MECHANICAL SPECIFICATIONS

PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM. DEFINITIONS: FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION. INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE. PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE. WARRANTY: PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. PROVIDE OPERATION MANUALS, MAINTENANCE MANUALS AND SCHEMATICS FOR ALL MECHANICAL EQUIPMENT INSTALLED. COORDINATION: COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. ROOF PENETRATIONS SHALL COMPLY WITH "SMACNA" AND "NRCA" STANDARDS, AND WITH THE REQUIREMENTS OF THE EXISTING ROOFING WARRANTY, IF APPLICABLE. DO NOT PERFORM ROOFING PENETRATIONS IN A MANNER WHICH WOULD VOID OR OTHERWISE LIMIT THE EXISTING ROOF WARRANTY. DUCT DIMENSIONS: UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS. SHEET METAL DUCTWORK: PROVIDE SHEET METAL DUCTWORK FABRICATED AND INSTALLED IN ACCORDANCE WITH ASHRAE AND SMACNA STANDARDS, FOR 1" W.G. PRESSURE CLASS, SEAL CLASS "A". SHEET METAL SHALL BE GALVANIZED SHEET STEEL OF LOCK FORMING QUALITY, WITH G90 ZINC COATING. SHEET STEEL SHALL COMPLY WITH ASTM A653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC-IRON ALLOY-COATED (GALVANNEALED) BY THE HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENTS FOR SHEET, METALLIC-COATED BY THE HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES AT ALL 90° ELBOWS. TRAPEZE DUCT HANGERS: PROVIDE MINIMUM 1" X 2" X 1" X 18 GAUGE CHANNELS WITH MINIMUM 1" X 18 GAUGE STRAPS TO STRUCTURAL SUPPORT. ROUND SHEET METAL DUCT: PROVIDE SPIRAL SEAM (ALL SIZES) OR SNAP LOCK (DUCT SIZES UP TO 10") GALVANIZED STEEL COMPLYING WITH SMACNA STANDARDS. SPIRAL SEAM DUCTWORK SHALL HAVE SMACNA SEAM TYPE RL-1. FIBER GLASS DUCT BOARD IS AN ACCEPTABLE ALTERNATIVE IF APPROVED BY OWNER AND THE LOCAL BUILDING CODE OFFICIAL. PRODUCT AND INSTALLATION MUST MEET NAIMA STANDARDS AND OTHER APPLICABLE CODES AND REGULATIONS. EXPOSED DUCTWORK: EXPOSED DUCTWORK SHALL BE CLEANED OF DEBRIS AND OIL, THEN WIPED DOWN WITH VINEGAR OR OTHER SURFACE PREPARING CHEMICAL TO PREPARE DUCT FOR PAINT. DUCT SEALANT: PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS. SEALER SHALL BE HIGH IN SOLID CONTENT. PROVIDE A TWO PART TAPE SEALING SYSTEM, CONSISTING OF WOVEN FIBER TAPE IMPREGNATED WITH A GYPSUM MINERAL COMPOUND, AND A MODIFIED ACRYLIC/SILICONE ACTIVATOR THAT REACTS EXOTHERMICALLY WITH THE TAPE. TWO PART TAPE SEALING SYSTEM MUST BE RATED FOR BOTH INDOOR AND OUTDOOR APPLICATION. TAPE SHALL NOT CONTAIN ASBESTOS. DUCT INSULATION: MATERIAL FOR SUPPLY AND RETURN AIR DUCT ABOVE CEILING INSIDE THE BUILDING SHALL HAVE THE EQUIVALENT THERMAL RESISTANCE OF MINIMUM R-6. THE REQUIRED R VALUES ARE FOR INSTALLED INSULATION WITH 25% COMPRESSION AT THE CORNERS. PROVIDE PINS AND WASHERS IN ACCORDANCE WITH SMACNA REQUIREMENTS AND AS REQUIRED TO PREVENT INSULATION FROM SAGGING. PROVIDE ADEQUATE INSULATION AT THE SUPPLY AIR DIFFUSERS TO PREVENT CONDENSATION. FLEXIBLE DUCT : UL #181 LISTED, CLASS 1, AND CONTAIN A 0.1 PERM RATED POLYETHYLENE INNER LINER, WITH R-8 FIBERGLASS INSULATION. FLEXIBLE DUCTS SHALL BE SECURED TO RIGID SHEET METAL COLLARS AND AIR DIFFUSERS WITH NYLON TIES OR STAINLESS STEEL WORM GEAR STRAPS. SEAL ALL CONNECTIONS AND JOINTS AIRTIGHT. SUPPORT FLEXIBLE DUCTS FROM THE BUILDINGS STRUCTURE WITH MINIMUM 1" WIDE, 18 GAUGE, GALVANIZED STEEL STRAP AT MAXIMUM 4'-0" CENTERS. PROVIDE 4" WIDE SHEET METAL SADDLES AT EACH SUPPORT EACH STRAP. SAG OF FLEXIBLE DUCT BETWEEN HANGERS SHALL NOT EXCEED 1/2" PER FOOT OF SUPPORT SPACING. RADIUS FOR TURNS OF FLEXIBLE DUCTS SHALL BE A MINIMUM OF ONE DUCT DIAMETER. FLEXIBLE DUCT RUNS SHALL NOT EXCEED 10'-0" IN LENGTH AND SHALL BE THE SAME SIZE AS THE DIFFUSER NECK CONNECTION. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM ½" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".

DUCT TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE. FLEXIBLE DUCT CONNECTORS: PROVIDE U.L. LABELED 30 OUNCE NEOPRENE COATED FIBERGLASS FABRIC DUCT CONNECTORS. DUCT ACCESS DOORS: PROVIDE HINGED ACCESS DOORS IN DUCTWORK WHERE REQUIRED FOR ACCESS TO EQUIPMENT. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. CONSTRUCT OF SAME OR THICKER GAUGE SHEET METAL AS DUCT IN WHICH IT IS INSTALLED. PROVIDE FLUSH FRAMES FOR UN-INSULATED DUCTS, AND EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCTS. PROVIDE CONTINUOUS HINGE ON ONE SIDE, WITH ONE HANDLE-TYPE LATCH FOR ACCESS DOORS 12" HIGH AND SMALLER, AND TWO HANDLE-TYPE LATCHES FOR LARGER ACCESS DOORS. HVAC CONTROL SYSTEM: PROVIDE ALL THE NECESSARY CONTROLS AND CONTROL WIRING IN CONDUIT COMPATIBLE TO SYSTEMS SHOWN ON EQUIPMENT SCHEDULE M2.0. PROGRAMMABLE THERMOSTAT FOR EACH SYSTEM SHALL ENABLE THE SUPPLY FAN AND CYCLE THE COOLING AND HEATING STAGES TO MAINTAIN SPACE SET-POINT. SUPPLY FAN RUNS CONTINUOUSLY DURING THE OCCUPIED MODE. EACH THERMOSTAT SHALL HAVE A DEAD BAND OF AT LEAST 5 DEGREES (ADJ) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING IS SHUT OFF, EACH THERMOSTAT SHALL HAVE SETBACK AND SET-UP CAPABILITY DURING THE UNOCCUPIED MODE. FOR SETBACK, THE HEATING SHALL RESTART AND TEMPORARILY OPERATE ACCORDING TO A SET-POINT ADJUSTABLE DOWN TO 55 DEGREES. FOR SET-UP, THE COOLING SHALL RESTART AND TEMPORARILY OPERATE ACCORDING TO A SET-POINT ADJUSTABLE UP TO 85 DEGREES OR TO PREVENT HIGH SPACE HUMIDITY LEVELS. EACH SYSTEM SHALL BE PROVIDED WITH A MOTORIZED OUTSIDE AIR DAMPER THAT WILL AUTOMATICALLY SHUT WHEN THE SYSTEM OR SPACES SERVED ARE NOT IN USE. VENTILATION OUTSIDE AIR DAMPERS SHALL BE CAPABLE OF AUTOMATICALLY CLOSING DURING PREOCCUPANCY BUILDING WARM-UP, COOL DOWN, AND SETBACK, EXCEPT WHEN VENTILATION REDUCES ENERGY COSTS (e.g., NIGHT PURGE) OR WHEN VENTILATION MUST BE SUPPLIED TO MEET CODE REQUIREMENTS. COMMISSIONING/VERIFICATION: HVAC CONTROL SYSTEM SHALL BE TESTED TO ENSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED, AND IN PROPER WORKING CONDITION, AND THAT THE SYSTEM MEETS THE DESIGN REQUIREMENTS. TEST AND BALANCE: CONTRACT DIRECTLY A THIRD PARTY TO PROVIDE TEST AND BALANCE OF THE HVAC SYSTEM. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR SCHEDULING. TEST AND ADJUST ALL MECHANICAL SYSTEM AND EQUIPMENT TO ASSURE PROPER BALANCE AND OPERATION. PERFORM TESTS IN ACCORDANCE WITH NEBB PROCEDURAL STANDARDS-1999 OR AABC 2002. AND ASHRAE STANDARD 111. ELIMINATE NOISE AND VIBRATION, AND ASSURE PROPER FUNCTION OF CONTROLS. SUBMIT COMPLETED TEST AND BALANCE REPORT TO OWNER'S REPRESENTATIVE. BALANCING CONTRACTOR SHALL BE INDEPENDENT AND CERTIFIED WITH NEBB OR AABC. BALANCE ALL SYSTEMS WITHIN 5% OF AIR FLOW INDICATED ON DRAWINGS, AND REPORT ALL DISCREPANCIES TO THE HVAC CONTRACTOR FOR CORRECTION. MARK FINAL BALANCE POSITIONS ON DAMPERS WITH PERMANENT MARKER. COMPLETION REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS AND AN OPERATING AND MAINTENANCE MANUAL TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE OWNER. THE RECORD DRAWING SHALL BE OF THE ACTUAL INSTALLATION AND INCLUDE AS A MINIMUM THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES, AND THE TERMINAL AIR OR WATER DESIGN FLOW RATES. THE OPERATING AND MAINTENANCE MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING; (A) SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE; (B) OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE, EXCEPT EQUIPMENT NOT FURNISHED AS PART OF THE PROJECT. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED; (C) NAMES AND ADDRESSES OF AT LEAST ONE SERVICE AGENCY; (D) HVAC CONTROLS SYSTEMS MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SYSTEM SEQUENCE DESCRIPTIONS. DESIRED OR FIELD-DETERMINED SET-POINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DRAWINGS AT CONTROL DEVICES OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS; (E) A COMPLETE NARRATIVE OF HOW EACH SYSTEM EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING SET-POINTS.

