
- FINAL LOCATION AND STRUCTURAL VERIFICATION BY OTHERS.

KEYED NOTES:

- GAS FIRED ROOFTOP UNIT LOCATE A MINIMUM OF 12'-0" FROM EDGE OF ROOF AND ROOF HATCH
- CANVAS FLEXIBLE CONNECTION
- 1" ACOUSTICALLY LINED DUCTS
- 4x4 ANGLE FASTENED TO ROOF DECK AND STRUCTURAL SYSTEM. PROVIDE SUPPORTS AS REQUIRED
- FACTORY FABRICATED, INSULATED ROOF CURB (BY SAME MFG'R AS UNIT)
- FASTEN CURB TO DECK
- INSULATED RADIUSSED ELBOW
- UNION BY PLUMBING CONTRACTOR (PC)
- GAS SHUT-OFF VALVE BY PC
- GAS LINE (BLACK STEEL) BY PC
- SECURE TO CURB
- WOOD NAILER
- ROOFING MEMBRANE, FLASH UP TO BELOW WOOD NAILER
- CANT STRIP
- ROOF DECK - CUT OPENINGS FOR DUCT PENETRATIONS ONLY
- CONDENSATE TRAP - SEE CONDENSATE DRAIN TRAP DETAIL
- HIGH WATER ALARM IN CONDENSATE DRAIN PAN. WIRE TO BREAK 24 VOLT CONTROL POWER IN THE CASE OF A HIGH WATER EVENT.

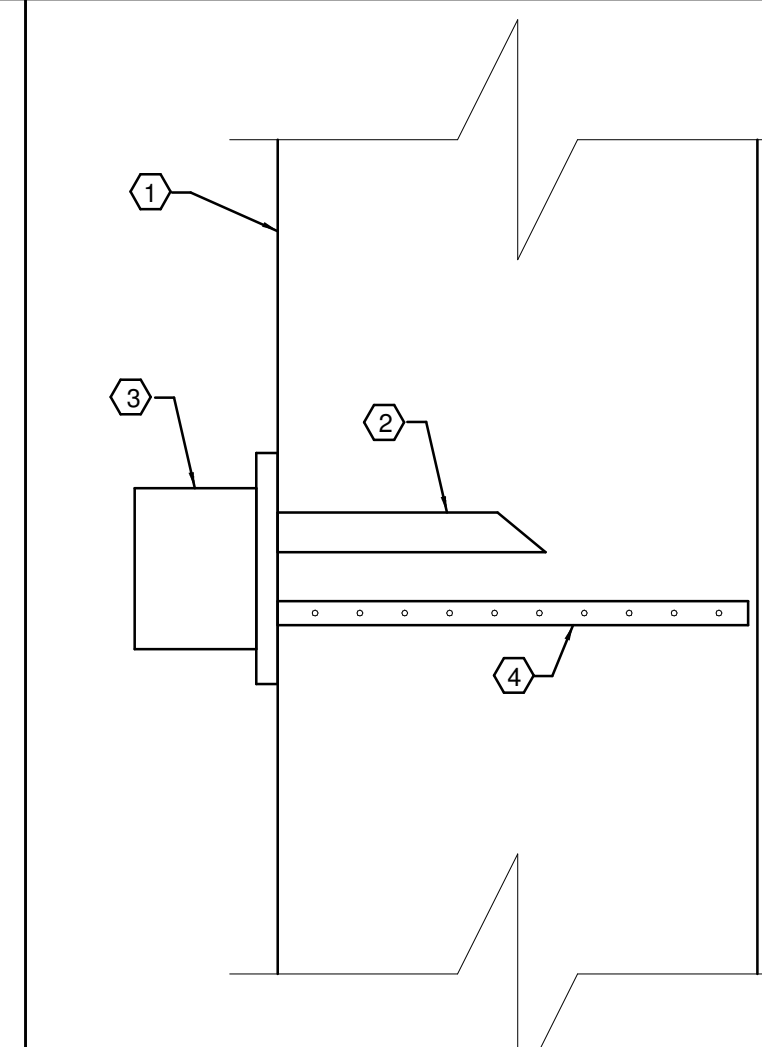
237433.00-04 - ROOF CURB & MOUNTING C

SCALE: NONE



233713.00-20 - DAMPER LOCATIONS

SCALE: NONE



KEYED NOTES:

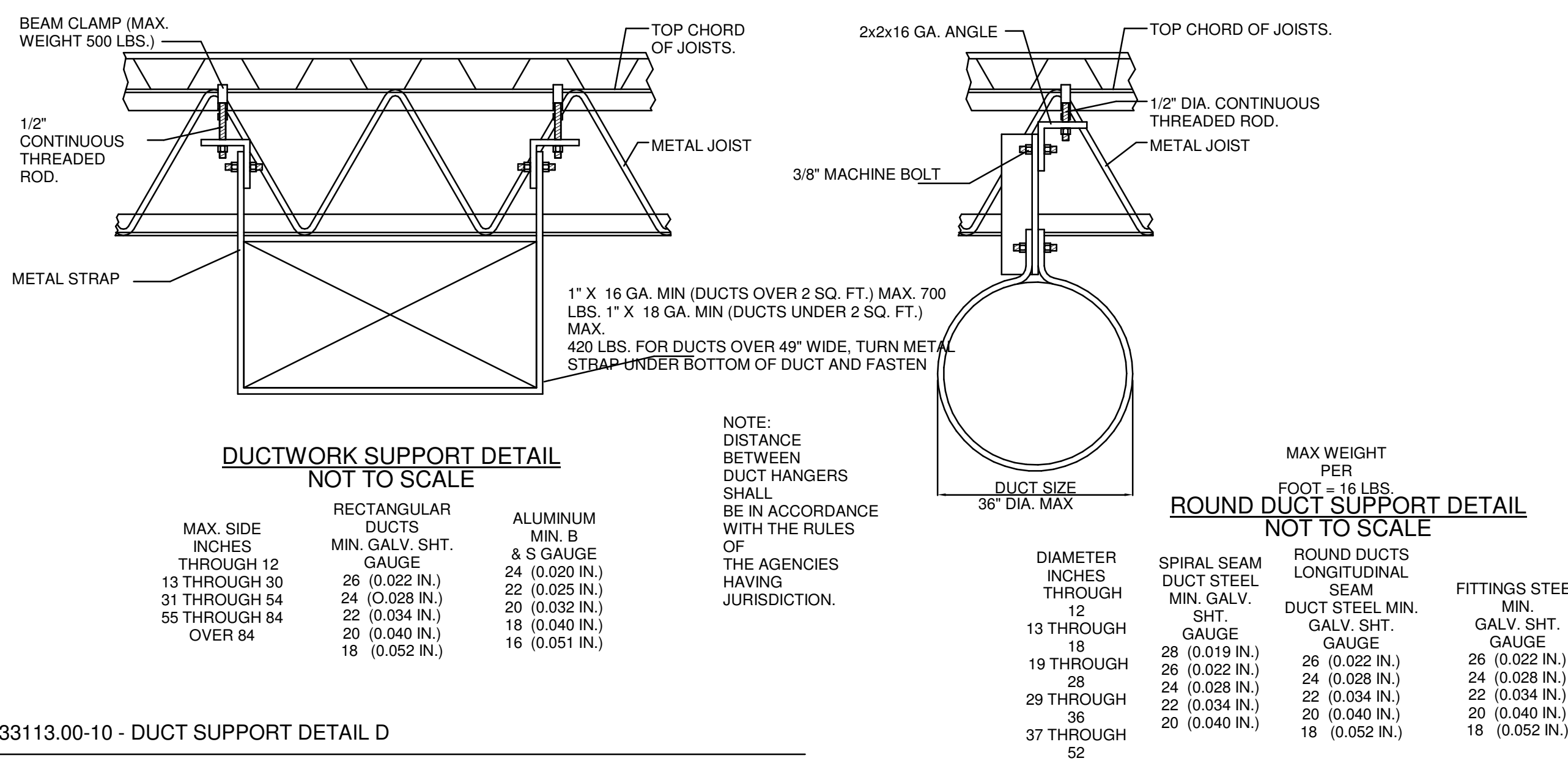
- DUCTWORK
- RETURN TUBE
- SMOKE DETECTOR
- SAMPLING TUBE.

GENERAL NOTES:

- REFER TO MANUFACTURER RECOMMENDATION FOR SMOKE DETECTOR MOUNTING LOCATION. PROVIDE STRAIGHT RUN UP AND DOWNSTREAM OF SAMPLING TUBE PER MANUFACTURER'S REQUIREMENTS.

230500.00-02 - DUCT MOUNTED SMOKE DETECTOR

SCALE: NONE



DUCTWORK SUPPORT DETAIL NOT TO SCALE

MAX. SIDE INCHES	RECTANGULAR DUCTS MIN. GALV. SHT. GAUGE	ALUMINUM MIN. B & S GAUGE
THROUGH 12	26 (0.022 IN.)	24 (0.020 IN.)
13 THROUGH 30	24 (0.028 IN.)	22 (0.025 IN.)
31 THROUGH 54	22 (0.034 IN.)	20 (0.032 IN.)
55 THROUGH 94	20 (0.040 IN.)	18 (0.040 IN.)
OVER 94	18 (0.052 IN.)	16 (0.051 IN.)

ROUND DUCT SUPPORT DETAIL NOT TO SCALE

DIAMETER INCHES	SPIRAL SEAM DUCT STEEL MIN. GALV. SHT. GAUGE	ROUND DUCTS LONGITUDINAL SEAM DUCT STEEL MIN. GALV. SHT. GAUGE	FITTINGS STEEL MIN. GALV. SHT. GAUGE
THROUGH 12	26 (0.022 IN.)	24 (0.028 IN.)	26 (0.022 IN.)
13 THROUGH 18	24 (0.028 IN.)	22 (0.034 IN.)	24 (0.028 IN.)
19 THROUGH 28	22 (0.034 IN.)	20 (0.040 IN.)	22 (0.034 IN.)
29 THROUGH 36	20 (0.040 IN.)	18 (0.052 IN.)	20 (0.040 IN.)
37 THROUGH 52	18 (0.052 IN.)	16 (0.051 IN.)	18 (0.052 IN.)

233113.00-10 - DUCT SUPPORT DETAIL D

SCALE: NONE

COMcheck Software Version 4.0.7.2 Review
Mechanical Compliance Certificate

Project Information
 Energy Code: 90.1 (2013) Standard
 Project Title: 20151.00 - Dollar Tree - Freestanding, Graylake, IL - Landlord Work
 Location: Graylake, Illinois
 Climate Zone: 5A
 Project Type: New Construction

Contractor: 995 E Belvidere Rd, Graylake, IL 60030
 Owner/Agent: Designer/Contractor:

Mechanical Systems List

- Quantity System Type & Description**
- RTU-1 (Single Zone)
 Heating: 1 each - Unit Heater, Electric, Capacity = 96 MBtu/h
 No minimum efficiency requirement applies
 Cooling: 1 each - Single Package DX Unit, Capacity = 111 MBtu/h, Air-Cooled Condenser, Air Economizer
 Proposed Efficiency = 12.00 EER, Required Efficiency: 11.20 EER = 12.9 EER
 Fan System: FAN SYSTEM 1 - Compliance (Motor nameplate HP method) - Passes
 Fans:
 FAN 1 Supply, Constant Volume, 3150 CFM, 2.0 motor nameplate hp, 0.5 fan efficiency grade
 - RTU-2 (Single Zone)
 Heating: 1 each - Unit Heater, Electric, Capacity = 121 MBtu/h
 No minimum efficiency requirement applies
 Cooling: 1 each - Single Package DX Unit, Capacity = 121 MBtu/h, Air-Cooled Condenser, Air Economizer
 Proposed Efficiency = 12.20 EER, Required Efficiency: 11.20 EER = 12.9 EER
 Fan System: FAN SYSTEM 2 - Compliance (Motor nameplate HP method) - Passes
 Fans:
 FAN 2 Supply, Constant Volume, 3600 CFM, 2.0 motor nameplate hp, 0.5 fan efficiency grade
 - RTU-3 (Single Zone)
 Heating: 1 each - Unit Heater, Electric, Capacity = 121 MBtu/h
 No minimum efficiency requirement applies
 Cooling: 1 each - Single Package DX Unit, Capacity = 121 MBtu/h, Air-Cooled Condenser, Air Economizer
 Proposed Efficiency = 12.20 EER, Required Efficiency: 11.20 EER = 12.9 EER
 Fan System: FAN SYSTEM 3 - Compliance (Motor nameplate HP method) - Passes
 Fans:
 FAN 3 Supply, Constant Volume, 3600 CFM, 2.0 motor nameplate hp, 0.5 fan efficiency grade
 - RTU-4 (Single Zone)
 Heating: 1 each - Unit Heater, Electric, Capacity = 48 MBtu/h
 No minimum efficiency requirement applies
 Cooling: 1 each - Single Package DX Unit, Capacity = 48 MBtu/h, Air-Cooled Condenser, Air Economizer
 Proposed Efficiency = 14.00 SEER, Required Efficiency: 13.00 SEER
 Fan System: FAN SYSTEM 4 - Compliance (Motor nameplate HP method) - Passes
 Fans:
 FAN 4 Supply, Constant Volume, 1800 CFM, 2.0 motor nameplate hp, 0.5 fan efficiency grade