HVAC GENERAL NOTES

1. THE INTENT OF THESE PLANS AND SPECIFICATIONS IS TO INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND SERVICES NECESSARY TO FURNISH, INSTALL, TEST, AND ADJUST A COMPLETE WORKABLE HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM AS SHOWN, PRESCRIBED, OR REASONABLY IMPLIED BUT NOT LIMITED TO THAT EXPLICITLY INDICATED IN THE CONTRACT DOCUMENTS, BUT NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE INTENT THEREOF.
2. THE ENTIRE INSTALLATION SHALL CONFORM TO THE APPLICABLE CODES AND REGULATIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION. IN THE EVENT OF CONFLICT BETWEEN SPECIFICATIONS, CODES, AND REGULATIONS, THE MORE RESTRICTIVE SHALL APPLY.
3. DRAWINGS FOR HVAC WORK ARE DIAGRAMMATIC SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENT, REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS. PROVIDE ALL DUCTWORK, MATERIALS, CONNECTIONS, ACCESSORIES, FITTINGS, OFFSETS, TRANSITIONS, DAMPERS AS REQUIRED FOR A COMPLETE WORKABLE SYSTEM.
4. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND APPROVED LISTING. ALL EQUIPMENT, PIPING AND SUPPORTS SHALL BE RESTRAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS" BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA). ALL EQUIPMENT SHALL BE ANCHORED TO RESIST THE LATERAL FORCE REQUIREMENTS OF CHAPTER 16 OF THE 2012 CALIFORNIA BUILDING CODE.
5. COORDINATE THE INSTALLATION OF THE HVAC SYSTEM WITH ALL OTHER TRADES PRIOR TO FABRICATION OR INSTALLATION. COORDINATE THE LOCATIONS OF PENETRATIONS AND FINAL LOCATION OF ALL EQUIPMENT WITH THE GENERAL CONTRACTOR. PROVIDE EQUIPMENT WEIGHTS, EQUIPMENT DIMENSIONS, PLATFORM SIZES & LOCATIONS, CURB SIZES & LOCATIONS, CONCRETE PAD SIZES AND LOCATIONS AS REQUIRED. COORDINATE LOCATIONS OF GAS & CONDENSATE LINES WITH PLUMBING CONTRACTOR. COORDINATE LOCATIONS OF POWER, DISCONNECTS, AND CONTROL CONDUIT WITH THE ELECTRICAL CONTRACTOR. COORDINATE LOCATIONS OF ALL DIFFUSERS, REGISTERS, AND GRILLES WITH ARCHITECTURAL PLANS, ELECTRICAL LIGHTING PLANS AND ARCHITECTURAL ELEVATIONS.
6. DETAILS FOR EQUIPMENT PADS, PLATFORMS, AND FLASHINGS SHALL BE AS INDICATED BY THE ARCHITECTURAL/STRUCTURAL/CIVIL DRAWINGS, UNLESS NOTED OTHERWISE.
7. ALL EQUIPMENT, DUCTS, PIPING, SUPPORTS, AND OTHER DEVICES OUTSIDE OF THE BUILDING OR EXPOSED TO WEATHER, SHALL BE COMPLETELY WEATHER-PROOFED.
8. OUTSIDE AIR INTAKES SHALL BE AT LEAST 10 FT. AWAY OR 3 FT. BELOW ANY VENT OR EXHAUST DISCHARGE.
9. ALL DUCT SIZES ARE CLEAR INSIDE DIMENSIONS. DUCTWORK SHALL BE CONSTRUCTED, ERECTED, INSULATED AND TESTED IN ACCORDANCE CHAPTER 6 OF THE 2022 CALIFORNIA MECHANICAL CODE.
10. ALL EXHAUST FANS SHALL BE EQUIPPED WITH A BACK DRAFT DAMPER.
11. DUCT AND AIR TRANSFER PENETRATIONS THRU BUILDING ASSEMBLIES REQUIRING PROTECTION SHALL BE PROTECTED WITH FIRE DAMPERS, SMOKE DAMPERS, COMBINATION SMOKE/FIRE DAMPERS AND CEILING RADIATION DAMPERS IN ACCORDANCE WITH SECTION 607 OF THE CALIFORNIA MECHANICAL CODE. DUCTS NOT REQUIRING DAMPERS SHALL COMPLY WITH SECTION 714 & 717 OF THE 2022 CALIFORNIA BUILDING CODE.
12. INSTALL SMOKED DETECTORS AND PROVIDE FOR SMOKE DETECTION AND AUTOMATIC SHUT-OFF OF ALL AIR HANDLING EQUIPMENT IN ACCORDANCE WITH SECTION 606 OF THE 2022 CALIFORNIA MECHANICAL CODE.
13. UNLESS NOTED OTHERWISE, ALL LINE VOLTAGE WIRING, CONDUIT, FINAL CONNECTIONS, DISCONNECTS, STARTERS, AND OVER CURRENT PROTECTION DEVICES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AS INDICATED ON THESE MECHANICAL DRAWINGS AND/OR ELECTRICAL DRAWINGS AND/OR ELECTRICAL SECTION OF THE SPECIFICATIONS.
14. INSTALL ALL LOW VOLTAGE HVAC CONTROL WIRE AND DEVICES PER PLAN. ALL WIRE SHALL BE IN CONDUIT PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR UNLESS NOTED OTHERWISE.
15. PROVIDE OWNER WITH THREE COPIES OF A CERTIFIED AIR BALANCE REPORT PREPARED IN BY A THIRD PARTY CERTIFIED BY THE AABC OR NEBB. TEST, ADJUST AND BALANCE THE HVAC SYSTEM IN ACCORDANCE WITH AABC OR NEBB PROCEDURES. PROVIDE START-UP/TEST REPORTS FOR ALL AIR HANDLING EQUIPMENT, FANS, AND REFRIGERATION EQUIPMENT. TEST AND VERIFY PROPER OPERATION OF ALL MAKE-UP AIR/EXHAUST AIR INTERLOCK SYSTEMS AND THEIR SEQUENCES OF OPERATION. BALANCE ALL AIR FLOWS WITHIN 5% OF DESIGN VALUES. PERMANENTLY MARK BALANCE POSITION OF ALL REGULATING DEVICES.
16. PROVIDE OWNER WITH THREE SETS OF AS-BUILT PLANS AND OPERATIONS AND MAINTENANCE MANUALS. CLEARLY IDENTIFY ALL EQUIPMENT WITH PERMANENT PLASTIC OR METAL LABELS/TAGS (PEN MARKING NOT ACCEPTABLE).
17. PROVIDE ONE YEAR WARRANTY ON ALL LABOR, PARTS AND MATERIALS.
18. ANY CHANGE OR DEVIATION FROM THESE PLANS OR SPECIFICATIONS SHALL REQUIRE THE WRITTEN APPROVAL OF THE ENGINEER PRIOR TO COMMENCEMENT OF SUCH WORK. 19.0

a) DUCTS FOR DEMAND CONTROLLED VENTILATION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE FAN MANUFACTURER'S INSTALLATION INSTRUCTIONS, THE PROVISIONS ASHRAE 62.2, TABLE 5.3, OR THE AIRFLOW SHALL BE MEASURED AS REQUIRED BY AND IN COMPLIANCE WITH ASHRAE 62.2, 5.4.

LEGEND

AxB		DUCT WORK (WIDTHxDEPTH)
AxB		LINED DUCT WORK (WIDTHxDEPTH DIMENSIONS ARE FOR I.D.)
		SUPPLY DUCT, SECTION
		RETURN DUCT, SECTION
		EXHAUST DUCT, SECTION
F OR D		RISE OR DROP IN DIRECTION OF AIR FLOW
	FLEX. CONN.	FLEXIBLE CONNECTION
		DUCT TRANSITION, ROUND AND RECTANGULAR
		SPLITTER DAMPER
		EXTRACTOR AT BRANCH DUCT
		TURNING VANES
		FLEXIBLE DUCT
		SINGLE LINE DUCT WORK
	AVD	AUTOMATIC VOLUME DAMPER
	MVD	MANUAL VOLUME DAMPER
	BDD	BACKDRAFT DAMPER
	MD	MODULATING DAMPER
	AFD	AUTOMATIC FIRE DAMPER
	AD	ACCESS DOOR
	SD	SUPPLY DIFFUSER
	RR	RETURN REGISTER
	ER	EXHAUST REGISTER
	SWR	SIDE WALL SUPPLY REGISTER
	SWE	SIDE WALL RETURN OR EXHAUST
	LD	LINEAR DIFFUSER
D.L.	DL	DOOR LOUVER
U.C.	UC	UNDER CUT DOOR
	VAV	VARIABLE AIR VOLUME
T		THERMOSTAT
S		DUCT SMOKE DECTECTOR
	T/B	TO BELOW
	F/B	FROM BELOW
	T/A	TO ABOVE
	F/A	FROM ABOVE

SPECIAL NOTICE TO CONTRACTORS

1. ALL CONTRACTORS (GENERAL CONTRACTOR AND SUB-CONTRACTORS) BIDDING THIS PROJECT ARE REQUIRED TO VISIT THE JOB SITE AND VERIFY THE EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID. CONTRACTORS ARE TO CAREFULLY REVIEW ALL CONSTRUCTION DOCUMENTS AND NOTE ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED AT THE JOB SITE PRIOR TO SUBMISSION OF ANY BID. THE BUILDING OWNER REPRESENTATIVE LISTED BELOW MAY BE CONTACTED FOR ACCESS TO THE JOB SITE.
2. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING THE LOCATION AND CONDITION OF ALL POINTS OF CONNECTION, LOCATION AND CONDITION OF ALL BUILDING (ROOF/FLOOR/CEILING) PENETRATIONS, LOCATION AND CONDITION OF ALL UTILITIES AND BUILDING SYSTEMS INCLUDING, BUT NOT LIMITED TO, GAS, WATER, SEWER, VENT, ELECTRICAL, BUILDING MECHANICAL SYSTEMS, DUCT CONNECTIONS, EXHAUST/OUTSIDE AIR CONNECTIONS, SECURITY, FIRE ALARM, DATA, AND PHONE PRIOR TO SUBMISSION OF THEIR BID.
3. ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED SHALL BE BROUGHT TO THE ATTENTION, IN WRITING, TO THE ARCHITECT AND/OR ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
4. NO WORK SHALL BE DONE ON ANY PART OF THE BUILDING BEYOND THE POINT INDICATED IN EACH SUCCESSIVE INSPECTION WITHOUT FIRST OBTAINING THE WRITTEN APPROVAL OF THE CODE OFFICIAL. NO CONSTRUCTION SHALL BE CONCEALED WITHOUT BEING INSPECTED AND APPROVED.

MECHANICAL LIST OF DRAWINGS (LoD):

SHEET TAG	TITLE	SCALE
M 0.01	MECHANICAL GENERAL NOTES AND SPECIFICATIONS	NTS
M 1.01	MAIN FLOOR - MECHANICAL LAYOUT	3/16" = 1'- 0"
M 1.02	ROOF - MECHANICAL LAYOUT, DUCTS & DIFFUSERS SCHEDULE	3/16" = 1'- 0"
M 2.01	MECHANICAL EQUIPMENT SCHEDULE & VENTILATION	NTS
M 3.01	MECHANICAL EQUIPMENT DATA SHEETS	NTS
M 4.01	MECHANICAL GENERAL DETAILS	NTS

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NOTES:

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3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

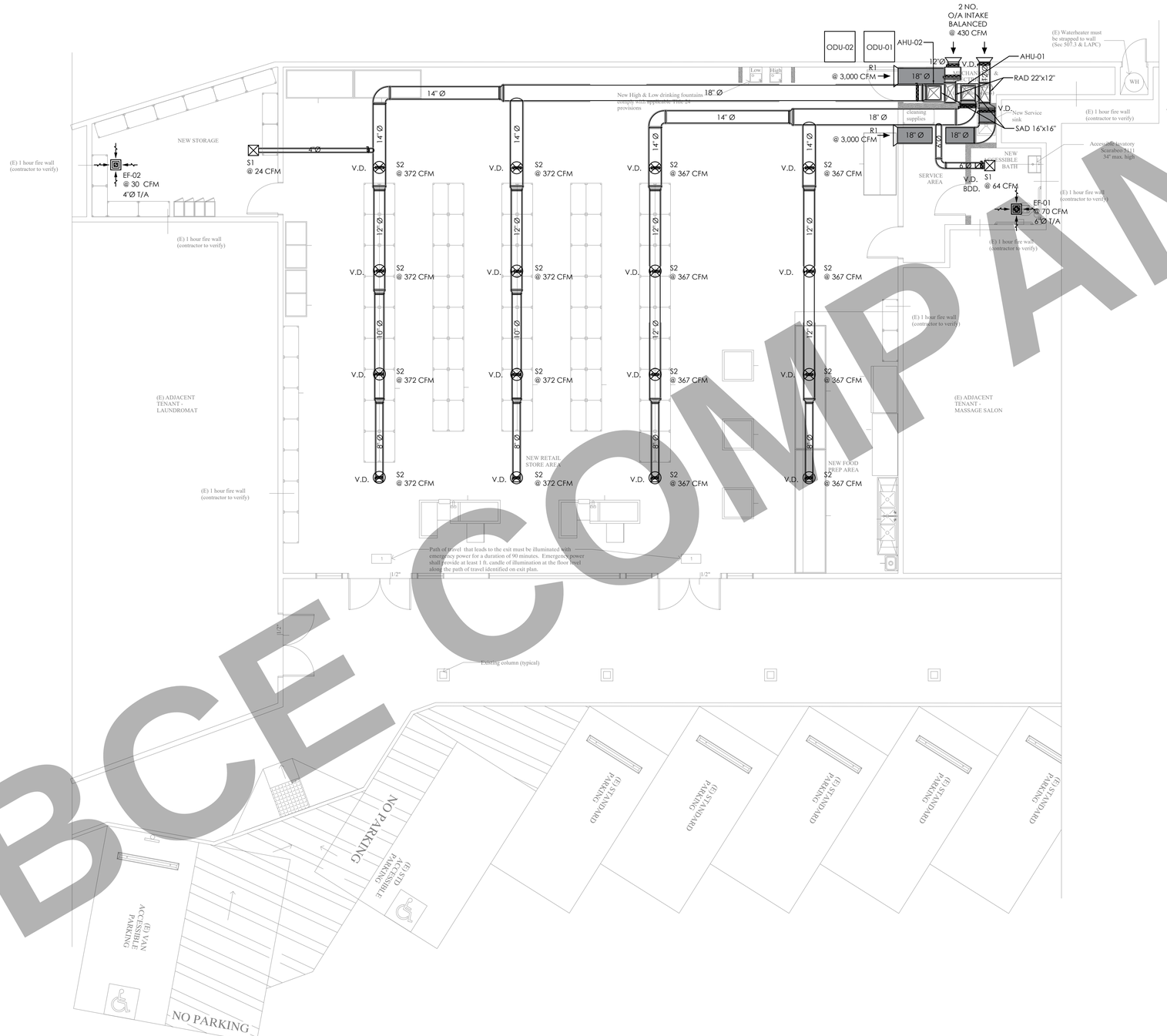
PROJECT

TITLE:
MECH GENERAL NOTES AND SPECIFICATIONS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
M 0.01

REV.



GENERAL NOTES:

1. MECHANICAL CONTRACTOR TO COORDINATE ROUTING AND LOCATION OF MECHANICAL COMPONENTS AND EQUIPMENT WITH ALL OTHER TRADES AND EXISTING FIELD CONDITIONS PRIOR TO PERFORMING WORK.
2. CONTRACTOR TO CUT AND PATCH AS REQUIRED TO PERFORM THE WORK.
3. ACCESS DOORS ARE REQUIRED FOR ANY COMPONENT REQUIRING ACCESS ABOVE HARD LID CEILINGS. COORDINATE SIZE, LOCATION AND FINISH WITH ARCHITECT PRIOR TO PERFORMING WORK.
4. REFER TO THE DIAGRAMS THAT APPLY TO THIS SHEET WHICH PROVIDE GENERAL GUIDANCE FOR INSTALLATION THOUGH NOT ALL COMPONENTS AND ACCESSORIES MAY BE SHOWN.
5. PRIOR TO INSTALLATION, CONFIRM SPECIFIC LOCATION FOR ALL THERMOSTATS / SENSORS WITH ARCHITECT. MOUNT AT 48" A.F.F. OR IN ACCORDANCE WITH ADA REQUIREMENTS. PROVIDE LOCKING COVERS.
6. COORDINATE AND CONFIRM BORDER, FRAME, FINISH, AND LOCATION WITH ARCHITECT PRIOR TO ORDERING.
7. ANY PENETRATIONS THROUGH WALL STUDS, FLOOR JOISTS, OR ROOF TO BE IN ACCORDANCE WITH THE LATEST ADOPTED BUILDING CODE.
8. DUCT DIMENSIONS SHOWN ARE CLEAR INSIDE DIMENSIONS.
9. CONTRACTOR TO CONFIRM ADEQUATE RETURN AIR PATH BACK TO MAIN AIR HANDLING UNIT.

CMC-402.4-Required outdoor-air intakes shall be covered with a screen having not less than 1/4 of an inch (6.4 mm) openings, and shall have not more than 1/2 of an inch (12.7 mm) openings.

CMC-407.2-Outdoor air intakes shall be located at least 25 feet (7.62 m) from exhaust outlets of ventilating systems, combustion equipment stacks, medical-surgical vacuum systems, cooling towers, and areas that may collect vehicular exhaust or other noxious fumes. Plumbing vents shall be located in relation to outdoor air intakes per California Plumbing Code. The bottom of outdoor air intakes shall be located as high as practicable, but not less than 10 feet (3048 mm) above ground level. If installed above the roof, they shall be located 18 inches (457 mm) above roof level or 3 feet (914 mm) above a flat roof where heavy snowfall is anticipated.

CMC-Appendix E 503.4.6.1-Outdoor air intake and exhaust systems shall be equipped with motorized dampers that will automatically shut when the systems or spaces served are not in use.
Exceptions: Back-draft gravity dampers shall be permitted for exhaust and relief in buildings less than 3 stories in height.

CMC-Appendix E 502.4.4-Duct systems shall be sized in accordance with ACCA Manual D.
Velocity in main duct shall not exceed 1000 feet per minute.
Velocity in section branches shall not exceed 600 feet per minute.

CMC-Appendix E 502.3.1-Balancing Dampers shall be installed in branch ducts, and the axis of the damper shall be installed parallel to the direction of airflow in the main duct

CMC-603.4.1-[Not permitted for OSHPD 1, 1R, 2, 3, 4 & 5] Flexible air ducts shall be not more than 5 feet (1524 mm) in length and shall not be used in lieu of rigid elbows or fittings. Flexible air ducts shall be permitted to be used as an elbow at a terminal device.

CMC-603.7.1-Ducts shall be supported at each change of direction and in accordance with SMACNA HVAC Duct Construction Standards -- Metal and Flexible. Riser ducts shall be held in place by means of metal straps or angles and channels to secure the riser to the structure.

CMC-903.2.3-The installation of air-conditioning appliances shall comply with the following requirements:
1- Listed air-conditioning appliances shall be installed with clearances in accordance with the terms of their listing and the manufacturer's installation instructions.
2- Unlisted air-conditioning appliances shall be installed with clearances from combustible material of not less than 18 inches (457 mm) above the appliance and at the sides, front, and rear and in accordance with the manufacturer's installation instructions. [NFPA 54:10.2.3(2)]

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3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

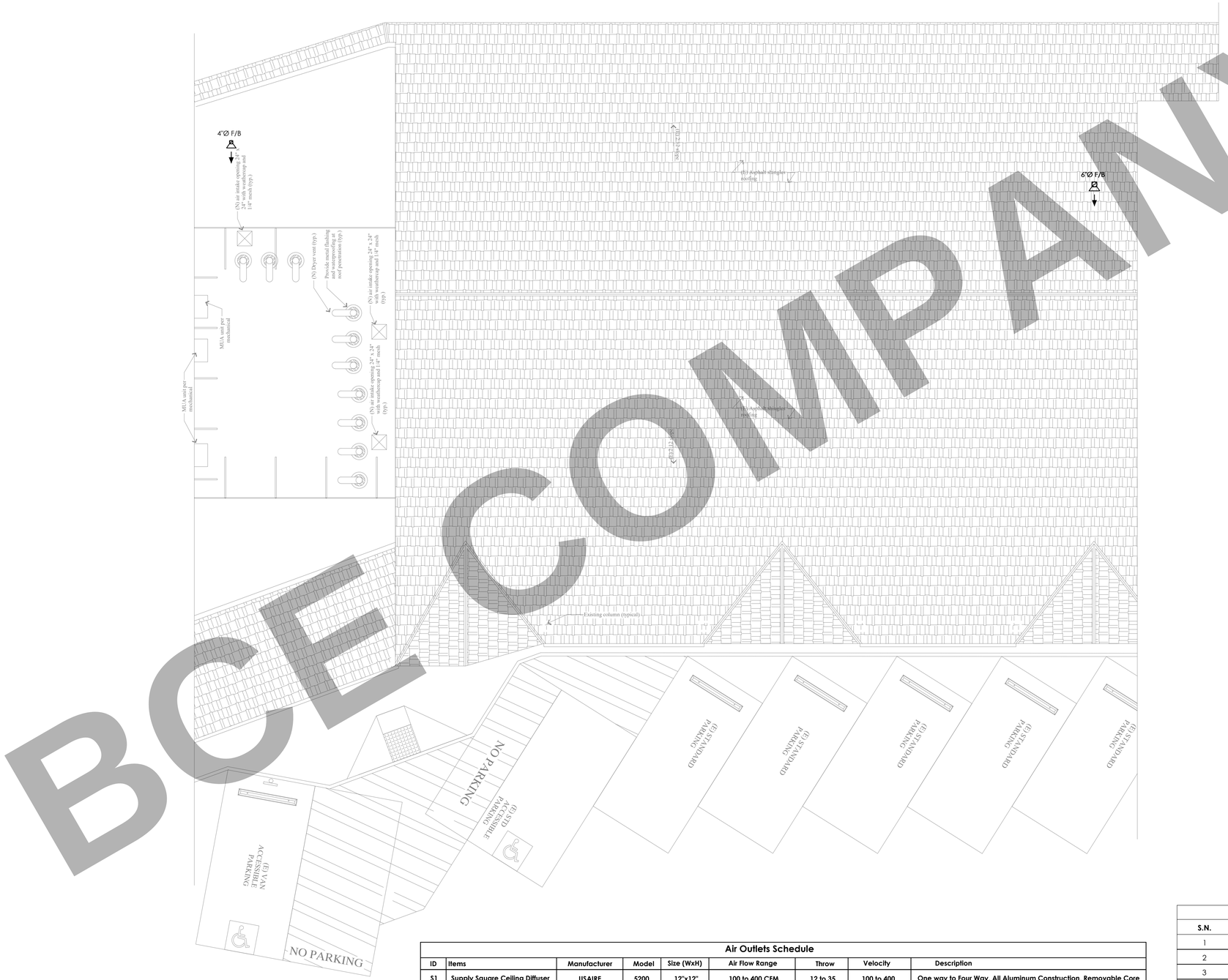
PROJECT:

TITLE:
MAIN FLOOR - MECHANICAL LAYOUT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

DRAWING NO.
M 1 . 0 1

REV.



GENERAL NOTES:

1. MECHANICAL CONTRACTOR TO COORDINATE ROUTING AND LOCATION OF MECHANICAL COMPONENTS AND EQUIPMENT WITH ALL OTHER TRADES AND EXISTING FIELD CONDITIONS PRIOR TO PERFORMING WORK.
2. CONTRACTOR TO CUT AND PATCH AS REQUIRED TO PERFORM THE WORK.
3. ACCESS DOORS ARE REQUIRED FOR ANY COMPONENT REQUIRING ACCESS ABOVE HARD LID CEILINGS. COORDINATE SIZE, LOCATION AND FINISH WITH ARCHITECT PRIOR TO PERFORMING WORK.
4. REFER TO THE DIAGRAMS THAT APPLY TO THIS SHEET WHICH PROVIDE GENERAL GUIDANCE FOR INSTALLATION THOUGH NOT ALL COMPONENTS AND ACCESSORIES MAY BE SHOWN.
5. PRIOR TO INSTALLATION, CONFIRM SPECIFIC LOCATION FOR ALL THERMOSTATS / SENSORS WITH ARCHITECT. MOUNT AT 48" A.F.F. OR IN ACCORDANCE WITH ADA REQUIREMENTS. PROVIDE LOCKING COVERS.
6. COORDINATE AND CONFIRM BORDER, FRAME, FINISH, AND LOCATION WITH ARCHITECT PRIOR TO ORDERING.
7. ANY PENETRATIONS THROUGH WALL STUDS, FLOOR JOISTS, OR ROOF TO BE IN ACCORDANCE WITH THE LATEST ADOPTED BUILDING CODE.
8. DUCT DIMENSIONS SHOWN ARE CLEAR INSIDE DIMENSIONS.
9. CONTRACTOR TO CONFIRM ADEQUATE RETURN AIR PATH BACK TO MAIN AIR HANDLING UNIT.

CMC-502.2.1-Environmental air duct exhaust shall terminate not less than 3 feet (914 mm) from a property line, 10 feet (3048 mm) from a forced air inlet, 10 feet (3048 mm) above a public walkway, and 3 feet (914 mm) from openings into the building. The discharge of environmental exhaust ducts shall not be directed onto a public walkway

Air Outlets Schedule

ID	Items	Manufacturer	Model	Size (WxH)	Air Flow Range	Throw	Velocity	Description
S1	Supply Square Ceiling Diffuser	USAIRE	5200	12"x12"	100 to 400 CFM	12 to 35	100 to 400	One way to Four Way, All Aluminum Construction, Removable Core
S2	Supply Round Ceiling Diffuser	USAIRE	900	14"Dia	50 to 400 CFM	3 to 13	150 to 381	Aluminum. 360 Degree Air Pattern, hole in center for damper control
R1	Return Grill	USAIRE	1400 series	24"x24"	800 to 2400 CFM	-	200 to 600	Aluminum. Fully Adjustable 2 Cone Diffuser

Round Ducts:			
S.N.	Duct Size	CFM Range	Velocity (FPM)
1	4" Dia	15 to 50	300 to 500
2	6" Dia	50 to 115	300 to 500
3	8" Dia	115 to 200	300 to 500
4	12" Dia	300 to 450	300 to 500
5	14" Dia	450 to 600	300 to 500
6	18" Dia	800 to 1000	300 to 500

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

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3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

TITLE:
ROOF - MECHANICAL LAYOUT, DUCTS & DIFFUSERS SCHEDULE

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

DRAWING NO.
M 1 . 0 2

REV.