Project Title: 20151.00 - Dollar Tree - Freestanding, Graylake, IL - Landlord Work Report date: 02/23/18
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Section # & Req. ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.4.1.4 (ME17)	Thermally ineffective panel surfaces of service heating panels have insulation $\geq R-3.5$.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.4.2.1 (ME10)	Ducts and plenums sealed based on static pressure and location.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.4.2.2 (ME11)	Ductwork operating > 3 in. water column requires air leakage testing.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.4.2.2 (ME11)	Ductwork operating > 3 in. water column requires air leakage testing.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.4.2.2 (ME11)	Ductwork operating > 3 in. water column requires air leakage testing.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.2.3 (ME19)	Dehumidification controls provided to prevent reheating, recirculating, mixing of hot and cold airstreams or concurrent heating and cooling of the same airstream.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.2.4 (ME18)	Humidifiers with airstream mounted preheating jackets have preheat shutdown/low value set to activate when humidification is not required.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.2.4.2 (ME19)	Humidification system dispersion tube hot surfaces in the airstream of ducts or air-handling units installed $\geq R-0.5$.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.2.5 (ME20)	Preheat coils controlled to stop heat output whenever mechanical cooling, including economizer operation, is active.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.3.5 (ME27)	Motors for fans $\geq 1/2$ hp and ≤ 1 hp are electronically commutated motors or have 70% These motors are also speed adjustable for either balancing or remote control.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

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Section # & Req. ID	Final Inspection	Complies?	Comments/Assumptions
6.4.3.1.2 (F10)	Thermostatic controls have a 5 °F deadband.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.2 (F10)	Temperature controls have setback overlap restrictions.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.3.1 (F12)	HVAC systems equipped with at least one automatic shutdown control.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.3.2 (F12)	Setback controls allow automatic restart and temporary operation as required for maintenance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.6 (F16)	When humidification and dehumidification are provided to a zone, simultaneous operation is prohibited. Humidity control prohibits the use of fossil fuel or electricity to produce RH $> 30\%$ in the warmest zone humidified and RH $\leq 60\%$ in the coldest zone dehumidified.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.7.2.1 (F17)	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.7.2.2 (F18)	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.7.2.3 (F19)	An air and/or hydronic system balancing report is provided for HVAC systems serving zones $> 5,000$ ft ² of conditioned area.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.7.2.4 (F110)	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
10.4.3 (F10)	Elevators are designed with the proper lighting, ventilation power, and standby mode.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.

Additional Comments/Assumptions:

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Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2013 ASHRAE Standard requirements in COMcheck Version 4.0.7.2 Review and to comply with any applicable mandatory requirements listed in the inspection Checklist.
 Joseph Kohls, P.E. Signature: *Joseph Kohls* Date: 2/23/2018

Requirements: 100.0% were addressed directly in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req. ID	Plan Review	Complies?	Comments/Assumptions
4.2.2.1 (PR2)	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and equipment and documents where exceptions are claimed. Load calculations per acceptable engineering standards and handbooks.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
4.2.2.2 (PR6)	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the electrical systems and equipment and documents where exceptions are claimed. Feeder conductors sized in accordance with approved plans and branch circuits sized for maximum drop of 3%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.7.3.4 (PR5)	Detailed instructions for HVAC systems commissioning included on all plans or specifications for projects $> 50,000$ ft ² .	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.

Additional Comments/Assumptions:

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Section # & Req. ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.5 (ME72)	Motors for fans $\geq 1/2$ hp and ≤ 1 hp are electronically commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.3.5 (ME72)	Motors for fans $\geq 1/2$ hp and ≤ 1 hp are electronically commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.3.5 (ME72)	Motors for fans $\geq 1/2$ hp and ≤ 1 hp are electronically commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.3.3 (ME42)	Multiple zone VAV systems with DDC or individual zone boxes have static pressure setback, reset controls.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.3.3 (ME42)	Multiple zone VAV systems with DDC or individual zone boxes have static pressure setback, reset controls.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.3.3 (ME42)	Multiple zone VAV systems with DDC or individual zone boxes have static pressure setback, reset controls.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.3.4 (ME23)	HVAC pumping systems ≥ 10 hp designed for variable fluid flow.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.1.6 (ME46)	Exhaust air energy recovery on systems meeting Tables 6.5.6.1.1 and 6.5.6.1.2.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.7.1.2 (ME48)	Kitchen hoods $> 5,000$ cfm have make up air $\geq 50\%$ of exhaust air volume.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 (ME48)	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.

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COMcheck Software Version 4.0.7.2 Review
Inspection Checklist
 Energy Code: 90.1 (2013) Standard

Requirements: 100.0% were addressed directly in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req. ID	Plan Review	Complies?	Comments/Assumptions
4.2.2.1 (PR2)	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and equipment and documents where exceptions are claimed. Load calculations per acceptable engineering standards and handbooks.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
4.2.2.2 (PR6)	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the electrical systems and equipment and documents where exceptions are claimed. Feeder conductors sized in accordance with approved plans and branch circuits sized for maximum drop of 3%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.7.3.4 (PR5)	Detailed instructions for HVAC systems commissioning included on all plans or specifications for projects $> 50,000$ ft ² .	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.

Additional Comments/Assumptions:

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Section # & Req. ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.7.1.2 (ME47)	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 (ME47)	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 (ME47)	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.7.1.8 (ME49)	Approved field test used to evaluate design air flow rates and demonstrate proper capture and containment of kitchen exhaust systems.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.8.1 (ME34)	Unenclosed spaces that are heated use only radiant heat.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.5.9 (ME35)	Hot gas bypass limited to: ≤ 240 kBtu/h - 15% > 240 kBtu/h - 10%			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.9 (ME35)	Hot gas bypass limited to: ≤ 240 kBtu/h - 15% > 240 kBtu/h - 10%			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.9 (ME35)	Hot gas bypass limited to: ≤ 240 kBtu/h - 15% > 240 kBtu/h - 10%			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.9 (ME35)	Hot gas bypass limited to: ≤ 240 kBtu/h - 15% > 240 kBtu/h - 10%			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.9 (ME63)	Heating for vestibules and air curtains include automatic controls that shut off the heating system when outdoor temperatures > 45 F. Vestibule heating systems controlled by thermostat in the vestibule with setback ≤ 6 F.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

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Section # & Req. ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
6.4.3.7 (FOV)	Freeze protection and snow/ice melting system sensors for future connection to controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.

Additional Comments/Assumptions:

Project Title: 20151.00 - Dollar Tree - Freestanding, Graylake, IL - Landlord Work Report date: 02/23/18
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Section # & Req. ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.10 (EL10)	Doors separating conditioned spaces from the outdoors have controls that disallow/reduce heating and cooling system when doors are open.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

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Section # & Req. ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.1.4 (ME17)	HVAC equipment efficiency verified. Non-MECA HVAC equipment labeled as meeting 90.1.	Efficiency: _____	Efficiency: _____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Mechanical Systems list for values.
6.4.3.4.1 (ME3)	Stair and elevator shaft vents have motorized dampers that automatically close.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.4.3.4.2 (ME4)	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rate. Check gravity dampers where allowed.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.4.3 (ME39)	Enclosed parking garage ventilation has automatic demand detection and capacity to stage or modulate fans to 50% or less of design capacity.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
6.4.3.4.4 (ME5)	Ventilation fans ≥ 75 hp have automatic controls to shut off fan when not required.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.3.8 (ME6)	Demand control ventilation provided for spaces ≥ 300 ft ² and ≥ 25 people/1000 ft ² occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow $> 3,000$ cfm.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.5.3.2.1 (ME5)	DX cooling systems ≥ 75 kBtu/h (≥ 65 kBtu/h effective 1/01/01) and chilled water and evaporative cooling fan motor hp ≥ 1 designed to vary indoor fan airflow as a function of load and comply with operational requirements.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Mechanical Systems list for values.
6.4.4.1.1 (ME7)	Insulation exposed to weather protected from damage. Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.4.3.2 (ME7)	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	R: _____	R: _____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
6.4.4.3.3 (ME7)	HVAC piping insulation thickness. Where pipes are installed in or under a slab, verification may need to occur during Foundation Inspection.	in: _____	in: _____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Project Title: 20151.00 - Dollar Tree - Freestanding, Graylake, IL - Landlord Work Report date: 02/23/18
 Data File Name: G:\20000-20999\20150-20199\20151\Project Data\EnergyCompliance\Mechanical Report\DT Page 5 of 12
 Graylake Comcheck.cck

Section # & Req. ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
10.4.1 (EL9)	Electric motors meet requirements where applicable.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

Project Title: 20151.00 - Dollar Tree - Freestanding, Graylake, IL - Landlord Work Report date: 02/23/18
 Data File Name: G:\20000-20999\20150-20199\20151\Project Data\EnergyCompliance\Mechanical Report\DT Page 10 of 12
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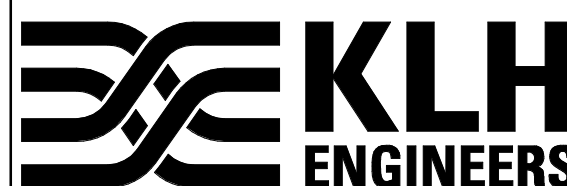
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KEYED NOTES

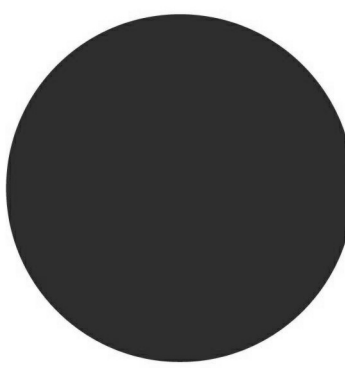
- P1 PROVIDE NEW 4" VENT THRU ROOF. COORDINATE ROOF PENETRATION REQUIREMENTS WITH LANDLORD'S ROOFING CONTRACTOR.
- P2 EXTEND DOMESTIC WATER TO EXISTING MIN. WATER. PROVIDE SHUT-OFF, BACKFLOW PREVENTER, PRESSURE REGULATING VALVE, METER, AND REMOTE READER IF REQUIRED. INSULATE ENTIRE LINE WITHIN BUILDING. FIELD VERIFY EXACT LOCATION OF EXISTING DOMESTIC WATER PRIOR TO INSTALLING ANY PIPING. REPORT DIFFERENCES TO ENGINEER. FAILURE TO DO SO MAY RESULT IN CONTRACTOR REPLACING PIPING AT NO ADDITIONAL COST TO TENANT.
- P3 CONNECT NEW SANITARY PIPING TO NEAREST EXISTING PIPING. FIELD VERIFY EXACT LOCATION, INVERT, DIRECTION OF FLOW, AND SYSTEM TYPE PRIOR TO STARTING WORK. CONTACT ENGINEER WITH ANY DIFFERENCES OTHER THAN WHAT IS SHOWN ON PLAN. PROVIDE CAMERA SCOPING TO INSURE PIPING SIZES AND LOCATION. FAILURE TO DO SO MAY RESULT IN CONTRACTOR REPLACING PIPING AT NO ADDITIONAL COST TO TENANT.
- P4 PROVIDE ELECTRIC HOT WATER HEATER ABOVE MOP SINK WITH 68" CLEAR TO BOTTOM OF WATER HEATER SUPPORT PLATFORM. PROVIDE EXPANSION TANK: AMTROL ST-5.

INCOMING WATER PRESSURE

WATER PRESSURE WAS ASSUMED TO BE 60 PSI FOR STATIC AND 55 PSI RESIDUAL. CONTRACTOR TO VERIFY PRESSURE AT ENTRANCE OF BUILDING PRIOR TO BID AND CONTACT ENGINEER OF RECORD IF PRESSURE DIFFERS FROM THE ASSUMED PRESSURES.