SCHEDULE No. 1
HEAT PUMP INDOOR UNIT SCHEDULE

TAG	AHU-01 & 02
SERVING	MAIN FLOOR
MANUFACTURER	CARRIER
MODEL	40RUQ08
POWER SUPPLY (V/PH/Hz)	208/1/60
MCA (A)	13.8
MOP (A)	20.0
NOMINAL CAPACITY (BTU/H)	90,000
AIR FLOW RATE (CFM)	3,000

SCHEDULE No. 2
OUTDOOR UNIT SCHEDULE

TAG	ODU-01 & 02
SERVING	AHU-01 & 02
MANUFACTURER	CARRIER
MODEL	38AUQ08
POWER SUPPLY (V/PH/Hz)	208/3/60
MCA (A)	35.0
MOP (A)	50.0
NOMINAL CAPACITY (BTU/HR)	90,000

SCHEDULE No. 3
CEILING EXHAUST FANS SCHEDULE

TAG	EF-01	EF-02
LOCATION	TOILET	STORAGE
SELECTED FLOW (CFM)	70	30
SELECTED PRESSURE DROP (IN. H2O)	0.25"	0.25"
ELECTRICAL (V / PH / HZ)	120 / 1 / 60	120 / 1 / 60
POWER	25 W	25 W
MOTOR SPEED (RPS)	MULTI SPEED	MULTI SPEED
FAN TYPE	CEILING FANS	CEILING FANS
MANUFACTURER	PANASONIC	PANASONIC
MODEL	WHISPER FV-0511VKS2	WHISPER FV-0511VKS2

NOTES:
1. PROVIDE UL LISTING.
2. PROVIDE ENERGY STAR COMPLIANCE.
3. INTERLOCK WITH WALL SWITCH.
4. PROVIDE MOTOR WITH THERMAL OVERLOADS.

AS PER CEnC 2022, TABLE 120.1-A MINIMUM VENTILATION RATES:

S.N.	SPACE NAME	AREA (FT2)	CFM/FT2	TOTAL CFM
1	STORAGE	200	0.15	30
2	TOILET	-	-	70
3	GROCERY	3,010	0.25	753
TOTAL		3,210	-	853

CLIENT:

ADDRESS:

NOTES:

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3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE: **MECHANICAL EQUIPMENT SCHEDULES & VENTILATION**

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO. **M 2 . 0 1**

REV.

Product Data

Split System Heat Pump

7-25 Nominal Tons, 60 Hz

40RUQ 07-12 (shown)

Puron

40RUQ 07-25 Split System Heat Pump
Indoor Unit (Air-Handling) with Puron® Refrigerant

Form 40RUQ-7-25-03PD Rev. A

Features/Benefits

The 40RUQ Series units with direct-expansion coils are the best choice for packaged heat pump air handlers. All models offer excellent fan performance, a unique combination of indoor air quality features, and easy installation. Their versatility and state-of-the-art features will provide economical performance. Easy-to-install and economical 40RU units provide reliable service.

Carrier's versatile packaged heat pump air-handling units satisfy design requirements with:

- Multi-position design for horizontal or vertical installation without modification.
- Standard sloped drain pans and cleanable insulation treated with an immobilized anti-microbial agent to inhibit the growth of bacteria and fungi on the insulation.
- High-static design meets a wider range of applications than competitive packaged air handler lines.
- Economizer accessory provides ventilation air and "free" cooling. Cooling coils with mechanically bonded fins provide peak heat transfer.
- Hot water coil, steam coil, and electric heat accessories are available.
- Standard factory-installed thermostatic expansion valves (TXV) with removable power element on 40RUQ units.
- Die-formed galvanized steel casings provide durability and structural integrity. Optional paint is available.

Indoor air quality

The unique combination of features in the 40RUQ Series air handlers ensures that clean, fresh, conditioned air is delivered to the occupied space.

Cooling coils prevent the build-up of humidity in the room, even during part-load conditions.

2 in. (51 mm) disposable filters remove dust and airborne particles from the occupied space.

Thermal insulation contains an immobilized anti-microbial agent to inhibit the growth of bacteria and fungi on the insulation.

Pitched drain pan can be adjusted for a right-hand or left-hand connection to provide positive drainage and prevent standing condensate. Each unit contains two separate drain pans which are provided for either vertical or horizontal fan coil positions.

Accessory economizer can provide ventilation air to improve indoor air quality. When used with CO_2 sensors, the economizer admits fresh outdoor air to replace stale, recirculated indoor air.

Economy

The 40RUQ Series packaged air handlers have low initial costs, and they continue to save money by providing reduced installation expense and energy-efficient performance.

Quick installation is ensured by the multi-position design. Units can be installed in either the horizontal or vertical (upflow) configuration without modifications. All units have drain-pan connections on both sides, and pans can be pitched for right-hand or left hand operation with a simple adjustment.

Fan motors and contactors are pre-wired and TXVs are factory-installed on 40RUQ models.

High-efficiency, precision balanced fans minimize air turbulence, surging, and unbalanced operation, thereby cutting operating expenses.

Economizer accessory precisely controls the blend of outdoor air and room air to achieve comfort levels. When the outside air enthalpy is suitable, outside air dampers can fully open to provide "free" cooling.

Rugged dependability

Die-formed galvanized steel panels ensure structural integrity under all operating conditions. Mechanically bonded coil fins provide improved heat transfer. Galvanized steel fan housings are securely mounted to a die-formed galvanized steel deck.

Model 40RUQ air handling units have galvanized steel casings; inlet and outlet connections are on the same end.

Direct expansion (DX) coils are designed for use with Puron® R-410A refrigerant and have copper tubes mechanically bonded to aluminum sine-wave fins.

Direct-expansion coils include matched, factory-installed thermostatic expansion valves (TXVs) with matching distributor nozzles.

Easier installation and service

The multi-position design and component layout allow for quick unit installation and operation. The DX coils have factory-installed TXVs with matching distributor nozzles. Units can be converted from horizontal to vertical operation by simply repositioning the unit.

Drain pan connections are duplicated on both sides of the unit. The filters, motor, drive, TXVs, and coil connections are easily accessed by removing a single side panel.

Table of contents

Model number nomenclature

40RUQ MODEL NUMBER NOMENCLATURE

Position: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Example: 4 0 R U Q A 1 2 A 1 A 6 - 0 A 0 A 0

Model Type
Packaged Air-Handling Unit Puron

Type of Coil
Q – Heat Pump

Refrigeration Options
A – None

Nominal Tonnage
07 – 6.0 Ton, 08 – 7.5 Ton, 12 – 10.0 Ton, 16 – 15 Ton, 25 – 20 Ton

Fan Motor Speed Controller
A – None – Standard
T – 2 Speed Fan Controller (VFD)

Indoor Fan Motor Options – Belt Drive
1 – Standard Motor / Standard drive
2 – Standard Motor / Medium Drive
3 – High Static Motor / High Drive†
4 – Standard Static, High Efficiency Motor / Standard Drive
5 – Standard Static, High Efficiency Motor/ Medium Drive
6 – High Static, High Efficiency Motor / High Drive

Coil Options
A – Standard Aluminum Fin / Copper Tube

Packaging
0 – Standard

Future Use
A – Standard

Cabinet Paint
0 – None
1 – Painted

Future Use
A – Standard

Future Use
0 – Standard

Revision Number
- – Standard

Voltage*
1 – 575-3-60
3 – 208/230-1-60 (07, 08 sizes only)
5 – 208/230-3-60
6 – 208/230/460-3-60

* All 40RU Q07 through 16 units with a "6" voltage designation are triple voltage; ie., 208/230/460-3-60. Units that require 2-speed indoor fan motor must use dedicated voltage models listed. The VFD used is not multi-voltage.

† Single-phase 07, 08 sizes designate standard motor and high static drive.

Physical data

PHYSICAL DATA — 40RUQ 07-25

UNIT 40RUQ	07	08	12	14	16	25
NOMINAL CAPACITY (Tons)	6	7-1/2	10	12-1/2	15	20
OPERATING WEIGHT (lb)						
Base Unit with TXV (4 Row)	399	404	425	695	713	730
Plenum	175	175	175	225	225	225
Economizer	185	185	185	340	340	340
Hot Water Coil	195	195	195	285	285	285
Steam Coil	215	215	215	340	340	340
FANS						
Qty...Diam. (in.)	1...15	1...15	1...15	2...15	2...15	2...15
Nominal Airflow (cfm)	2400	3000	4000	5000	6000	8000
Airflow Range (cfm)	1800-3000	2250-3750	3000-5000	3750-6250	4500-7500	6000-10,000
Nom. Motor Hp (Standard Motor)* 208/230-160	1.3	2.4	—	—	—	—
208/230-3-60 and 460-3-60	2.4	2.4	2.4	2.9	3.7	5.0
575-3-60	1.0	2.0	2.0	3.0	3.0	5.0
Motor Speed (rpm) 208/230-1-60	1725	1725	—	—	—	—
208/230-3-60 and 460-3-60	1725	1725	1725	1725	1725	1760
575-3-60	1725	1725	1725	1725	1725	1745
REFRIGERANT	Puron (R-410A)					
Shipping Charge (lb)	Nitrogen Purge					
Metering Device	TXV					
Operating Charge (lb) (approx per circuit)†	3.0	3.0	1.5/1.5	2.0/2.0	2.5/2.5	3.5/3.5
DIRECT-EXPANSION COIL	Enhanced Copper Tubes, Aluminum Sine-Wave Fins					
Max Working Pressure (psig)	650					
Material	Al / Cu					
Coil Type	RTPF					
Face Area (sq ft)	6.67	8.33	10.01	13.25	17.67	19.88
No. of Splits	1	1	2	2	2	2
Split Type...Percentage	—	—	Face...50/50			
No. of Circuits per Split	12	15	9	12	16	18
Rows...Fins/in.	4...15	4...15	4...15	4...15	4...15	4...15
STEAM COIL†						
Max Working Press. (psig at 260°F)	20					
Total Face Area (sq ft)	6.67	6.67	6.67	13.33	13.33	13.33
Rows...Fins/in.	1...9	1...9	1...9	1...10	1...10	1...10
HOT WATER COIL**						
Max Working Pressure (psig)	150					
Total Face Area (sq ft)	6.67	6.67	6.67	13.33	13.33	13.33
Rows...Fins/in.	2...8.5	2...8.5	2...8.5	2...8.5	2...8.5	2...8.5
Water Volume						
(gal)	8.3			13.9		
(ft³)	1.1			1.85		
PIPING CONNECTIONS						
Quantity...Size (in.)						
DX Coil—Suction (ODF)	1...1-1/8	1...1-1/8	2...1/1/8	2...1-1/8	2...1-1/8	2...1-1/8
DX Coil — Liquid Refrig (ODF)	1...5/8		2-5/8			
Steam Coil, In (MPT)	1...2-1/2		1...2-1/2			
Steam Coil, Out (MPT)	1...1-1/2		1...1-1/2			
Hot Water Coil, In (MPT)	1...1-1/2		1...1-1/2	1...2		
Hot Water Coil, Out (MPT)	1...1-1/2		1...1-1/2	1...2		
Condensate (PVC)	1...5/8 ODM / 1...1/4 IDF					
FILTERS	Throwaway — Factory-Supplied					
Quantity...Size (in.)	4...16 x 24 x 2			4...16 x 20 x 2 /4...16 x 24 x 2		
Access Location	Right or Left Side					

LEGEND
DX — Direct Expansion
TXV — Thermostatic Expansion Valve

*Refer to Alternate Fan Motor Data table on page 6 for alternate motor data.
†Units are shipped without refrigerant charge.
**Field installed accessory only.

Physical data (cont)

FAN MOTOR DATA STANDARD MOTOR — SINGLE SPEED

UNIT	40RUQ*07	40RUQ*08	40RUQ*12	40RUQ*16	40RUQ*25
208/230-1-60					
Speed (rpm)	1725	1725	—	—	—
Hp	1.3	2.4	—	—	—
Frame (NEMA)	56Y	56Y	—	—	—
Shaft Dia (in.)	5/8	5/8	—	—	—
230-3-60 and 460-3-60					
Speed (rpm)	1750	1750	1750	1750	1755
Hp	2.4	2.4	2.4	3.7	5.0
Frame (NEMA)	56Y	56Y	56Y	56HZ	184T
Shaft Dia (in.)	5/8	5/8	5/8	7/8	1-1/8
575-3-60					
Speed (rpm)	1725	1725	1725	1725	1755
Hp	1.0	2.0	2.0	3.0	5.0
Frame (NEMA)	56	56HZ	56HZ	56HZ	184T
Shaft Dia (in.)	5/8	7/8	7/8	7/8	1-1/8

LEGEND
NEMA — National Electrical Manufacturers Association (U.S.A.)

FAN MOTOR DATA ALTERNATE MOTOR — SINGLE SPEED

UNIT	40RUQ*07	40RUQ*08	40RUQ*12	40RUQ*16	40RUQ*25
208/230-1-60					
Speed (rpm)	1725	1725	—	—	—
Hp	2.4	2.4	—	—	—
Frame (NEMA)	56Y	56Y	—	—	—
Shaft Dia (in.)	5/8	5/8	—	—	—
230-3-60 and 460-3-60					
Speed (rpm)	1750	1750	1750	1755	1760
Hp	2.9	2.9	3.7	5.0	7.5
Frame (NEMA)	56Y	56Y	56HZ	184T	S213T
Shaft Dia (in.)	7/8	7/8	7/8	1-1/8	1-3/8
575-3-60					
Speed (rpm)	1725	1725	1725	1745	1755
Hp	2.0	3.0	3.0	5.0	7.5
Frame (NEMA)	56HZ	56HZ	56HZ	184T	S213T
Shaft Dia (in.)	7/8	7/8	7/8	1-1/8	1-3/8

LEGEND
NEMA — National Electrical Manufacturers Association (U.S.A.)

MOTOR EFFICIENCY 40RUQ — SINGLE SPEED MOTOR

MOTOR HP	EPACT MINIMUM	MOTOR EFFICIENCY
1.3*	—	70.00%
2.4	—	76.80%
2.9	—	77.10%
3.7	—	81.50%
5.0	89.50%	89.25%
7.5	91.70%	91.70%
10.0	91.70%	91.70%

LEGEND
EPACT — Energy Policy and Conservation Act of 1992

*Single-phase only.

Physical data (cont)

FAN MOTOR DATA STANDARD MOTOR — 2-SPEED

UNIT	40RUQ*07	40RUQ*08	40RUQ*12	40RUQ*16	40RUQ*25
208/230-3-60 and 460-3-60					
Speed (rpm)	1680	1680	1690	1750	1755
Hp	2.4	2.4	1.7	3.7	5.0
Frame (NEMA)	56HY	56HY	56HY	56HY	184T
Shaft Dia (in.)	5/8	5/8	5/8	7/8	1-1/8
575-3-60					
Speed (rpm)	1680	1680	1665	1710	1755
Hp	2.4	2.4	1.7	3.7	5.0
Frame (NEMA)	56HY	56HY	56HY	56HY	184T
Shaft Dia (in.)	5/8	5/8	5/8	7/8	1-1/8

FAN MOTOR DATA ALTERNATE MOTOR — 2-SPEED

UNIT	40RUQ*07	40RUQ*08	40RUQ*12	40RUQ*16	40RUQ*25
208/230-3-60 and 460-3-60					
Speed (rpm)	1750	1750	1725	1755	1760
Hp	3.7	3.7	3.7†	5.0	7.5
Frame (NEMA)	56HY	56HY	56HY	184T	S213T
Shaft Dia (in.)	7/8	7/8	7/8	1-1/8	1-3/8
575-3-60					
Speed (rpm)	1710	1710	1710	1755	1750
Hp	3.7	3.7	3.7	5.0	7.5
Frame (NEMA)	56HY	56HY	56HY	184T	S213T
Shaft Dia (in.)	7/8	7/8	7/8	1-1/8	1-3/8

†High Efficiency Motor

MOTOR EFFICIENCY 40RUQ — 2-SPEED MOTOR

MOTOR HP	EPACT MINIMUM	MOTOR EFFICIENCY
1.7	—	82.0%
2.4	—	80.0%
2.9	—	86.5%
3.7	—	83.6%
3.7*	—	87.9%
5.0	89.5%	89.5%
7.5	91.7%	91.7%
10.0	91.7%	91.7%

LEGEND
EPACT — Energy Policy and Conservation Act of 1992

*High Efficiency Motor.

Physical data (cont)

STANDARD DRIVE DATA

UNIT	40RUQ07	40RUQ08	40RUQ12	40RUQ16	40RUQ25
MOTOR DRIVE					
Motor Pulley Pitch Dia (in.)	2.4-3.4	2.8-3.8	3.4-4.4	2.8-3.8	3.7-4.7
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	3.0
FAN DRIVE					
Pulley Pitch Dia (in.)	8.8	8.8	8.8	9.0	9.4
Pulley Bore (in.)	1	1	1	1-7/16	1-7/16
Belt No. — Section	1—A	1—A	1—A	1—A	1—B
Belt Pitch (in.)	40.3	41.3	42.3	42.3	41.8
FAN SPEEDS (rpm)					
Factory Settings	568	647	764	632	771
Range	470-666	549-745	666-863	537-728	679-863
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200
Change per 1/2 turn of Moveable Motor Pulley Flange	19.6	19.6	19.7	19.1	15.3
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	6
SHAFTS CENTER DISTANCE (in.)	10.44 - 12.32	10.44 - 12.32	10.44 - 12.32	10.44 -12.32	9.12 -10.99

MEDIUM-STATIC DRIVE DATA

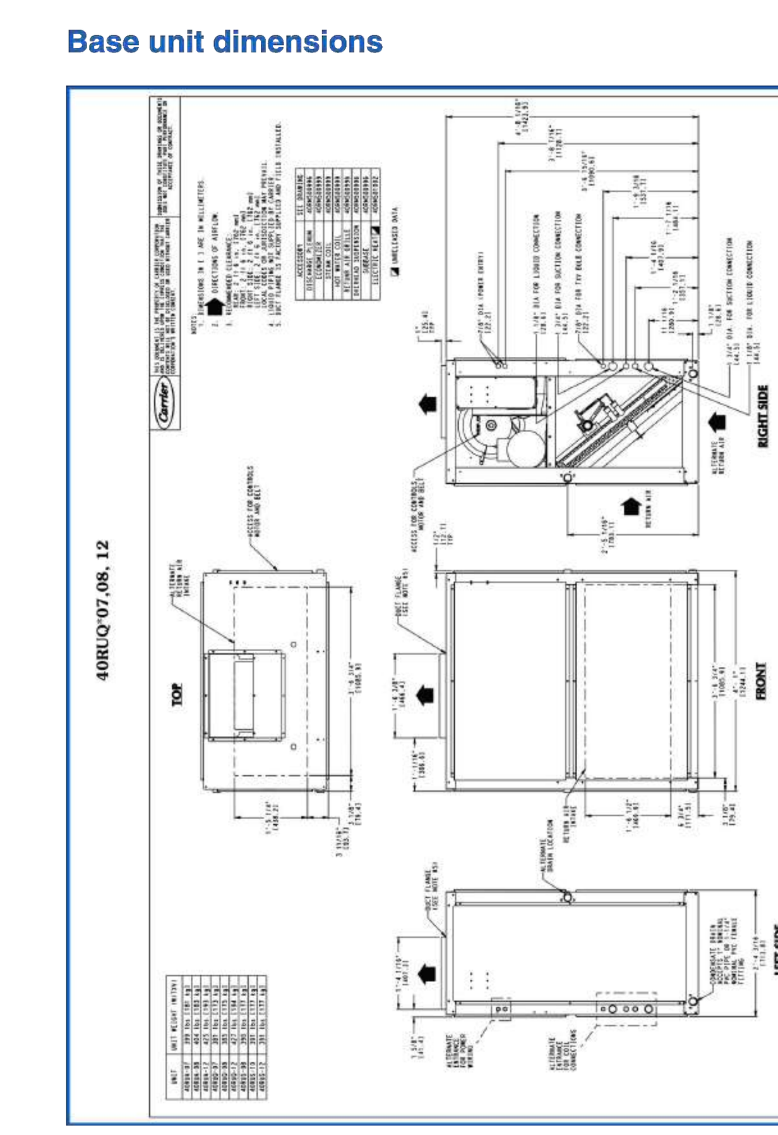
UNIT	40RUQ07	40RUQ08	40RUQ12	40RUQ16	40RUQ25
MOTOR DRIVE					
Motor Pulley Pitch Dia (in.)	3.4-4.4	3.4-4.4	3.4-4.4	3.7-4.7	4.3-5.3
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	3.0	3.0
FAN DRIVE					
Pulley Pitch Dia (in.)	8.8	8.0	8.0	8.6	9.4
Pulley Bore (in.)	1	1	1	1-7/16	1-7/16
Belt No. — Section	1—A	1—A	1—A	1—B	1—B
Belt Pitch (in.)	42.3	40.3	40.3	41.8	41.8
FAN SPEEDS (rpm)					
Factory Setting	764	841	841	842	881
Range	666 - 863	733 - 949	733 - 949	742 - 943	798 - 984
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200
Change per 1/2 Turn of Moveable Motor Pulley Flange	19.7	21.6	21.6	16.7	15.3
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	6	6
SHAFTS CENTER DISTANCE (in.)	10.44 - 12.32	10.44 - 12.32	10.44 - 12.32	10.44 - 12.32	9.16 - 10.99

HIGH-STATIC DRIVE DATA

UNIT	40RUQ07	40RUQ08	40RUQ12	40RUQ16	40RUQ25
MOTOR DRIVE					
Motor Pulley Pitch Dia (in.)	3.4-4.4	3.4-4.4	3.4-4.4	4.3-5.3	4.3-5.3
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	3.0	3.0
FAN DRIVE					
Pulley Pitch Dia (in.)	7.0	6.0*	6.0	7.9	7.4
Pulley Bore (in.)	1	1	1	1-7/16	1-7/16
Belt No. — Section	1—A	1—A	1—A	1—B	2—B
Belt Pitch (in.)	41.3	37.3	37.3	39.8	36.8
FAN SPEEDS (rpm)					
Factory Setting	961	1121	1121	1060	1118
Range	838 - 1084	978 - 1200*†	978 - 1200†	950 - 1171	1014 - 1200†
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200
Change per 1/2 Turn of Moveable Motor Pulley Flange	24.6	28.7	28.7	18.4	19.4
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	6	6
SHAFTS CENTER DISTANCE (in.)	10.44 - 12.32	10.44 -12.32	10.44 - 12.32	9.16 - 10.99	8.16 - 10.02

* Values for 3-phase motor shown. For single-phase motor, pulley pitch diameter is 7 in. and resulting fan speed is 837-1096 rpm.
† It is possible to adjust drive so that fan speed exceeds maximum allowable. DO NOT exceed 1200 rpm.

Base unit dimensions



Electrical data (cont)

ELECTRICAL DATA — STANDARD MOTORS WITH FACTORY-INSTALLED SINGLE SPEED FAN OPTION

UNIT	V-PH-Hz†	VOLTAGE LIMITS	FAN MOTOR Hp (kW)	FAN MOTOR FLA	POWER SUPPLY MINIMUM CIRCUIT AMPS	POWER SUPPLY MAX FUSE or HACR BRKR
40RUQ*07	208/230-160	187-253	1.3 (0.97)	6.60	9.00	15
	208/230-3-60	187-253	2.4 (1.79)	5.20	7.00	15
	460-3-60	414-506	2.4 (1.79)	2.60	4.00	15
	575-3-60	518-632	1.0 (0.75)	1.40	2.00	15
40RUQ*08	208/230-1-60	187-253	2.4 (1.79)	11.00	13.80	20
	208/230-3-60	187-253	2.4 (1.79)	5.20	7.00	15
	460-3-60	414-506	2.4 (1.79)	2.60	4.00	15
	575-3-60	518-632	2.0 (1.49)	2.40	3.00	15
40RUQ*12	208/230-3-60	187-253	2.4 (1.79)	5.20	7.00	15
	460-3-60	414-506	2.4 (1.79)	2.60	4.00	15
	575-3-60	518-632	2.0 (1.49)	2.40	3.00	15
40RUQ*16	208/230-3-60	187-253	3.7 (2.76)	10.20	13.00	20
	460-3-60	414-506	3.7 (2.76)	4.80	6.00	15
	575-3-60	518-632	3.0 (2.24)	3.80	5.00	15
40RUQ*25	208/230-3-60	187-253	5.0 (3.73)	18.00	23.00	40
	460-3-60	414-506	5.0 (3.73)	9.10	12.00	20
	575-3-60	518-632	5.0 (3.73)	8.00	10.00	15

See legends and notes on page 26.