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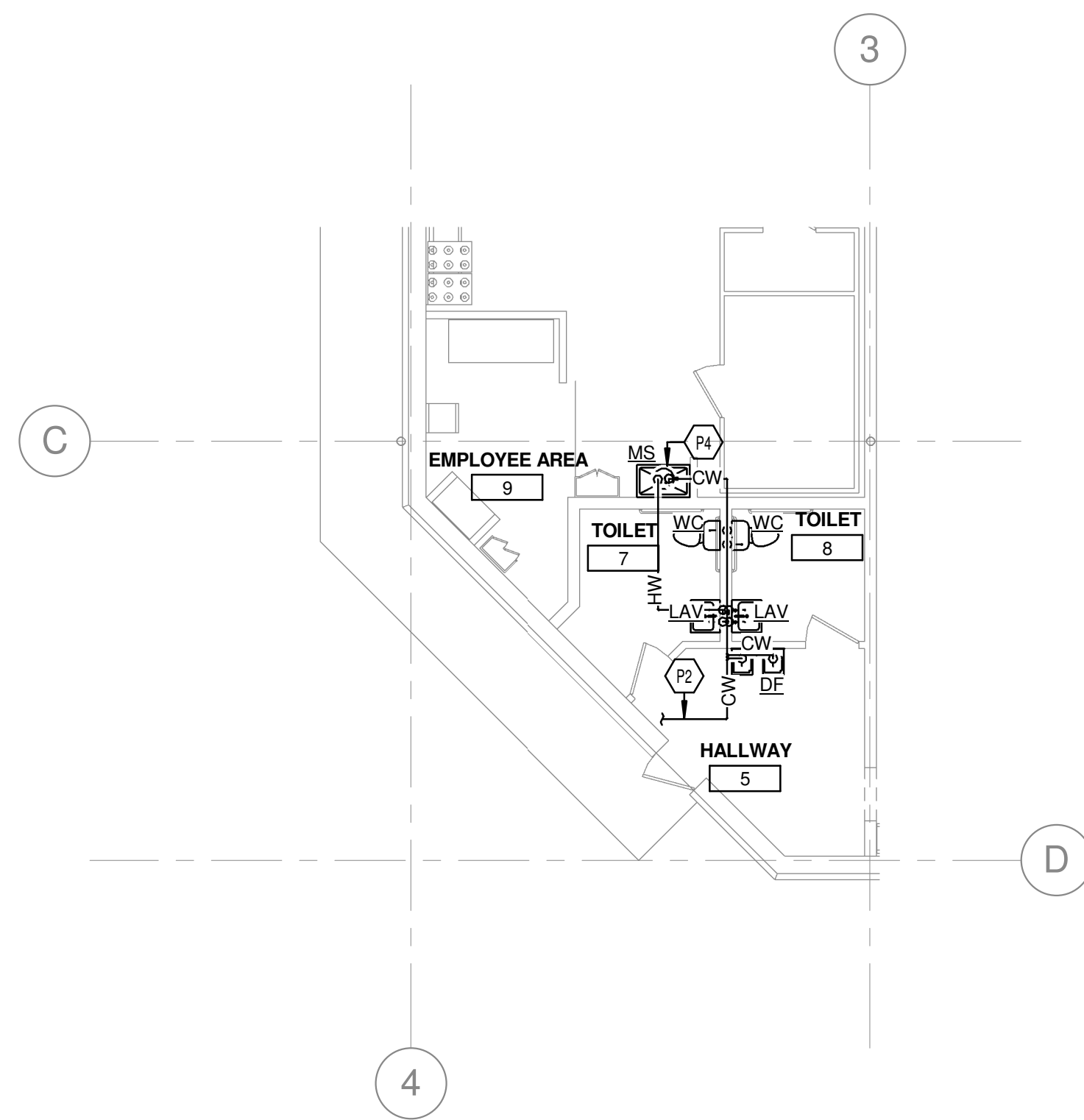
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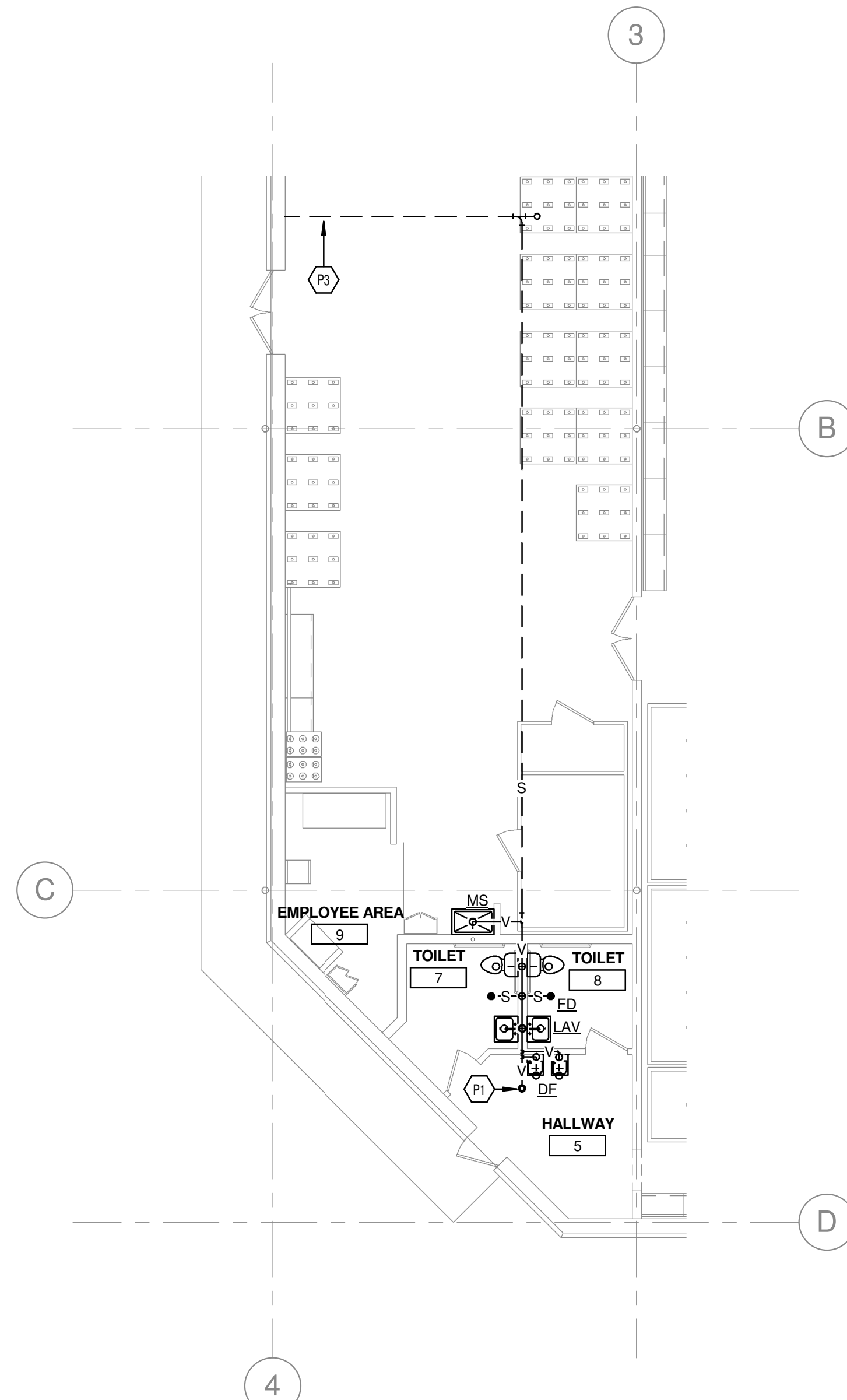
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PLUMBING - FIRST
 FLOOR - SANITARY,
 VENT AND WATER

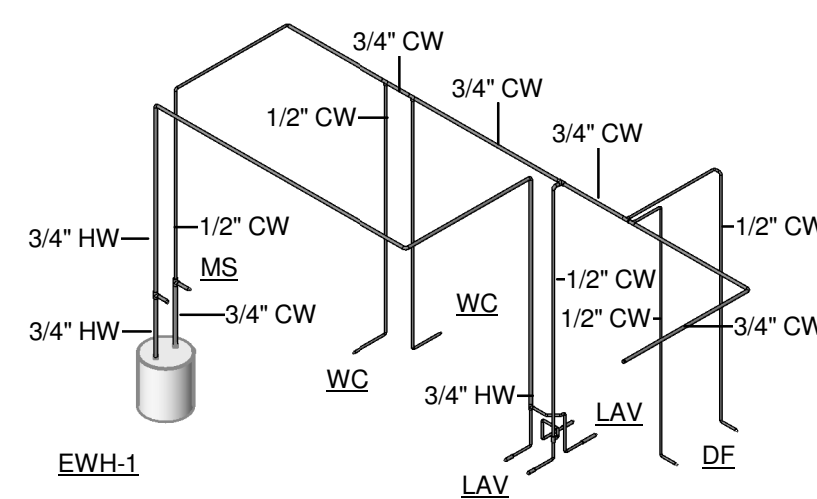
P-101



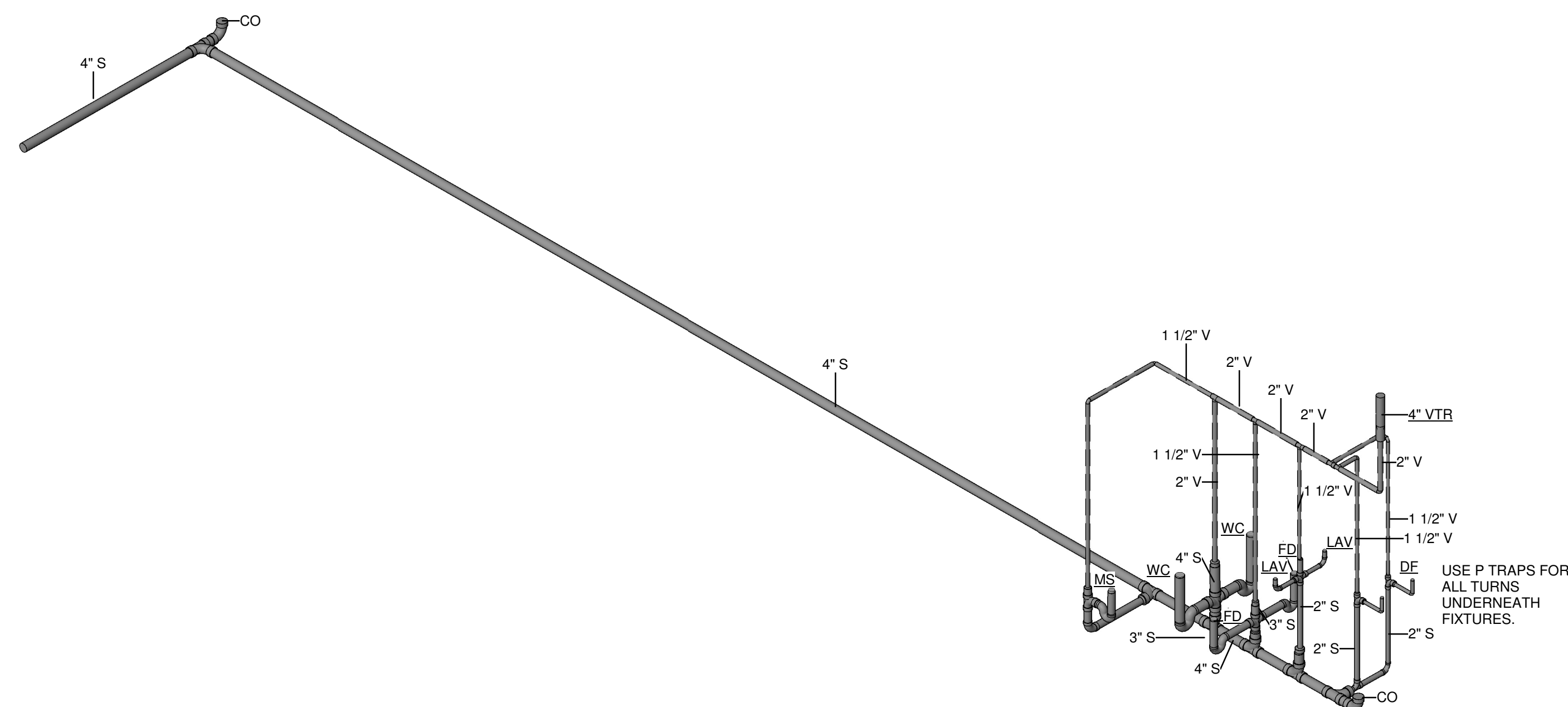
1 PN FIRST FLOOR - FLOOR-WATER
 1/8" = 1'-0"



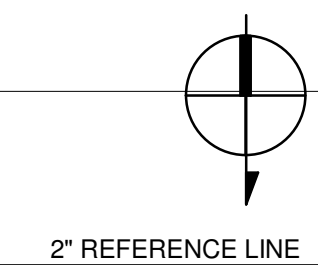
4 PLUMBING - FIRST FLOOR
 1/8" = 1'-0"