ELECTRICAL DATA — ALTERNATE MOTORS WITH FACTORY-INSTALLED SINGLE SPEED FAN OPTION

UNIT	V-PH-Hz†	VOLTAGE LIMITS	FAN MOTOR Hp (kW)	POWER SUPPLY MINIMUM CIRCUIT AMPS	POWER SUPPLY MAX FUSE or HACR BRKR
40RUQ*07	208/230-1-60	187-253	2.4 (1.79)	13.80	20
	208/230-3-60	187-253	2.9 (2.16)	10.0	15
	460-36-0	414-506	2.9 (2.16)	5.0	15
	575-3-60	518-632	2.0 (1.49)	3.0	15
40RUQ*08	208/230-1-60	187-253	2.4 (1.79)	13.80	15
	208/230-3-60	187-253	2.9 (2.16)	10.0	15
	460-3-60	414-506	2.9 (2.16)	5.0	15
	575-3-60	518-632	3.0 (2.24)	5.0	15
40RUQ*12	208/230-3-60	187-253	3.7 (2.76)	13.0	20
	460-3-60	414-506	3.7 (2.76)	6.0	15
	575-3-60	518-632	3.0 (2.24)	5.0	15
40RUQ*16	208/230-3-60	187-253	5.0 (3.73)	23.0	40
	460-3-60	414-506	5.0 (3.73)	12.0	20
	575-3-60	518-632	5.0 (3.73)	10.0	15
40RUQ*25	208/230-3-60	187-253	7.5 (5.59)	30.0	50
	460-3-60	414-506	7.5 (5.59)	19.0	30
	575-3-60	518-632	7.5 (5.59)	13.0	20

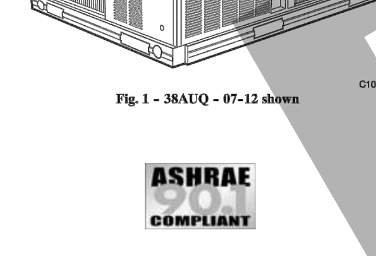
See legends and notes on page 26.

38AUQ
60 Hz Heat Pump Outdoor Unit
Split System with Puron® (R−410A) Refrigerant
6 to 20 Nominal Tons
Sizes: 07−25

Carrier — turn to the experts

Product Data

Gemini



C10108

Fig. 1 - 38AUQ - 07-12 shown

ASHRAE 90.1 COMPLIANT

Puron

Gemini split system heat pump systems save energy and provide outstanding heating and cooling all year with:

- All-season comfort in any climate
- High energy savings capability
- Suitability for new construction or replacement

FEATURES/BENEFITS

System indoor and outdoor sections offer outstanding performance in either the cooling or heating mode

Heat pump system energy savings opportunity

Electrical energy consumption is always a prime concern when selecting an air-conditioning system for a commercial application. An easy, effective way to save energy is to install a heat pump. When building plans call for a heat pump, consider a matched Carrier 38AUQ/40RUQ heat pump system. These systems not only offer highly efficient cooling, they also provide a clean, safe, efficient source of heat. In fact, they are capable of delivering more than 3 units of heat energy for each unit of electrical power consumed.

Heat pump uniqueness

The outstanding performance of these heat pump systems is due to the heat pump's ability to absorb and transfer heat — from outdoors to indoors for heating, and from indoors to outdoors for cooling. System indoor and outdoor sections operate as evaporators or condensers, depending on whether heating or cooling is required. The heating cycle starts with the outdoor coil absorbing heat from the surrounding air (even outside air at extremely cold temperatures), and ends with the indoor coil releasing or rejecting heat to the air around it.

38AUQ application versatility

Whether for a new application or replacement, these Carrier split system heat pumps offer time-proven performance for year-round comfort in any climate. With matching 40RUQ air handler, the units standard cooling operation ranges up to 125°F (52°C) and down to 35°F (2°C) ambient temperatures. If lower ambient cooling temperatures are required, Carrier's Motor Master controller will allow operation down to -20°F (-29°C) ambient temperatures.

FEATURES/BENEFITS (cont.)

38AUQ

Rugged long life compressor

The 38AUQ outdoor units are equipped with a scroll compressor for superior efficiency and long life. Crank case heaters are available where required and each circuit is further protected by a suction line accumulator to protect during the defrost cycles or unique applications plus provide important oil management, all resulting in higher reliability.

Controls for performance efficiency

These units offer the building owner operating controls and components designed for performance dependability. The highly efficient hermetic scroll compressors are engineered for long life and durability. The compressor includes overload protection and compressor vibration isolation for further enhancement of quiet operation. The high-pressure switch protects the entire refrigeration system from abnormally high operating pressures. A loss-of-charge switch is also provided to protect the system against low charge conditions.

Each unit utilizes the the Comfort Alert™ diagnostic and troubleshooting control system. This protects the units operation and provides valuable diagnostic information such as:
- System Go LED indicator
- Fault LED indicator
- Compressor fault LED indicator
- Phase loss protection
- Phase reversal protection
- Anti short cycle protection

The 24-v-75VA control circuit transformer permits quick, easy wiring of standard and programmable 24-v thermostats. The 24−V75VA control circuit transformer also comes with a re-settable circuit breaker for extra protection.

Latest safety standards are assured through UL (Underwriters' Laboratories), UL - Canada and ETL (Electrical Testing Laboratories) approval .

The 38AUQ units utilize a reliable defrost board with field configurable timed defrost cycles. The defrost board may be easily configured for defrost cycles of 30 to 90 minutes, depending upon the application.

Motor failure due to electrical overload is prevented by temperature and current sensors. Coil quality and performance are enhanced by copper tubes and aluminum fins, which provide maximum heat transfer. The coil is circuited for subcooling. A large heat transfer surface offers additional efficiency.

Innovative Carrier 40RUQ indoor units are custom matched to 38AUQ outdoor units for superior system performance

The 40RUQ Heat Pump air handler has excellent fan performance, efficient direct-expansion (DX) coils, easy installation, and a unique combination of indoor air quality features. Its versatility and state-of-the-art features help to ensure that the heat pump system provides economical performance now and in the future.

Easy installation and service — The 40RUQ multi-position design and component layout helps to get the unit installed and running quickly. The direct-expansion (DX) coils have factory-installed thermostatic expansion valves (TXVs) with matching distributor nozzles. All 40RUQ units also include factory-installed check valves and piping for heat pump duty with matching 38AUQ units.

The 40RUQ units can be converted from horizontal to vertical operation simply by repositioning the unit. Drain pan connections are duplicated on both sides of the unit. Fan motors and contactors are pre-wired. For easier service, the filters, motor, drive, TXVs, check valves, and coil connections are accessible by removing a single side panel.

Indoor-air quality (IAQ) features — The unique combination of IAQ features in the 40RUQ Series indoor units helps to make sure that only clean, fresh, conditioned air is delivered to the occupied space.

In the Cooling mode, direct-expansion (DX) cooling coils prevent the build-up of humidity in the room, even during part-load conditions.

Standard 2-in. disposable filters remove dust and airborne particles from the occupied space.

Thermal insulation contains an immobilized anti-microbial agent to inhibit the growth of bacteria and fungi. The anti-microbial agent is registered with the U.S. Environmental Protection Agency (EPA).

The pitched corrosion-free drain pan can be adjusted for a right- or left-hand connection to provide positive drainage and to prevent standing condensate. Each unit contains two separate drain pans which are provided for either vertical or horizontal fan coil positions.

The 40RUQ accessory economizer can provide ventilation air to improve indoor air quality. When used in conjunction with Carrier Comfort System thermostats and CO_2 sensors or PremierLink™ controller, the economizer admits fresh outdoor air to replace stale, recirculated indoor air.

Economy — The 40RUQ Series air handlers have low initial costs, and they continue to save money by providing reduced installation expense and energy-efficient performance.

Quick installation reduces installation costs, and TXVs, check valves, and heat pump piping are factory-installed.

High-efficiency, precision-balanced fans minimize air turbulence, surging, and unbalanced operation, cutting operating expenses.

The economizer accessory precisely controls the blend of outdoor air and room air to achieve comfort levels.

When the outside air enthalpy is suitable, outside air dampers can fully open to provide "free" cooling.

FEATURES/BENEFITS (cont.)

Rugged dependability — The 40RUQ units are made to last. The die-formed galvanized steel panels ensure structural integrity under all operating conditions. Galvanized steel fan housings are securely mounted to a die-formed galvanized steel deck. Coil housings are galvanized steel, and coils have aluminum fins mechanically bonded to copper tubes. The condensate drain pans provide corrosion-free performance.

Coil flexibility — Model 40RUQ coils have galvanized steel casings; inlet and outlet connections are on the same end. The coils are designed for use with Puron (R−410A) refrigerant and have 3/8-in. diameter copper tubes mechanically bonded to aluminum sine-wave fins. The coils include matched, factory-installed TXVs with matching distributor nozzles. Check valves and heat pump piping are also included in all 40RUQ units.

Duplicate piping access holes on both sides of the unit eliminate drilling; condensate connections for both vertical and horizontal installations are also provided on both sides of the unit.

TABLE OF CONTENTS

PAGE

MODEL NUMBER NOMENCLATURE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
3 8 A U Q A 0 8 A 0 A 6 – 0 A 0 A 0

Model
38AU = Commercial Split System
Puron® R−410A Refrigerant

Type
Q = Heat Pump

Refrigerant Options
A = None
B = Low Ambient
D = Single circuit two−stage (07, 08, 12 models only)
E = Single circuit two−stage with Low Ambient Controls (07, 08, 12 models only)

Nominal Tonnage
07 = 6 Tons, 08 = 7.5 Tons, 12 = 10 Tons, 16 = 15 Tons, 25 = 20 Tons

Factory Assigned
A = Default

Factory Assigned
0 = Default

Coil Options (Tube − Fin − Hail Guard)
A = Al/Cu Standard
B = Pre Coat Al/Cu
C = E−Coat Al/Cu
M = Al/Cu Standard with louvered hail guard
N = Pre Coat Al/Cu with louvered hail guard
P = E−Coat Al/Cu with louvered hail guard

Brand / Packaging
0 = Standard
1 = LTL Packaging

Electrical Options
A = None
C = Non−Fused Disconnect

Service Options
0 = None
1 = Un−powered Convenience Outlet
2 = Powered Convenience Outlet

Factory Assigned
A = Default

Base Unit Controls
0 = Standard Electrical Mechanical Controls

Design Rev
– = Factory Assigned

Voltage
1 = 575/3/60
5 = 208/230/3/60
6 = 460/3/60

SOUND POWER LEVELS, dB

UNIT	COOLING STAGES	A−Weighted	63	125	250	500	1000	2000	4000	8000
38AUQ(A,B)07	1	82	86.4	86.0	79.2	80.2	77.6	72.0	67.9	62.3
38AUQ(D,E)07	1	84	87.8	84.9	83.2	81.4	78.7	74.5	68.8	63.8
38AUQ08	1 & 2	82	86.8	85.7	80.3	80.3	77.7	72.3	70.2	65.4
38AUQ(A,B)12	1	82	82.8	81.5	79.2	79.4	76.2	72.3	69.4	64.2
38AUQ(D,E)12	1	84	84.8	92.0	80.8	82.6	78.4	74.0	69.2	67.8
38AUQ16	2	80	90.3	81.8	78.0	76.7	75.2	70.5	66.4	61.9
38AUQ25	2	85	91.0	85.0	80.0	86.0	79.0	73.0	68.0	63.0

(OUTDOOR SOUND (dB) spans the A−Weighted through 8000 columns.)

LEGEND
dB = Decibel
NOTE: Outdoor sound data is measure in accordance with AHRI standard 270.