2 PLUMBING - ISO WATER WATER ISOMETRIC



3 PLUMBING - SANITARY ISO SANITARY AND VENT ISOMETRIC



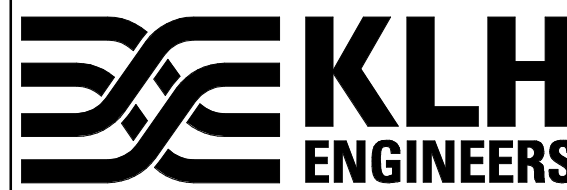
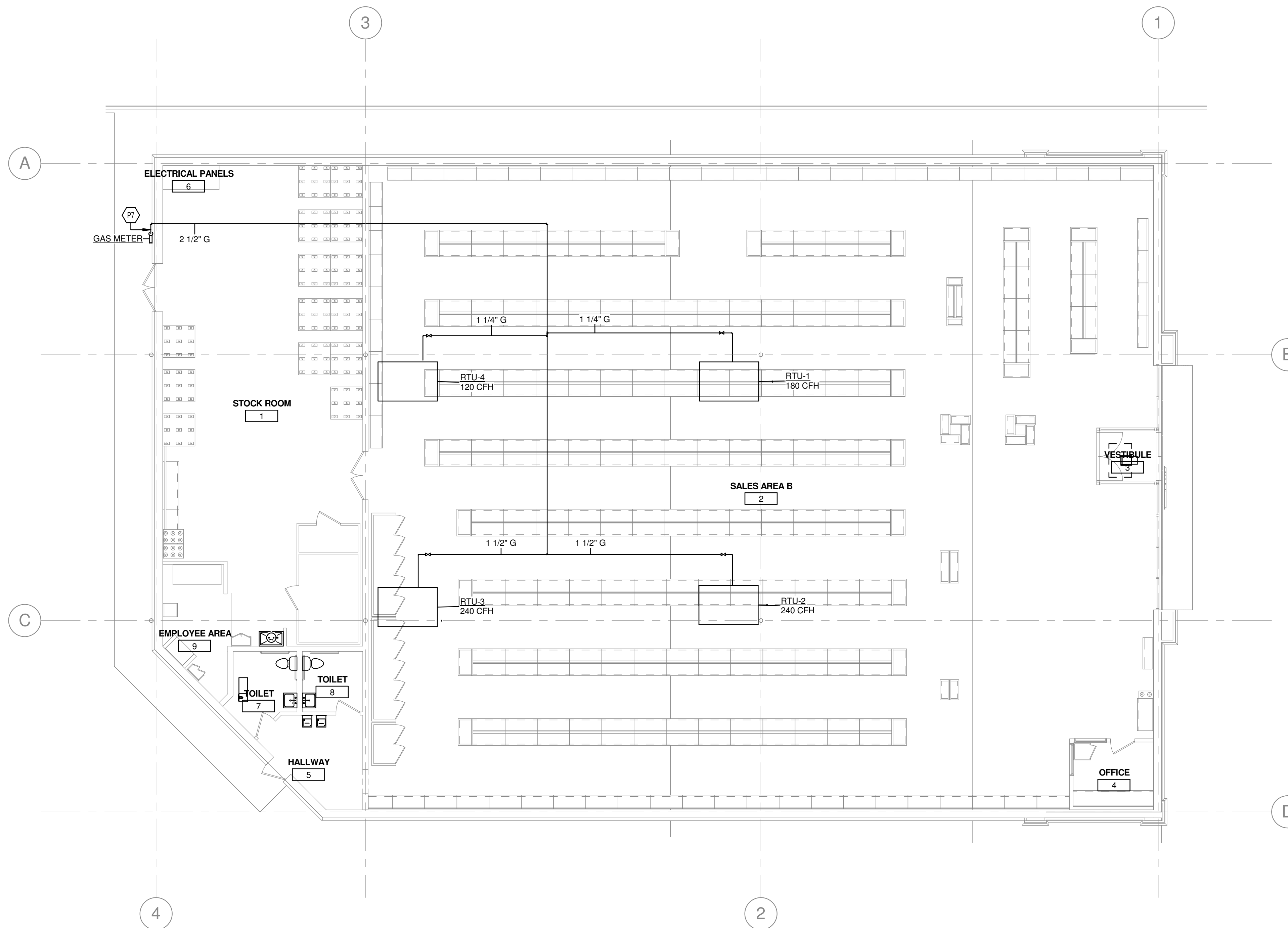
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KEYED NOTES

P7 CONTRACTOR TO COORDINATE WITH NATURAL GAS COMPANY FOR GAS METER INSTALLATION.

NATURAL GAS NOTES

NATURAL GAS PIPING IS SIZED BASED ON A 780 CFH CONNECTED LOAD, 120 LINEAR FEET OF PIPE, LESS THAN 7" W.C. OF PRESSURE, A PRESSURE DROP OF 0.3 INCH WATER COLUMN AND A SPECIFIC GRAVITY OF 0.6. PLUMBING CONTRACTOR SHALL FIELD VERIFY AND COORDINATE EXACT CONDITIONS WITH LOCAL NATURAL GAS COMPANY PRIOR TO BID. IMMEDIATELY NOTIFY ENGINEER OF RECORD IF FIELD CONDITIONS DIFFER.

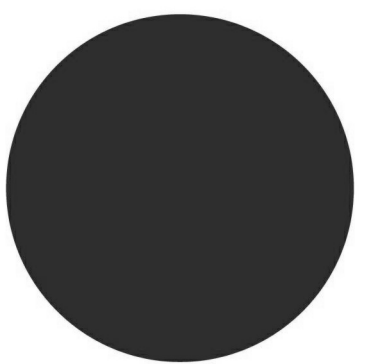


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PLUMBING - FIRST
FLOOR - GAS

P-102

2" REFERENCE LINE

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PLUMBING ELECTRICAL COORDINATION SCHEDULE

ABBREVIATIONS		CONTRACTOR TYPE		MOTOR CONTROL TYPE		CONTROL TYPE	
DC	LOCAL DISCONNECT	EC	ELECTRICAL CONTRACTOR	CS	COMBINATION STARTER	TC	TIMELOCK
MC	MOTOR CONTROL (POWER)	EX	EXISTING	IMC	MOTOR CONTROL STARTER	CPT	CONTROL POWER TRANSFORMER
SD	DUCT SMOKE DETECTOR	FC	FIRE PROTECTION CONTRACTOR	MG	MAGNETIC STARTER OR CONTACT	BAS	BUILDING AUTOMATION SYSTEM
CN	CONTROLS	GC	GENERAL CONTRACTOR	MS	MANUAL STARTER	LOW	LOW VOLTAGE CONTROLS
TS	TOGGLE SWITCH	HC	HVAC CONTRACTOR	VFD	VARIABLE FREQUENCY DRIVE	LINE	LINE VOLTAGE CONTROLS
CB	H.A.C.R. CIRCUIT BREAKER AT SOURCE PANELBOARD	MFR	MANUFACTURER	MSR	MANUAL STARTER W/ CONTROL RELAY	FLINE	REVERSE ACTING LINE VOLTAGE THERMOSTAT
FUSE	FUSE AT LOCAL DISCONNECT (VERIFY FIELD RATING)	PC	PLUMBING CONTRACTOR	OV	OVERCURRENT PROTECTION	MAN	MANUAL
FLA	OPERATING FULL LOAD AMPS	OR	OWNER OR OTHERS			FA	FIRE ALARM
MCA	MINIMUM CIRCUIT AMPACITY					CO	CARBON MONOXIDE SENSOR
CP	CORD AND PLUG CONNECTION					INT	INTEGRAL TO EQUIPMENT

EQUIPMENT MARK	DESCRIPTION	VOLTS (V)	PHASE	EMERGENCY	BHP (HP)	HP (HP)	HTG KW (KW)	WATTS (W)	FLA (A)	MCA (A)	OCP (A)	DC TYPE	DC FURN	DC INST	DC WIRE	MC TYPE	MC FURN	MC INST	MC WIRE	CN FURN	CN INST	CN TYPE	CN WIRE	
EWH-1	ELECTRIC DOMESTIC WATER HEATER	120	1				1.5					EC	EC	EC	---	---	---	---			MFR	MFR	INT	MFR

PLUMBING ELECTRIC DOMESTIC WATER HEATER SCHEDULE

MARK	DESCRIPTION	LOCATION	STATUS	MANUFACTURER	MODEL	VOLTS	PHASE	EFFICIENCY	EWT (Deg F)	LWT (Deg F)	GAS HTG IN (mhb)	STORAGE (GAL)	FUEL	HTG KW (kW)	WEIGHT	FLA (amps)	MCA (amps)	OCP (amps)	ACCESS
EWH-1	ELECTRIC DOMESTIC WATER HEATER			BRADFORD WHITE	RE110	120	1	98	40	140	0	10	ELECTRIC	1.5	30				