PHYSICAL DATA

	38AUQ(A,B)07	38AUQ(D,E)07	38AUQ(A,B)08	38AUQ(D,E)08	38AUQ(A,B)12	38AUQ(D,E)12	38AUQ16	38AUQ25
Refrigeration System								
# Circuits / # Comp. / Type	1 / 1 / Scroll	1 / 1 / 2−Stage Scroll	1 / 1 / Scroll	1 / 1 / Digital Scroll	1 / 1 / Scroll	1 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
Shipping charge A/B (lbs)	9.0 Puron	9.0 Puron	9.0 Puron	9.0 Puron	9.0 Puron	9.0 Puron	9.0/9.0 Puron	9.0/9.0 Puron
System charge w/ fan coil * A/B (lbs)	18	18	21	24	27	27	21 / 21	27 /27
Metering Device	Acutrol	Acutrol	Acutrol	Acutrol	Acutrol	Acutrol	Acutrol	Acutrol
High−press. Trip / Reset (psig)	630 / 505	630 / 505	630 / 505	630 / 505	630 / 505	630 / 505	630 / 505	630 / 505
Low−press. Trip / Reset (psig)	27 / 44	27 / 44	27 / 44	27 / 44	27 / 44	27 / 44	27 / 44	27 / 44
Outdoor Coil								
Material − Tube / Fin	Al/Cu	Al/Cu	Al/Cu	Al/Cu	Al/Cu	Al/Cu	Al/Cu	Al/Cu
Coil type	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF
Rows / FPI	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17
Total Face Area (ft2)	17.5	17.5	23.0	28.1	28.1	28.1	47.1	50.1
Outdoor fan / motor								
Qty / Motor drive type	2 / direct	2 / direct	2 / direct	2 / direct	2 / direct	2 / direct	3 / direct	4 / direct
Motor HP / RPM	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
Fan diameter (in)	22	22	22	22	22	22	22	22
Nominal Airflow (cfm)	6,000	6,000	6,000	6,000	6,000	6,000	10,000	14,000
Watts (total)	610	610	610	610	610	610	970	1150
Piping Connections								
Qty / Vapor (in. ODS)	1 / 1 1/8	1 / 1 1/8	1 / 1 1/8	1 / 1 1/8	1 / 1 3/8	1 / 1 3/8	2 / 1 3/8	2 / 1 3/8
Qty / Liquid (in. ODS)	1 / 1 3/8	1 / 1 3/8	1 / 1/2	1 / 1/2	1 / 1/2	1 / 1/2	2 / 1/2	2 / 1/2

LEGEND
* Approximate system charge with 25 ft. piping of sizes indicated with matched 40RUQ
RTPF – Round Tube / Plate Fin

ELECTRICAL DATA

WITHOUT POWERED CONVENIENCE OUTLET

UNIT	NOMINAL POWER SUPPLY V−Ph−Hz	VOLTAGE RANGE MIN	VOLTAGE RANGE MAX	COMPRESSOR No. 1 RLA	COMPRESSOR No. 1 LRA	COMPRESSOR No. 2 RLA	COMPRESSOR No. 2 LRA	OFM (ea) QTY	OFM (ea) FLA	POWER SUPPLY MCA	POWER SUPPLY Fuse or HACR Brkr	DISCONNECT SIZE FLA	DISCONNECT SIZE LRA
38AUQA/B07 Units produced on or after 02/09/2015	208/230−3−60	187	253	19.6	136	–	–	2	1.5	28/28	45/45	26/26	142/142
	460−3−60	414	506	8.2	66	–	–	2	0.8	12	20	11	70
	575−3−60	518	633	6.6	55	–	–	2	0.7	10	15	9	59
38AUQA/B*07 Units produced on or prior to 02/08/2015	208/230−3−60	187	253	19.0	123	–	–	2	1.5	26.8/26.8	45/45	25/25	129/129
	460−3−60	414	506	9.7	62	–	–	2	0.8	13.7	20	13	66
	575−3−60	518	633	7.4	50	–	–	2	0.7	10.7	15	10	54
38AUQD/E*07	208/230−3−60	187	253	17.5	136	–	–	2	1.5	25/25	30/30	24/24	142/142
	460−3−60	414	506	8.4	66	–	–	2	0.8	13	20	12	70
	575−3−60	518	633	6.3	55	–	–	2	0.7	10	15	9	59
38AUQ*08	208/230−3−60	187	253	25.2	164	–	–	2	1.5	35/35	50/50	32/32	170/170
	460−3−60	414	506	12.7	100	–	–	2	0.8	18	30	16	104
	575−3−60	518	633	11.0	78	–	–	2	0.7	16	25	14	82
38AUQA/B12	208/230−3−60	187	253	30.8	225	–	–	2	1.5	42/42	60/60	39/39	231/231
	460−3−60	414	506	16.7	114	–	–	2	0.8	23	30	21	118
	575−3−60	518	633	12.8	80	–	–	2	0.7	18	30	16	84
38AUQD/E12	208/230−3−60	187	253	15.9	110	15.6	110	2	1.5	39/39	50/50	40/40	226/226
	460−3−60	414	506	7.7	52	7.7	52	2	0.8	19	25	20	108
	575−3−60	518	633	5.7	39	5.8	39	2	0.7	15	20	15	82
38AUQ*16	208/230−3−60	187	253	30.8	164	25.0	164	3	1.5	60.8/60.8	80/80	63/63	337/337
	460−3−60	414	506	12.2	100	12.2	100	3	0.8	29.9	40	31	206
	575−3−60	518	633	9.7	78	9.7	78	3	0.7	23.9	30	25	162
38AUQ*25	208/230−3−60	187	253	30.1	225	30.1	225	4	1.5	73.7/73.7	100/100	76/76	462/462
	460−3−60	414	506	16.7	114	16.7	114	4	0.8	40.8	50	42	236
	575−3−60	518	633	12.2	80	12.2	80	4	0.7	30.3	40	31	168

(COMPRESSOR, OFM (ea), POWER SUPPLY and DISCONNECT SIZE columns are grouped under WITHOUT POWERED CONVENIENCE OUTLET.)

LEGEND AND NOTES

LEGEND:
BRKR – Circuit breaker
FLA – Full Load Amps
LRA – Locked Rotor Amps
MCA – Minimum Circuit Amps Protection
NEC – National Electrical Code
PWRD CO – Powered convenient outlet
RLA – Rated Load Amps
UNPWR CO – Unpowered convenient outlet

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. The MCA values are calculated in accordance with The NEC. Article 440.
3. Motor RLA and LRA values are established in accordance with Underwriters' Laboratories (UL). Standard 1995.
4. The 575−v units are UL, Canada−listed only.
5. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

Example: Supply voltage is 230-3-60

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227$$

Determine maximum deviation from average voltage.
(AB) 227 – 224 = 3 v
(BC) 231 – 227 = 4 v
(AC) 227 – 226 = 1 v
Maximum deviation is 4 v.
Determine percent of voltage imbalance.

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{4}{227} = 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.
IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

NOTES:

1. ALL DIMENSIONS HEREIN ARE IN IMPERIAL UNITS UNLESS STATED OTHERWISE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
MECHANICAL EQUIPMENT DATA SHEETS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
M 3 . 0 1

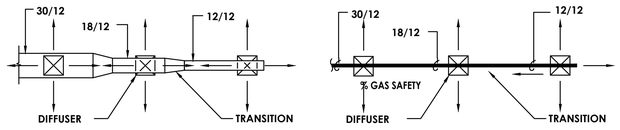
REV.

GENERAL NOTES

1. MECHANICAL CONTRACTOR SHALL EXAMINE ALL OTHER SPECIFICATIONS, DRAWINGS AND ALL FEATURES OF BUILDING CONSTRUCTION WHICH MAY AFFECT HIS WORK AND SHALL B GOVERNED BY THESE AND OTHER SPECIFICATIONS, INCLUDIN THE GENERAL CONDITIONS AND PARTICULAR INSTRUCTIONS T ALL BIDDER AND SUPPLIERS .
2. ALL WORK SHALL BE EXECUTED AND INSPECTED IN STRICT ACCORDANCE WITH ALL LOCAL CODES AND/OR STATE CODES, LAWS, ORDINANCES, RULES AND REGULATIONS APPLICABLE TO THIS PARTICULAR CLASS OF WORK, AND EACH CONTRACTOR SHALL INCLUDE IN HIS PRICE ALL APPLICABLE SERVICE CHARGES, FEES, PERMITS, TAXES, AND OTHER SIMILAR COSTS IN CONNECTION THEREWITH .
3. PRIOR TO FABRICATION OF DUCTWORK, THE MECHANICAL CONTRACTOR SHALL EXAMINE AND VERIFY ALL CONDITIONS ABOVE AND BELOW THE CEILING WHICH MAY INTERFERE WITH THE DUCT SYSTEM AND NOTIFY THE ARCHITECT OF ANY CONFLICT ENCOUNTERED CONTRACTOR SHALL PROVIDE ALL OFFSETS, ETC WHICH MAY BE REQUIRED, WITHOUT ADDITIONAL COST TO THE OWNER
4. ALL SHEET METAL DUCT CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH "SMACNA" LOW PRESSURE DUCT CONSTRUCTION STANDARD·
5. TURNING VANES SHALL BE INSTALLED IN ALL BENDS IN RECTANGULAR DUCT EXCEEDING 30"
6. ALL DUCTS SHALL BE SUPPORTED WITH 1"WIDE, 16 GAUGE, GALVANIZED STEEL BANDS .
7. ALL RECTANGULAR DUCT SHALL BE INSULATED WITH A MIN OF 1"INTERNAL LINER, 2 LBS DENSITY R-60 ALL ROUND DUCTS AND DIFFUSER TOPS SHALL HAVE A MIN 2" THICK OF FOIL BACKED BLANKET TYPE INSULATION R=4-4 2, WITH ALL JOINTS BUTTED AND TAPED .
8. ALL DUCT DIMENSIONS SHOWN ON PLANS ARE INTERNAL
9. THE MECHANICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF SUPPLY AND RETURN AIR REGISTERS, DUCTS, GRILLES AND DIFFUSERS WITH LIGHTING AND CEILING PATTERNS
10. PROVIDE LATERAL BRACING OF ALL DUCTS AND PIPES AS REQUIRED BY CODE .
11. INSULATE AND SEAL ALL DUCTWORK PER CHAPTER 10 OF THE STATE MECHANICAL CODE (T-24, PART 4)
12. MOUNT ALL THERMOSTATS AT 48" ABOVE FINISHED FLOOR .
13. ALL BRACING OF DUCTS AND PIPING SHALL BE INSTALLED IN ACCORDANCE WITH SMACNA GUIDELINES
14. WHERE BRACING DETAILS ARE NOT SHOWN ON THE DRAWINGS OR IN THE GUIDELINES, THE FIELD INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE ARCHITECT AND THE MECHANICAL ENGINEER .
15. DUCT SMOKE DETECTOR SHALL BE INSTALLED BELOW THE ROOF
16. ALL MECHANICAL EQUIPMENT AND SYSTEMS INSTALLED AS PART OF PROJECT SHALL COMPLY WITH ALL REQUIREMENTS OF THE 2022 CALIFORNIA MECHANICAL CODE AND THE 2022 CALIFORNIA BUILDING CODE AND THE 2022 CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS .
17. OUTSIDE AIR FOR A HEATING OR COOLING SYSTEM SHALL NOT BE TAKEN FROM CLOSER THAN 10 FEET FROM AN APPLIANCE VENT OUTLET, VENT OPENING OF A PLUMBING SYSTEM, OR THE DISCHARGE OUTLET OF EXHAUST FAN, UNLESS THE OUTLET IS 3 FT ABOVE THE OUTSIDE AIR INLET (CMC 314 3) . .
18. PROVIDE 120 VOLT ELECTRICAL OUTLETS WITHIN 25 FT OF ALL MECH EQUIPMENT (CMC 309)
19. HEATING,VENTILATING,ANDAIR CONDITIONING SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH ONE OF THE FOLLOWING METHODS IN ACCORDANCE WITH CMC 317 1 REQUIREMENTS .
    A. AABC NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE
    B. ACCA MANUAL B
    C. ASHRAE 111
    D. NEBB PROCEDURAL STANDARDS FOR TESTING,ADJUSTING ADJUSTING BALANCING OF ENVIRONMENTAL SYSTEMS
    E. SMACNA HVAC TESTING,ADJUSTING,AND BALANCING
20. MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL BE NON COMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX NOT TO EXCEED 25 AND A SMOKE DEVELOPED INDEX NOT TO EXCEED 50 WHERE TESTED AS A COMPOSITE PRODUCT IN ACCORDANCE WITH ASTM E84 OR UL 723 .