PLUMBING FIXTURE SCHEDULE

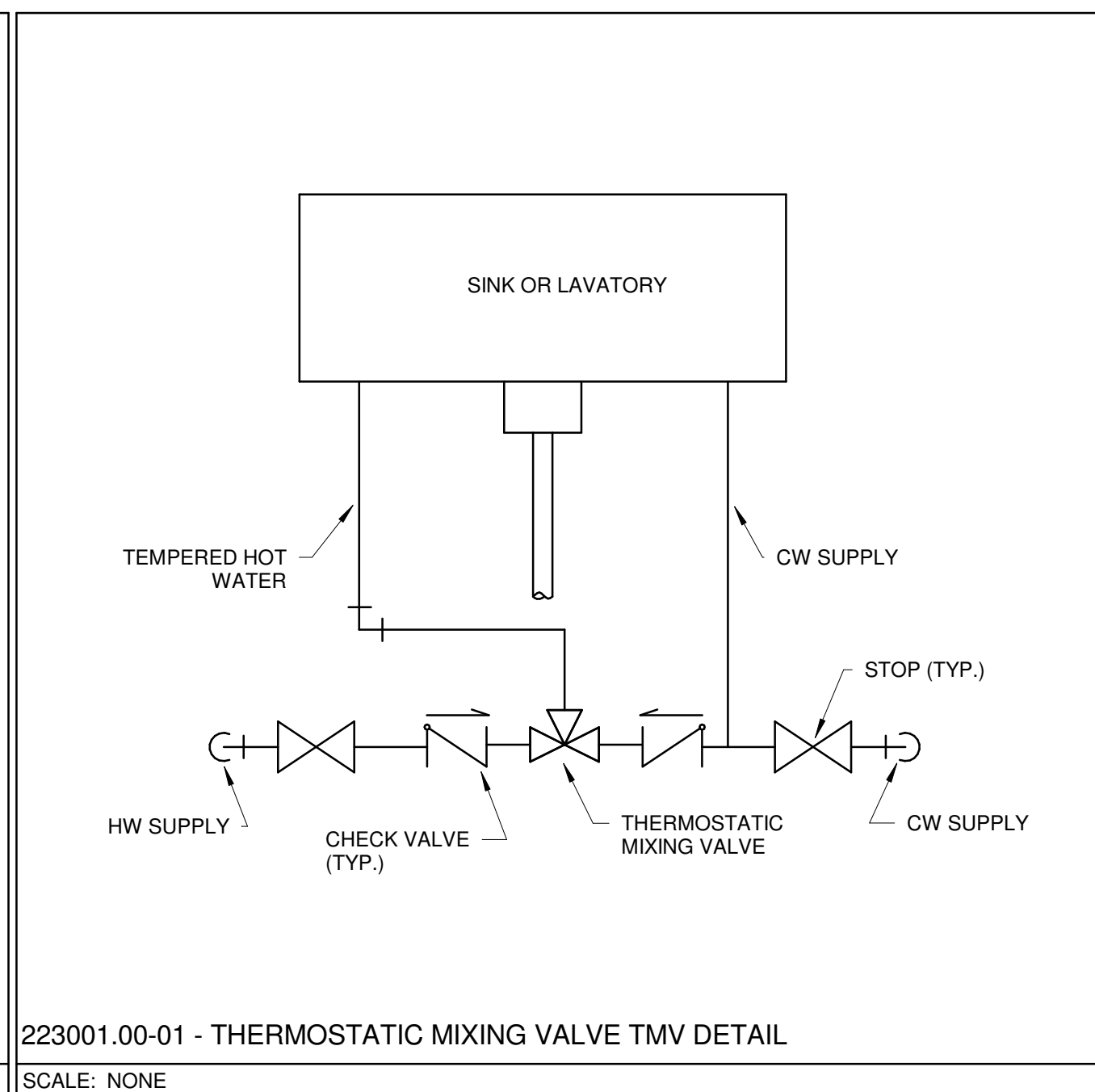
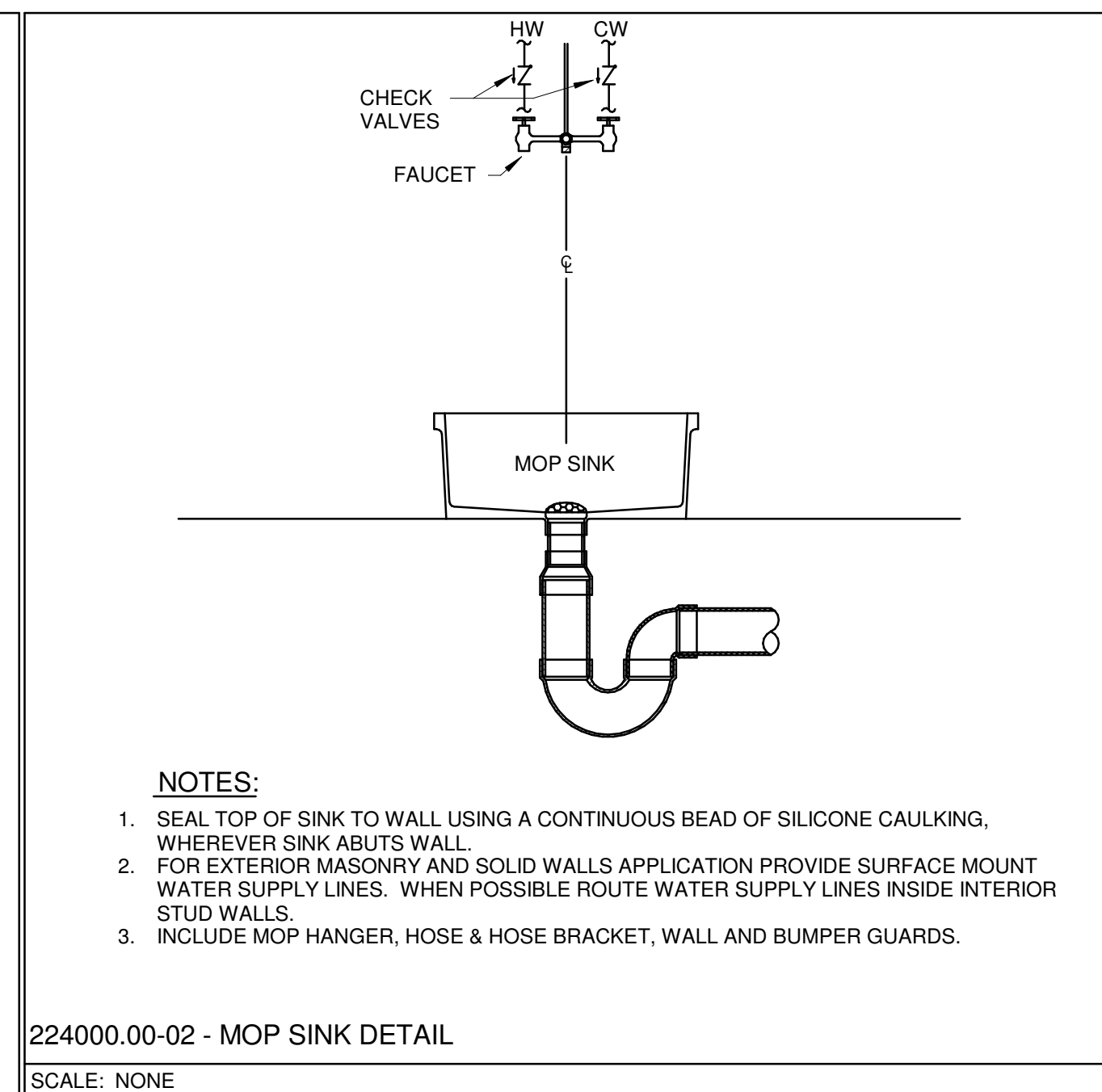
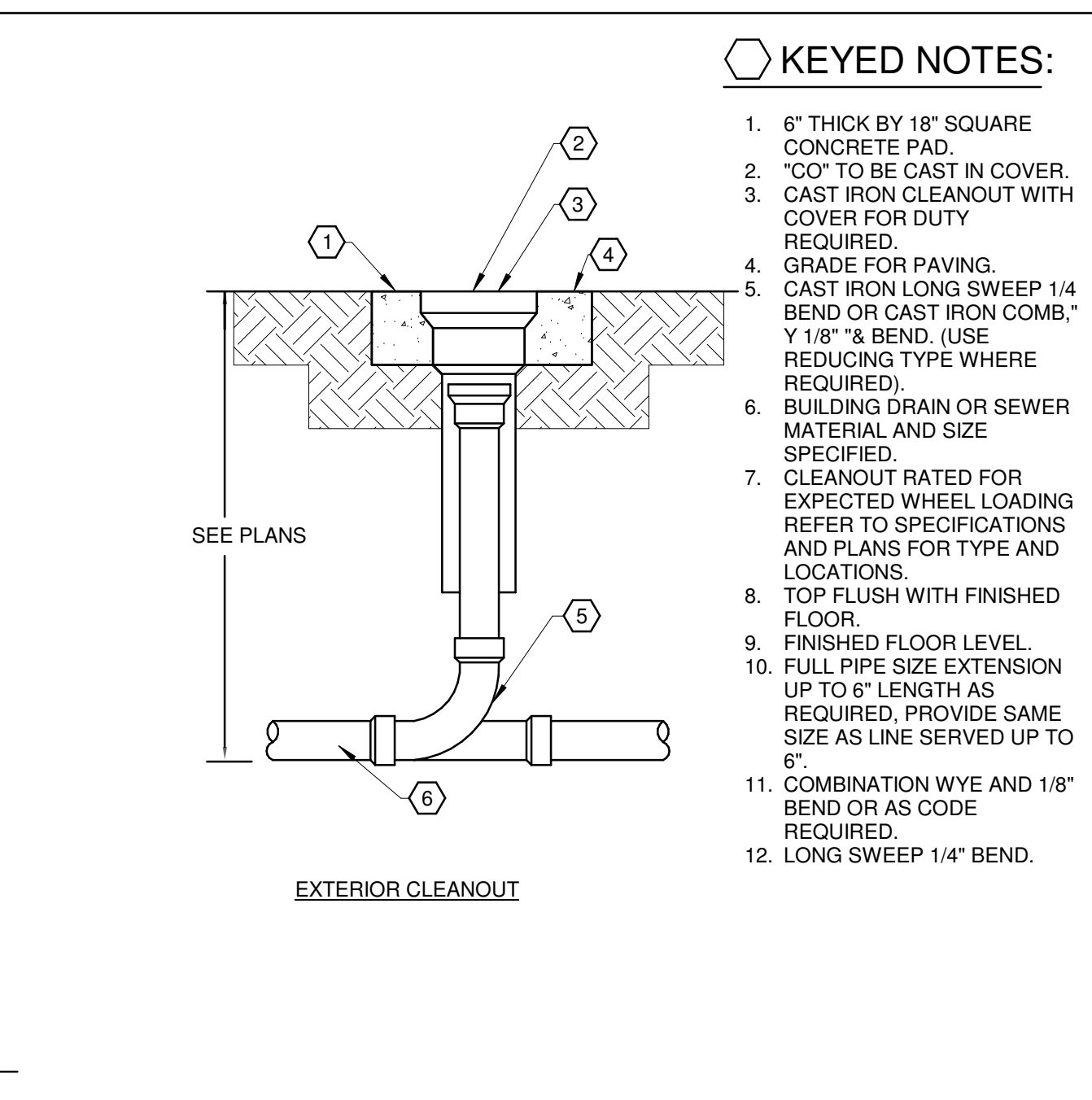
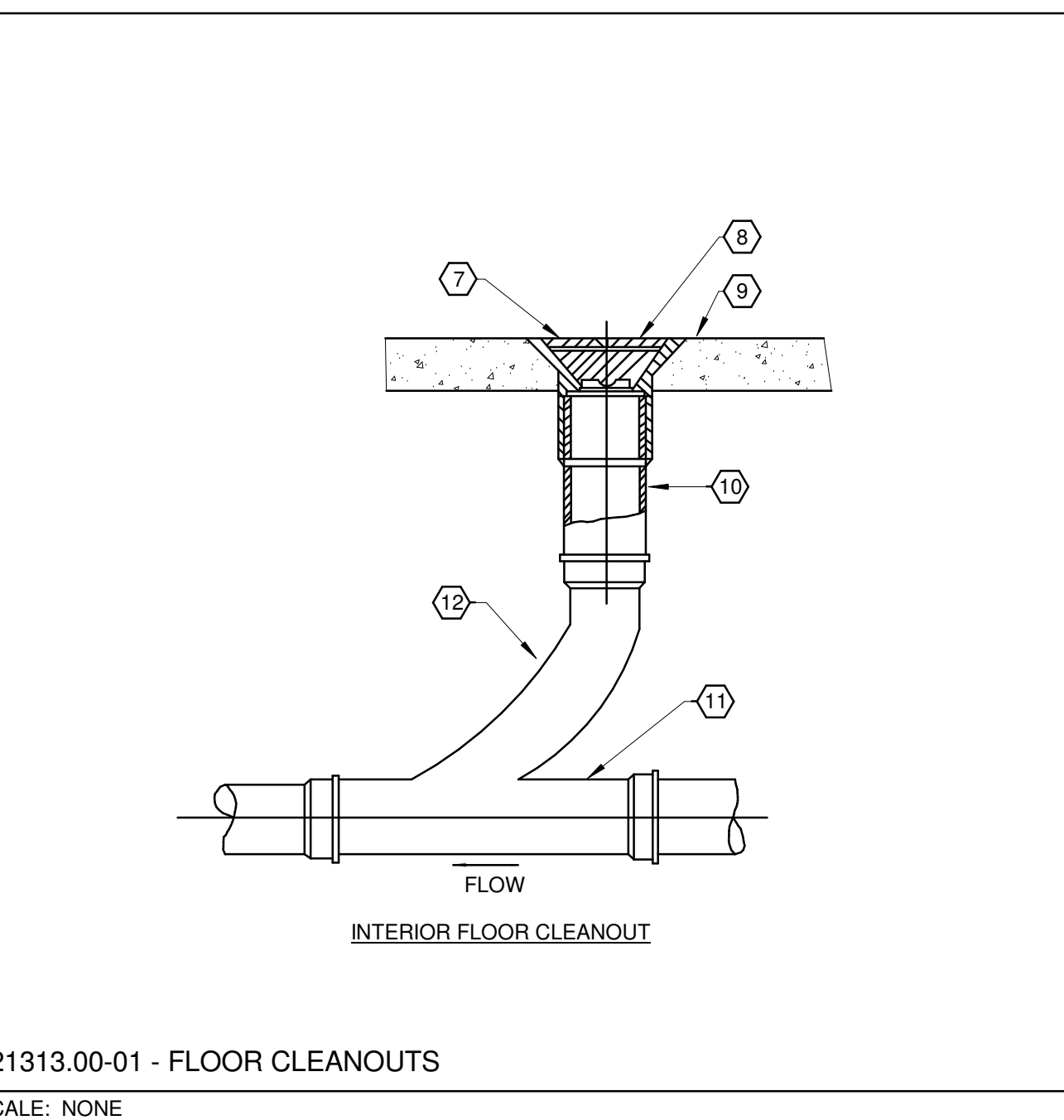
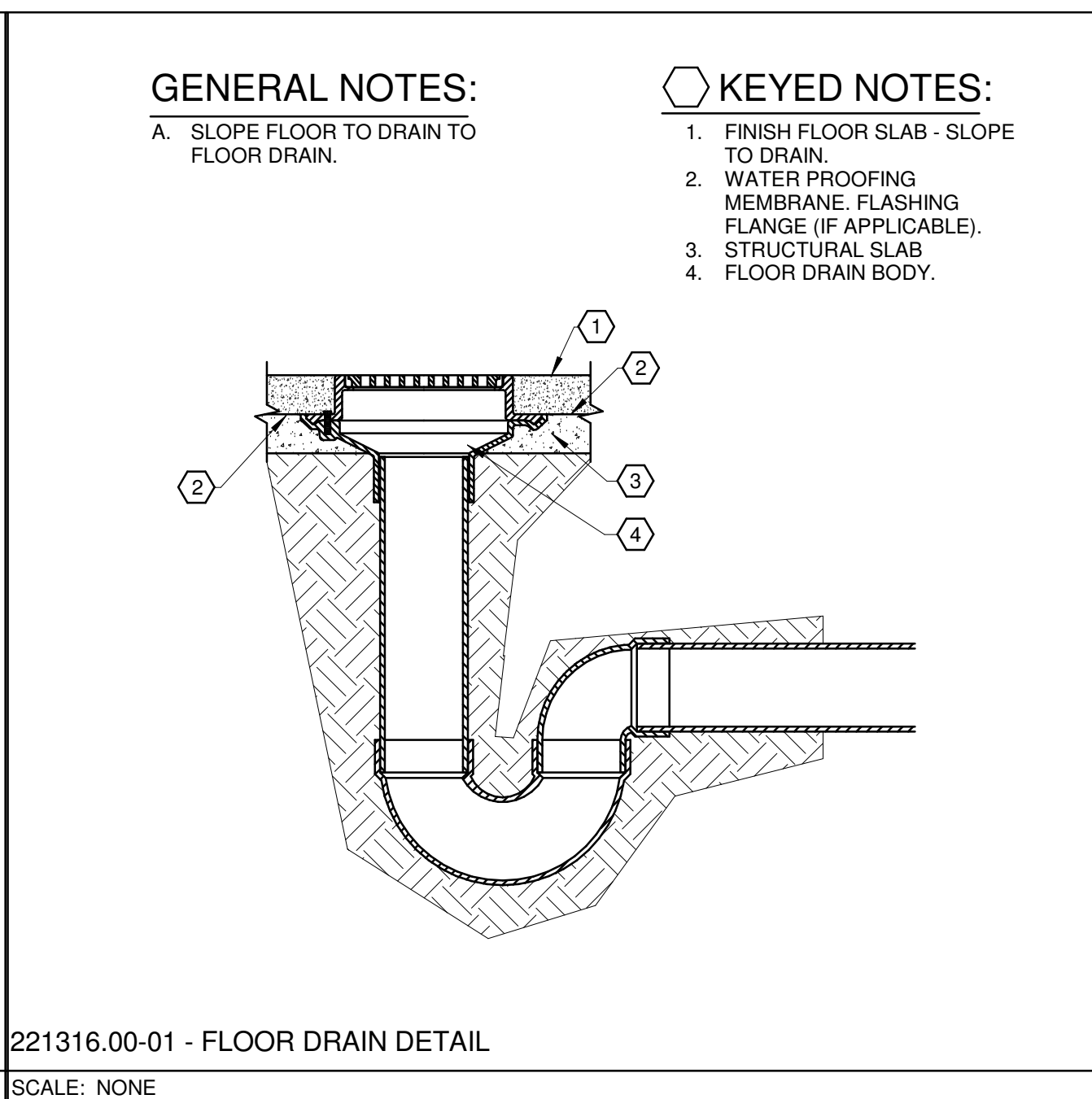
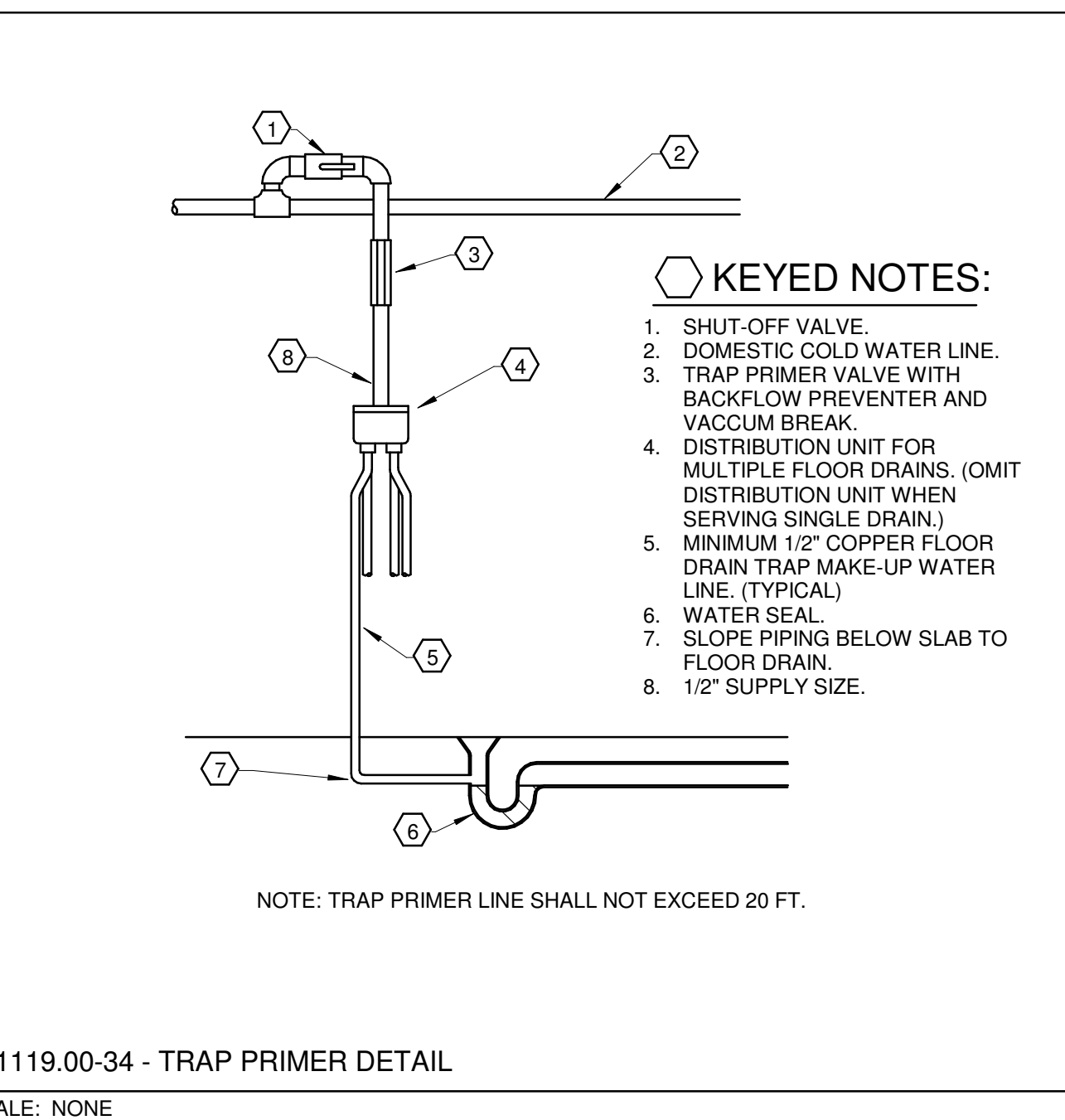
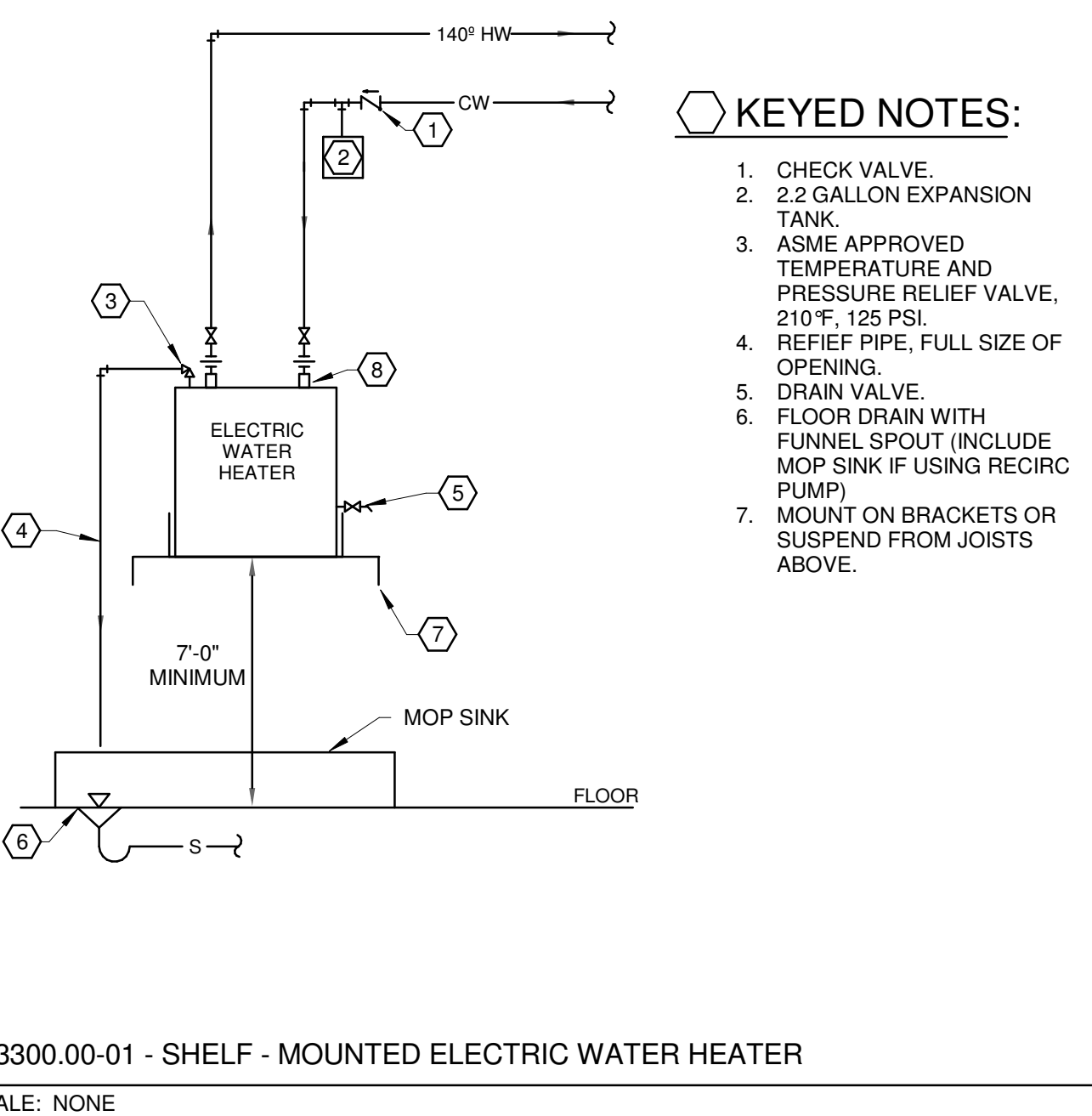
MARK	DESCRIPTION	MANUFACTURER	MODEL	VALVE/FAUCET MFG	VALVE/FAUCET MODEL	CW SIZE (in)	HW SIZE (in)	SAN SIZE (in)	VENT SIZE (in)	TRAP SIZE (in)	INT TRAP	ACCESSORIES
DF	DRINKING FOUNTAIN	OASIS	PACSL			1/2	---	2	1-1/2	1-1/2	NO	FURNISH STD. CABINET FINISH FOUNTAIN, SUPPLY STOP & TUBE, DRAIN KIT, AND WALL HANGER KIT
LAV	SINK	ZURN	Z5344	ZURN	Z86500-XL	1/2	1/2	1-1/2	1-1/2	1-1/2	NO	FURNISH LAVATORY, LEAD FREE METERING FAUCET, WALL HANGER KIT, SUPPLY STOPS & TUBES, DRAIN, AND ADA PIPING PROTECTION.
MS	MOP SINK	ZURN	Z2600	ZURN	Z843MI	3/4	3/4	3	2	3	NO	FURNISH VACUUM BREAKER, HOSE AND BRACKET, MOP HANGER, AND DRAIN KIT.
WC	TANK WATER CLOSET	ZURN	Z5560			1/2	---	4	2	---	YES	FURNISH ADA CLOSET & TANK, ADA OPEN FRONT SEAT, SELF SUSTAINING HINGE, FLOOR FLANGE, CLOSET BOLTS & CAPS, WAX RING, SUPPLY STOP & TUBE, FLUSH CONTROL MUST BE LOCATED ON THE WIDE/ACCESS SIDE OF THE WC (SIDE OPPOSITE THE WALL).

PLUMBING DRAIN SCHEDULE

MARK	DESCRIPTION	MANUFACTURER	MODEL	MATERIAL/FINISH	CONNECTIONS (BY PLUMBING CONTRACTOR)	TRAP SIZE (in)	SAN SIZE (in)	VENT SIZE (in)	ACCESSORIES/REMARKS
FD	FLOOR DRAIN	ZURN	Z-415		TRAP PRIMER	3	3	2	TYPE "N" STRAINER. PROVIDE WITH COMPLETE BODY ASSEMBLY WITH TRAP PRIMER CONNECTION.

PLUMBING GAS LOAD SCHEDULE

Equipment Mark	HVACTYPE	Description	Status	GAS HTG IN (CFH)	MIN GAS PRESSURE (in W.C.)	MAX GAS PRESSURE (in W.C.)
RTU-1	23 74 33.00	PACKAGED OUTDOOR ROOFTOP UNIT	NEW	360	4	14
RTU-2	23 74 33.00	PACKAGED OUTDOOR ROOFTOP UNIT	NEW	480	4	14
RTU-3	23 74 33.00	PACKAGED OUTDOOR ROOFTOP UNIT	NEW	480	4	14
RTU-4	23 74 33.00	PACKAGED OUTDOOR ROOFTOP UNIT	NEW	240	4	14
TOTAL GAS LOAD:				1560		

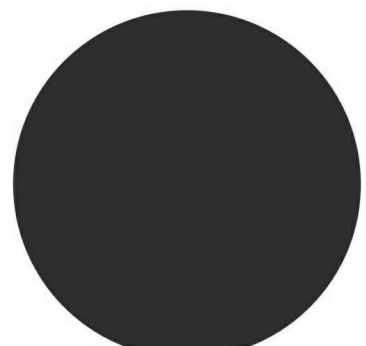


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PLUMBING - DETAILS
AND SCHEDULES

P-201

2" REFERENCE LINE

Division 22 - PLUMBING SPECIFICATION
SECTION 22 05 00.00 - COMMON WORK RESULTS FOR PLUMBING
GENERAL

The general conditions, supplementary conditions and instructions to bidders shall apply to and be part of this specification.

Contractor shall comply with all applicable codes, rules and regulations.
Contractor shall obtain and pay for all permits, certificates of inspection and approvals required. The base bid shall include furnishing all materials, labor, tools, equipment and installation of all work required to provide complete plumbing systems as outlined in Division-22.
Examine the drawings, specifications, and visit the site prior to submitting a bid.
APPLICABLE STANDARDS

The applicable provisions of the following standards shall govern:

American Society for Test Materials (ASTM);
American Standards Association (ASA);
Underwriters Laboratories (UL);
National Fire Protection Association (NFPA);
Illinois Building Code.

The installation of all plumbing work shall conform to the applicable local plumbing codes and statutes.

PLANS
Plans are diagrammatic indicating required size, points of termination of piping and suggested routes. However, it is not intended that drawings indicate all necessary offsets. Install piping in such manner as to conform to the structure, avoid obstructions and preserve headroom. All piping shall be run as straight as possible and symmetrical with architectural items. Piping shall be concealed in pipe shafts, pipe spaces, and furring wherever possible. Piping fabricated before coordination with the other trades will be done at contractors' own risk.
In the event of inconsistencies or conflict within or between the Contract Documents, provide the better quality, more costly or greater quantity of work and comply with the more stringent requirements. Seek the direction of the Engineer of Record for clarification of conflicts as soon as a conflict is identified. (Prior to installation)

CUTTING, PATCHING AND DEMOLITION

Contractor shall include all necessary cutting and patching required to perform their work. Care shall be taken when working in existing spaces so as not to damage existing walls and ceilings where work is being performed.
Provide non-destructive concrete structural scanning or concrete x-ray prior to drilling, cutting or coring.
Saw cut all slab penetrations. Seal around all wall, floor and ceiling pipe penetrations with NFPA approved sealant material to maintain the fire resistant and watertight integrity of the assembly. Disconnect, demolish, and remove from site all plumbing systems, equipment, and components intended to be removed and as necessary to perform the described scope of work. No unused plumbing systems, equipment, and components shall be abandoned.
No means of demolition shall be used that would result in damage to structures, materials, equipment or components indicated to remain or endanger the health, safety and welfare of the general public.

EXCAVATION AND BACKFILL

Perform all excavation and backfilling required for this work. Contractor shall consult with utility company prior to beginning excavation.
At a minimum, all piping shall be laid on a bed of sand, 6" deep, well tamped into place and properly graded to permit the pipe to have an even bearing throughout its entire length. Sand shall be installed around the piping and to a point 6" above the piping.
PIPE JOINTS AND CONNECTIONS
Any minor adjustment in location of alignment of new work or connection to existing utilities shall be made as directed by the engineer without additional cost to the owner.
The contractor shall be responsible for damages to the grounds, walks, road, building, piping systems, electrical systems, and their equipment and contents, caused by leaks in the piping systems being installed or having been installed by him. The contractor shall repair at his expense all damaged or caused. All repair work shall be done as directed by and in such manner as satisfactory to the architect.
Owner reserves the right to make emergency repairs as required to keep equipment in operation without voiding the contractor's guarantee bond nor relieving the contractor of his responsibilities during the bonding period.

project conditions
Where new plumbing systems are required to be connected to existing plumbing systems, it is the contractor's responsibility to verify the location, size, invert elevation, pressure, condition, and they shall verify that the existing plumbing system is indeed the correct and appropriate plumbing system before any work is done. Provide all necessary camera scoping and dye testing as necessary. If there is any need for concern, if it is determined that the existing plumbing system is not a correct or appropriate plumbing system or not connected to a correct or appropriate plumbing system, if the condition of the existing plumbing system is not viable for re-use, or any other condition that would not allow the proper functioning of the new plumbing system, the contractor shall notify the engineer in writing immediately via RFI and wait for direction before proceeding.

WARANTY
This contractor shall warrant that all work under this section shall be free of defective work, materials and parts for a period of one year after acceptance of the work and shall repair, revise, and replace, at no cost to the owner, any such defects occurring within the warranty period.

22 05 03.00 - SUBMITTALS FOR PLUMBING

General
Where submittals are required by the Contract Documents, they shall be prepared and supplied in accordance with the Contract Documents. In addition to Division 01, the Contractor is advised to review and comply with the requirements articulated within each Division and within each section of that Division.
Some Divisions may include a division-specific "Submittal Requirements for ..." section. Where this section exists, it articulates additional requirements for submittals that apply to the work of that Division.
The following requirements help to identify, track and keep the project organized for all parties involved. They are necessary to ensure a timely turnaround and an appropriate technical review. Submittals that do not conform to the administrative requirements are rejected and returned, without technical review.
Requirements
Supply submittals for each section: Submittals shall be supplied on a section-by-section and type-by-type basis. For example, independent product data submittals shall be furnished for each section that requires product data submittals. Independent shop drawing submittals shall be furnished for each section that requires shop drawings. Refer to the specifications for identification of which submittals are required for the project. Separate PDF file packages shall be supplied for each section, for each submittal type, where electronic submittals are required. Each PDF shall represent a single standalone submittal.
Separately bound and identified submittals shall be provided where hardcopies are required. Include a transmittal: Transmittals shall enumerate each submittal for each section of each type and iteration.
Include cover sheet / title page: The cover sheet shall include the information identified in the contract documents. It shall be included as the first page of each electronic and/or hardcopy document-based submittal. An editable and printable PDF form created with editable fields and specification compliant appearance is available from KIH upon request. It is also downloadable from the KIH website at www.kihengrs.com.
Include an index: The index shall enumerate the contents of the submittal.
Include checklists: Where checklists are included with the specifications, complete and include them within the appropriate submittal. Supply complete submittals: Complete submittals of each type are required. Partial submittals will be rejected. Where a section requires a product data submittal, all product data for that section shall be supplied together, at one time, as one complete submittal. Do not send half the product data as one submittal and the other half as a separate one. When resubmittal is required (e.g. Revise and Resubmit) the revised submittal shall be more complete, more accurate and more contract-compliant than its rejected predecessor. The submittal number (for each section and type) shall increment for each subsequent submittal (00 - Original submission, 01 - First Resubmission, 02 - Second Resubmission, etc...). Resubmittals shall include a copy of the reviewers comments supplied with the prior submittal rejection and shall be amended with a description of the specific action taken to comply with the reviewer's comments.
The absence of this on resubmittal is cause for rejection.
Name electronic files to match the submittal ID and cover sheet: The electronic file name of submittals shall match the submittal ID included on the submittals cover page. For example: The original/first product data submittal for Section 220523 would be labeled as "220523.00-PD-00"; the first resubmittal of same shall be labeled "220523.00-PD-01". The original/first shop drawings submittal file for the same section would be labeled "220523.00-SD-00"; the first resubmittal of same shall be labeled "220523.00-SD-01".

Use of Electronic Drawings from the Owner's Design Team
Plan drawings for the Project were created with Revit. Revit electronic files are not available. If expressly permitted by the Owner and the terms of the Contract, editable electronic versions of published two-dimensional plan drawings may be made available for the creation of shop and as-built drawings for a nominal surcharge by sheet series for projects that were designed in Revit and must be converted to an AutoCAD or Navisworks format.
Due to the proprietary nature of internal design systems, editable native-software versions of some drawings, including but not limited to system diagrams and details will not be made available in an editable form. In these cases, electronic versions of the drawings may be made available only in PDF, JPG or similar non-editable electronic form, at the sole discretion of the Design Professional. The Request Drawings form can be accessed, filled out and submitted at the following internet address (scroll down to bottom of home page): <http://www.kihengrs.com>.

22 05 23.00 - GENERAL DUTY VALVES

General
Provide stops or isolation valves on domestic water supplies to isolate hot and cold water to each fixture, including all equipment and equipment provided by others.
Fixtures, item or units furnished by the manufacturer with integral stops or stops specified with the fixture are considered to be properly valved at the fixtures.
Access shall be provided to all valves.
Valves on domestic water piping shall be ball valves.
Ball valves - 2 inch and smaller: Lead-Free, 2-piece body, 600 psi CWP, 100 psi at 300°F, cast bronze body, full port, Teflon seats, blowout-proof stem, adjustable packing gland, chrome plated bronze ball, and vinyl-covered steel handle. Provide solder ends. Provide extended valve stems for valves used on insulated lines. Provide equal to Nibco series 585-80-LF.
Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the work include, and are limited to, the following:
American Valve, Inc.
Conbraco Industries, Inc.; Apollo Valves.
Crane Co., Crane Valve Group; Crane Valves.
Hammond Valve.
Milwaukee Valve Company.
NIBCO INC.
Red-White Valve Corporation.
Watts Regulator Co., a division of Watts Water Technologies, Inc

CHECK VALVES
Spring check valves - class 125, cast bronze body and cap, horizontal swing, y-pattern, with a bronze disc, and having threaded or solder ends. Provide solder ends for domestic hot and cold water service. Provide equal to Nibco T-480-Y-LF.

22 05 28.00 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

GENERAL
Support all piping and equipment by hangers or brackets. Provide structural steel members where required to support piping and equipment. No portion of piping or valves shall be supported by equipment.

DELEGATED DESIGN

For equipment supports, this contractor shall retain a qualified professional engineer to provide support calculations of static and dynamic loading due to operating equipment weight, seismic and wind forces. The signed and sealed calculations and details shall be submitted by the retained professional engineer.

PIPING

Provide hangers, supports, clamps and attachments to support piping properly from building structure. Support from the decking above is prohibited. Arrange for grouping of parallel runs of horizontal piping supported together on field-fabricated, heavy-duty trapeze hangers where possible. Where piping of various sizes is supported together by trapeze hangers, space hangers for smallest pipe size or provide intermediate supports for smaller diameter pipe as specified above for individual pipe hangers.
Individual pipe hangers to be Anvil International Clevis Hanger Fig. 260, Elcen, or approved equal. Rod sizes to conform to the following: 3/8" rods for 3/4" to 2" pipe; 1/2" rods for 2-1/2" to 3" pipe; 5/8" rods for 4" to 5" pipe; 3/4" rods for 6" pipe.
Hangers shall be sized to allow insulation to pass through unobstructed, provide saddle support for insulation at all hangers.
Hanger spacing for steel piping unless otherwise noted is to be as follows: 1'-1/4" or smaller to be 8' on center; 1-1/2" to 2" to be 10' on center; 2-1/2" and larger to be 12' on center and at each change of direction.
Hanger spacing for copper pipe to be as follows: 1" or smaller 6' on center; 1-1/4" or larger 8' on center.
Hanger spacing for cast iron piping shall be 5'-0" on center.

Spring shall also be supported at each change in direction, valves and equipment.

22 05 53.00 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PIPING
Provide self-adhesive pipe labels with white background and black lettering, contact type with permanent adhesive backing. Include identification of piping service using same designations or abbreviations as used on the drawings and an arrow indicating flow direction.

EQUIPMENT
Provide self-adhesive plastic equipment labels with white background and black lettering, contact type with permanent adhesive backing, 160 degree F temperature. Include equipment's drawing designation and specification section number where equipment is specified.

22 07 19.00 - PLUMBING SYSTEM INSULATION

GENERAL
Insulation shall be listed and labeled per ASTM E 84 for plenum installations employing slip on techniques.

Provide insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

PIPING SYSTEMS REQUIRING INSULATION
Insulate domestic cold water piping, associated fittings and valves with flexible elastomeric 1/2" wall thickness insulation.

Insulate domestic hot water piping, associated fittings and valves with 1" thick flexible elastomeric, 1-1/2" thick fiberglass insulation or per local energy code, whichever greater.

Insulate domestic hot water return piping, associated fittings and valves with 1" wall thickness insulation or per local energy code, whichever greater.

Insulate waste piping above ceilings that receive condensate with 1/2" wall thickness insulation.

Insulate exposed sanitary drains, domestic water, domestic hot water, and stops for plumbing fixtures for people with disabilities.

FLEXIBLE ELASTOMERIC INSULATION
Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

Adhesives, Sealers, and Protective Finishes: As recommended by insulation manufacturer for applications indicated.

Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the work include, and are limited to, the following:

Aeroflex USA, Inc.; Aerocel.
Armaflex LLC; AF Armflex.
K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

FIBERGLASS INSULATION
Fiberglass piping insulation: ASTM C 547, Class 1

knitcase pipe fittings insulation with one-piece pre-molded PVC fitting covers.

Vapor Barrier Material: Paper-backed aluminum foil, except as otherwise indicated, strength and permeability rating equivalent to adjoining pipe insulation jacketing.

Staples, Bands, Wires, and Cement: As recommended by insulation manufacturer for applications indicated.

Adhesives, Sealers, and Protective Finishes: As recommended by insulation manufacturer for applications indicated.

Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the work include, and are limited to, the following:

Armstrong World Industries, Inc.
Owens-Corning Fiberglass Corp.
Keene Corp.
Certain Teed
Johns Manville.

ADHESIVES
Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

Insulation for handicap accessible fixtures
All handicap lavatory p-trap and angle stop assemblies shall be insulated with trap wrap protective kit manufactured by ProFlo model PF-202WH or equal. Abrasion resistant, anti-microbial vinyl exterior cover shall be smooth. For traps, the insulation shall have a cleantout nut cap to allow service to the trap without disassembly. For stops, the insulation shall have a lock lid that prevents tampering but allows access without removal of the insulation. Fasteners shall remain substantially out of sight.

Manufacturers: subject to compliance with requirements:
ProFlo
Truebro
FlumDrexx

22 11 16.00 - DOMESTIC WATER PIPING

GENERAL
Install piping concealed from view unless noted otherwise, free of sags and bends. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction. Clean and disinfect potable domestic water piping using approved procedures by authorities having jurisdiction.

Install at right angles; diagonal runs are prohibited unless otherwise shown. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal. Coordinate all piping with all other trades.

Provide water pressure regulators where necessary to limit the incoming water pressure to 80 psi inside the building.

DOMESTIC WATER PIPING ABOVE GROUND:
Hard copper tube: ASTM B 88, Type L wrought-copper, solder-joint fittings; and soldered joints.

Solder Filler Metals: ASTM B 32, lead-free alloys.
Flux: ASTM B 813, water flushable.

Type 1; copper pressure-seal joint; and pressure-seal joint systems.

CATHODIC PROTECTION
Provide dielectric insulation at points where copper or brass pipe comes in contact with ferrous piping, reinforcing steel or other dissimilar metal in structure.

22 13 03.00 - NATURAL GAS PIPING SYSTEMS
GENERAL
Plumbing contractor shall be responsible for installing gas piping run-outs to all gas-fired equipment, including equipment supplied by the HVAC and electric contractors. Piping shall be installed full-size (as indicated on the drawings) to each unit's gas inlet connection, burner, regulator, etc. Plumbing subcontractor shall provide gas cock and make final connections.

Connections to each gas-fired equipment item shall include a drip leg and shutoff gas cock. Comply with equipment manufacturer's instruction. For connections to gas-fired rooftop equipment, plumbing contractor shall be responsible for the roof penetration and shall install the gas piping through the roof in a location that has been coordinated with the HVAC contractor.

BUILDING DISTRIBUTION PIPING:
All piping from meter/regulator to gas fired equipment connections shall be black steel.
Steel Pipe - ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

Pipe size 2" and smaller: Malleable Fittings
Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.

GENERAL DUTY VALVES:
Metallic valves 2 inches and smaller shall comply with ASME B16.33, cold working pressure of 125 psig.
Metallic valves larger than 2 inches shall comply with ASME B16.38, cold working pressure of 125 psig.

Provide one-piece ball valves with bronze body, chrome-plated brass ball, blowout proof stem and seat, and bronze trim complying with MSS SP-110.
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, and limited to, the following:

BrassCraft Manufacturing Company; a Masco Company.
Conbraco Industries, Inc.; Apollo Div.
Lyall, R. W. & Company, Inc.
McDonald, A. Y. Mfg. Co.
Perfection Corporation; a subsidiary of American Meter Company.

PRESSURE REGULATORS:
Provide pressure regulators to conform with ANSI Z21.80, cast iron or die-cast aluminum body, interchangeable zinc-plated steel springs and diaphragm plate, single port, self-contained regulator with orifice no larger than required at maximum pressure inlet and no pressure sensing piping external to the regulator.
Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.

Overpressure Protection Device: Factory mounted on pressure regulator.
Regulator shall include vent limiting device, instead of vent connection and piping, if approved by authorities having jurisdiction.

NATURAL GAS METERS:
Service meters shall comply with the requirements of the utility supplying gas to the facility.

22 13 16.00 - SANITARY, WASTE AND VENT PIPING SYSTEM
GENERAL
Provide a complete soil, waste and vent system in the building and on the site as indicated on the drawings and as specified herein.
Above ground soil, waste and vent piping within buildings including soil stacks, vent stacks,

horizontal branches, traps, and connections to fixtures and drains.
Underground building drain piping including main branches, traps, connections to fixtures and drains, and connections to stacks, terminating at connection to existing sanitary sewer.

INTERIOR PIPING
Cast iron soil piping and fittings no hub ASTM A-74 with ASTM C-564 gasketed joints.
Waste and vent piping 2-1/2" and under - 1-Type "M" copper ASTM B88 82

Soil, waste and vent piping 3" and over in size and all underground cast iron soil piping and fittings, ASTM A-74.
No-hub cast iron pipe and fittings may be used above floor for soil, waste, and vent piping.

Piping alignment shall be as indicated on the drawings using approved wye branches or eight bands for direction changes and shall be surely supported or secured to maintain such alignment.

Piping alignment shall be as indicated on the drawings using approved wye branches or eighth bends for direction changes and shall be surely supported or secured to maintain such alignment. Pitch of sanitary piping shall be uniform at a minimum of 1/8" per foot for building drains, drainage piping greater than 2" and as indicated on the drawings. Pitch of sanitary piping shall be uniform at a minimum of 1/4" per foot for drainage piping 2" and smaller and as indicated on the drawings.

Protection shall be given all footings, other structural elements during underground work adjacent to such items. Refer to architectural and/or structural drawings for locations.

Vent all fixtures, connect branch vents to main vent risers at least six inches above flood rim of fixtures. Pvent vent lines back to soil or waste pipe, free of drops and sags.

Cleanouts shall be full size of pipe up to 4" and 4" for larger sizes. For underground and concealed lines, provide cleanouts in accessible positions at each right angle turn and at intervals not to exceed fifty feet. In floors, install flush with finish floor with extension pipe from cleanout wye.

22 30 01.00 - POINT OF USE THERMOSTATIC MIXING VALVES
GENERAL
Thermostatic mixing valves shall be provided for all public hand washing sinks and lavatories and shall be ASSE 1070 listed, lead free, sweat connections, 125 psi operating pressure. Mount under sink or lavatory. Set outlet temperature of thermostatic mixing valves to 105 degrees F.

Point-of-use thermostatic mixing valves shall be equal to Powers LFG480. Route tempered water to hot water side of sink and lavatories.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, and are limited to, the following:

Symmons
Lawler
Leonard
Powers
Bradley

22 33 00.00 - COMMERCIAL ELECTRIC, DOMESTIC WATER HEATERS
TANK TYPE
Provide commercial electric tank type water heater as scheduled. Comply with UL 1453 Standard.

Provide corrosion resistant metal drain pan with raised edge sized not less than the base of the water heater and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads.

Provide field fabricated piping heat trap arrangement according to ASHRAE/IESNA 90.1.

Provide combination temperature and pressure relief valve, ASME rated and stamped with relieving capacity at least as great as heat input and pressure setting less than water heater's rated operating pressure.

Provide water heater stands or mounting brackets with manufacturer's factory fabricated steel capable of supporting water heater and water.

Provide steel pressure-rated expansion tank constructed with welded joints and factory-installed butyl rubber diaphragm, pre-charged to minimum system operating pressure at tank.

Provide field-fabricated piping-type heat traps in accordance with ASHRAE/IESNA 90.1.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, and are limited to, the following:

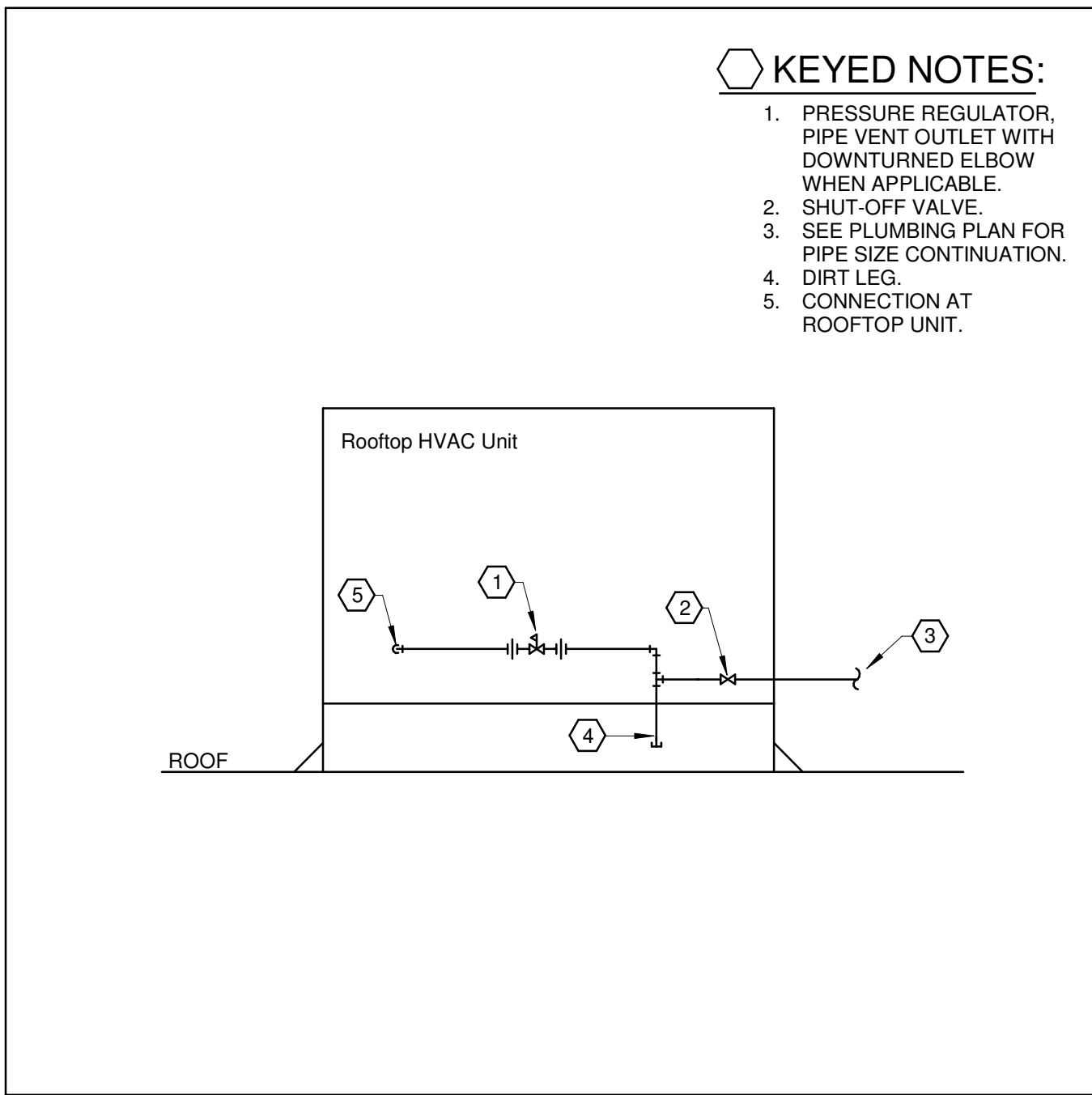
AO Smith
Bock Water Heaters
Bradford White Corporation.
Lochinvar Corporation.
State Industries.

22 40 00.00 - PLUMBING FIXTURES
GENERAL
Refer to plumbing fixture schedule.

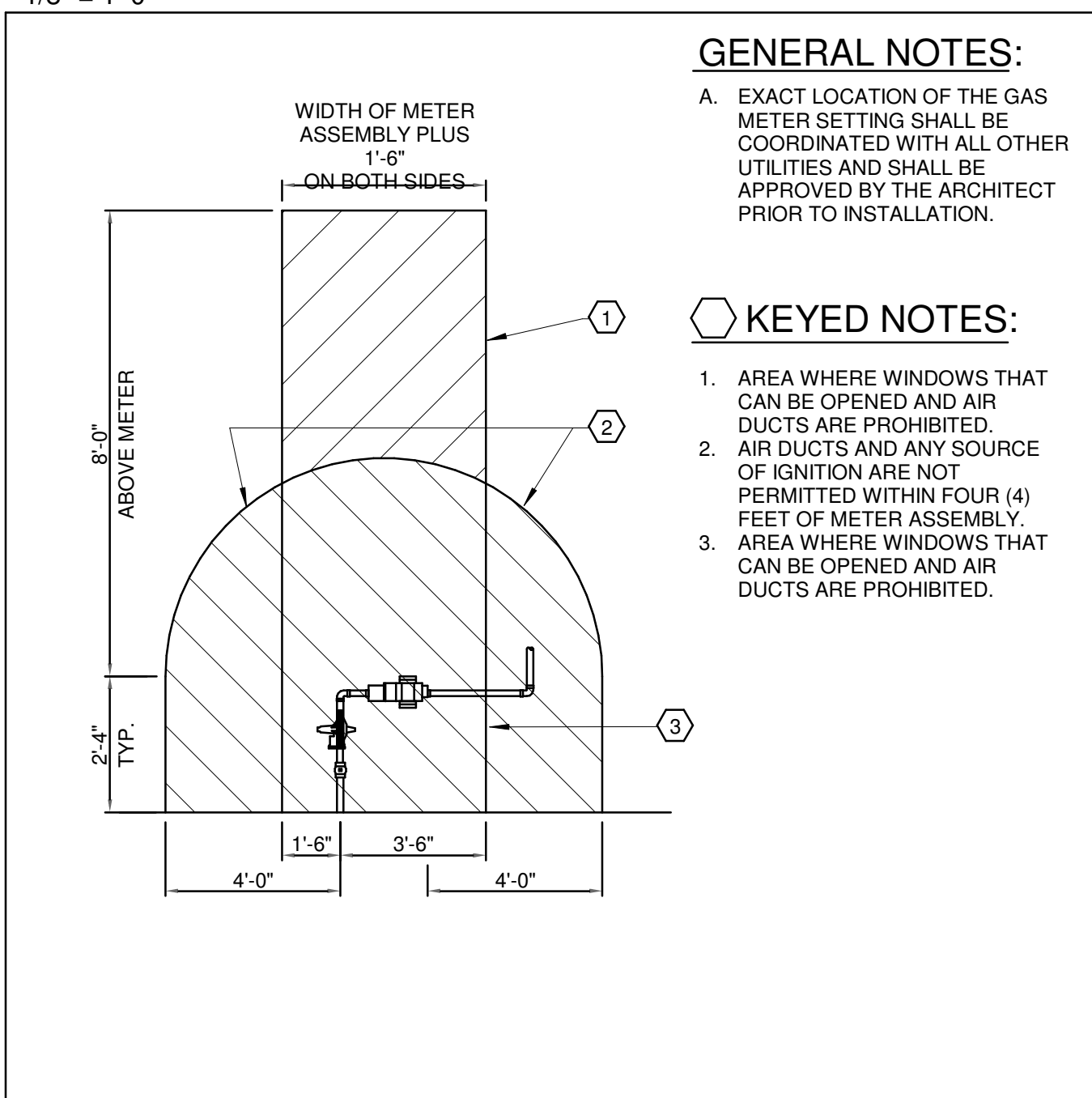
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, and are limited to, the following:

American Standard America.
Crane Plumbing, LLC.
Kohler Co.
Toto USA, Inc.
Zurn Industries, LLC; Commercial Brass and Fixtures.
Sterling; a Kohler Company.
Ejler Inc.

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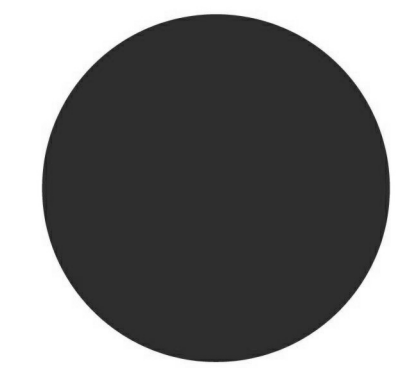
221613.00-14 - GAS PIPING CONNECTIONS
1/8" = 1'-0"



221613.00-01 - GAS METER SETTING CLEARANCES
1/8" = 1'-0"

2" REFERENCE LINE

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PLUMBING - DETAILS
AND SPECIFICATIONS

P-301

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