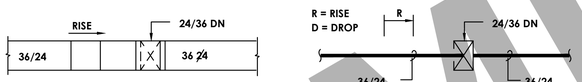
DUCTWORK SYMBOLS LEGEND

TRANSITIONS

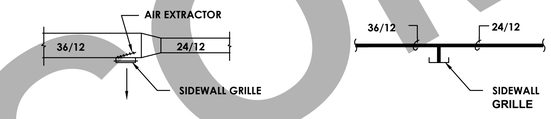


MAIN BRANCH TAKE-OFFS

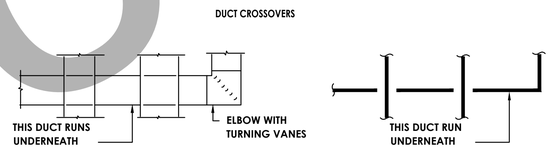
RISERS

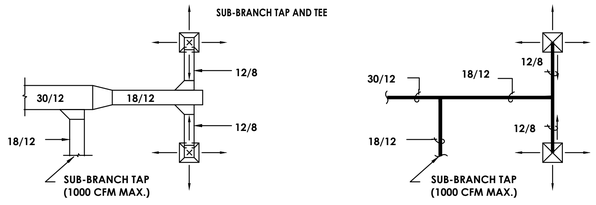


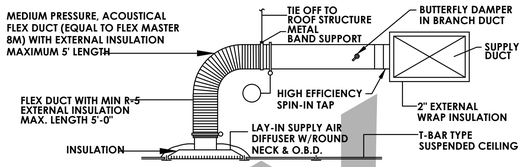
SIDEWALL REGISTERS



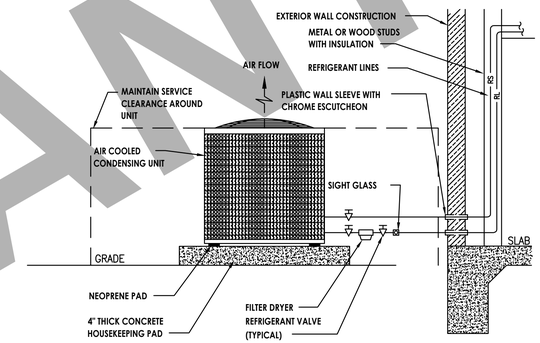
DUCT CROSSOVERS



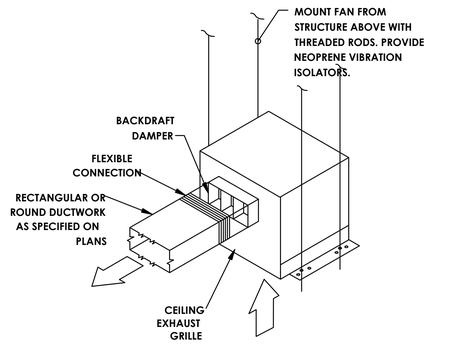




SUPPLY AIR DIFFUSER CONNECTION



OUTSIDE AIR CONDITIONER



CEILING EXHAUST FAN DETAIL

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

NOTES:

1. ALL DIMENSIONS HEREIN ARE IN IMPERIAL UNITS UNLESS STATED OTHERWISE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
MECHANICAL GENERAL DETAILS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
M 4 . 0 1

REV.

LIST OF SYMBOLS AND SERVICES

PL	LED Damp Rated High Bay, 63W,9000LM
FL	1' x 4' Fluorescent 2 lamp light ,40w
GFI/W.P	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED WITH GROUND FAULT CIRCUIT INTERRUPTER (FLOOR)
$S?	LIGHT SWITCH - WALL MOUNTED @ +48" AFF UNLESS NOTED SUBSCRIPTS: S2 = 2-POLE SWITCH S3 = 3 WAY SWITCH S4 = 4 WAY SWITCH D = DIMMER SWITCH K = KEY OPERATED SWITCH M = MOMENTARY CONTACT SWITCH P = SWITCH WITH PILOT LIGHT T = TIMER OS=WITH BUILT IN OCCUPANCY SENSOR
	120/240V, 1PH, 3W LOAD CENTER
GFI	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED WITH GROUND FAULT CIRCUIT INTERRUPTER
	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED
J	JUNCTION BOX - WALL MOUNTED - HEIGHT AS INDICATED
J	JUNCTION BOX
YxXXA	NON-FUSED DISCONNECT SWITCH - SIZE AS INDICATED
	CONDUITS IN CEILING
	CONDUITS UNDER TILES
	Secondary Sidelit Daylit Zone
	Primary Sidelit Daylit Zone
INSTALLATION HEIGHTS: h1: 24 in h2: 42 in h3: 48 in h4: 72 in h5: 94 in h6: 60 in	

SW	4" Open and Wallwash LED New Construction Downlight , 32w, 2500 lumen
EXIT	Emergency LED Exit Sign Combo with 90-Minute Battery Backup and Adjustable Ultra-Bright LED Lamps
EM	Emergency Lights LED with Backup Battery with Adjustable Heads, 90 minutes of illumination
	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED (FLOOR)

WSI	Wall Scone (indoor), 60w, incandescent
	360-degree View Occupancy Sensor (covering 251 to 500 ft2)
	Daylighting sensor
	partial ON occupancy sensor wall mounted

GENERAL NOTES:

1. ALL WORK AND EQUIPMENT UNDER THIS DIVISION SHALL BE IN STRICT COMPLIANCE WITH THE CODES, STANDARDS AND PRACTICES LISTED HEREIN, AND THEIR RESPECTIVE DATES ARE FURNISHED AS THE MINIMUM LATEST REQUIREMENTS.

A. LIFE SAFETY CODE
B. NATIONAL FIRE PROTECTION ASSOCIATION
C. NATIONAL ELECTRICAL CODE
D. AMERICAN NATIONAL STANDARDS INSTITUTE
E. INSTITUTE IF ELECTRICAL AND ELECTRONIC ASSOCIATION
F. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
G. REQUIREMENTS OF LOCAL POWER COMPANY
H. BUILDING CODE

2. THE ELECTRICAL INSTALLATION SHALL MEET THE APPROVAL OF THE LOCAL GOVERNING AUTHORITIES AND THE OWNER'S REPRESENTATIVE PRIOR TO ACCEPTANCE.
3. REFER TO THE ARCHITECTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION, CIVIL, INTERIOR DESIGN, FOR RELATED INFORMATION AND ADDITIONAL INSTALLATION REQUIREMENTS TO BE CONSIDERED AS PART OF THE ELECTRICAL CONTRACT DOCUMENTS.
4. IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION THE CONTRACTOR IS EXPECTED TO FURNISH ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM. PROVIDE EVERYTHING NECESSARY FOR EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MINOR ITEMS WHICH ARE OBVIOUSLY NECESSARY TO COMPLETE THE INSTALLATION.
5. LIGHT SWITCHES SHALL BE MOUNTED 48 INCHES ABOVE FINISHED FLOOR TO CENTER LINE OF THE DEVICE, UNLESS NOTED OTHERWISE. GANG SWITCHES AND DIMMER WITH A COMMON PLATE WHERE TWO (2) OR MORE ARE INDICATED ADJACENT TO EACH OTHER.
6. RECEPTACLES SHALL BE LOCATED 18" ABOVE FINISHED FLOOR TO CENTER LINE OF DEVICE. UNLESS NOTED OTHERWISE. ABOVE-COUNTER RECEPTACLES SHALL BE MOUNTED 6" ABOVE BACK SPLASH TO CENTERLINE OF DEVICE UNLESS NOTED OTHERWISE.
7. USE GALVANIZED RIGID STEEL CONDUIT WHERE EPOSED TO EXTERIOR CONDITIONS OR WHERE EXPOSED IN ANY LOCATIONS WHERE SUBJECT TO MECHANICAL DAMAGE. EMT SHALL BE PROVIDED WITH SET SCREW STEEL FITTINGS FOR INSTALLATION IN ALL CONCEALED WALLS AND CEILINGS IN DRY AREAS. ALL CONDUIT FOR LIGHTING PROTECTION SHALL BE PVC, SCHEDULE 40. UNLESS OTHERWISE NOTED, PVC MAY BE USED WHERE BURIED UNDER GRADE AND ENCASED IN CONCRETE SLAB OR WALLS. ALUMINUM CONDUIT IS NOT ALLOWED. EMT CAN BE USED IN DRY AREAS WHEN INSTALLED 10 FEET ABOVE FINISHED FLOOR LEVEL.
8. ALL CONDUITS IN PUBLIC SHALL BE CONCEALED UNLESS NOTED OTHERWISE.

ELECTRICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
A/C	AMP INTERRUPTING CURRENT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
BFG	BELOW FINISHED GRADE
BKBD	BACKBOARD
C	CONDUIT
CU	COPPER
DB	DISTRIBUTION BOARD
(E)	EXISTING TO REMAIN
EA	EACH
EM	EMERGENCY
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM
EWC	ELECTRIC WATER COOLER
F	FUSE (DUAL ELEMENT, TIME DELAY)
FBO	FINISHED BY OTHERS
FPN	FUSE PER NAMEPLATE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
W.P	WEATHER PROOF
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
IG	ISOLATED GROUND
JBOX	JUNCTION BOX
KVA	KILOVOLT-AMPS
KW	KILOWATT
MCC	MOTOR CONTROL CENTER
MPC	MINI POWER CENTER
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NOT TO SCALE
PB	PULLBOX
PNL	PANEL BOARD
(R)	EXISTING TO BE RELOCATED
RGS	RIGID GALVANIZED STEEL
SWBD	SWITCH BOARD
SQFT	SQUARE FEET
TL	TWISTLOCK
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TVP	TYPICAL
UG	UNDERGROUND
UMC	UNIFORM MECHANICAL CODE
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTABLE POWER
V	VOLTS
VA	VOLT-AMPS
V/PH/A	VOLTS/PHASE/AMPS
V/PH/HZ	VOLTS/PHASE/HERTZ
VFD	CARIABLE FREQUENCY DRIVE - PROVIDED BY MECHANICAL
WP	WEATHER PROOF (NEMA 3R)
(X)	EXISTING TO BE REMOVED
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

CLIENT:

ADDRESS:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
GENERAL NOTES AND ABBREVIATIONS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
E 0 . 0 1

REV.

ELECTRICAL SPECIFICATIONS

1. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS IN FIELD PRIOR TO COMMENCEMENT OF WORK.
2. WHEREVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN TO "PROVIDE AND INSTALL".
3. FINAL CONNECTIONS TO EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
4. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER RESERVES THE RIGHT TO APPROVE METHODS AND MATERIALS NOT REFLECTED HEREIN.
5. CONTRACTOR SHALL REVIEW ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND OTHER RELATED DRAWINGS PRIOR TO BID.
6. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED IN THE CONTRACT DOCUMENTS. CONTRACTOR SHALL INCLUDE IN HIS BID, ANY COSTS REQUIRED TO MAKE HIS WORK MEET THE CONTRACT SCOPE UTILIZING EXISTING CONDITIONS.
7. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT.
8. WORK, MATERIALS AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE AND NATIONAL CODES AND ORDINANCES.
9. PROVIDE PERMITS AND INSPECTIONS REQUIRED.
10. GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE, DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE OWNER.
11. PROVIDE RECORD DRAWINGS TO ENGINEER. DRAWINGS SHALL INCLUDE ALL ADDENDUM ITEMS, CHANGE ORDERS, ALTERATIONS, REROUTINGS, ETC.
12. VERIFY SPECIFIC LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
13. ELECTRICAL SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.
14. RECESSED LIGHT FIXTURES INSTALLED IN GYP. BOARD OR PLASTER CEILINGS SHALL HAVE PLASTER FRAMES INSTALLED PRIOR TO CEILING MATERIAL.
15. RECESSED FIXTURES INSTALLED INDOORS SHALL BE THERMALLY PROTECTED.
16. SEE DIVISION 15 DRAWINGS FOR LOCATION OF MECHANICAL EQUIPMENT. PROVIDE SERVICE TO AND CONNECT EQUIPMENT AS REQUIRED.
17. PROVIDE EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS.
18. ALL ELECTRICAL SYSTEMS COMPONENTS SHALL BE LISTED OR LABELED BY U.L. OR OTHER RECOGNIZED TESTING FACILITY.
19. WIRE TERMINATION PROVISIONS FOR PANELBOARDS, CIRCUIT BREAKERS, SAFETY SWITCHES, AND ALL OTHER ELECTRICAL APPARATUS SHALL BE LISTED AS SUITABLE FOR 75 DEGREE C.
20. THE FOLLOWING CONDUCTOR SIZES SHALL BE UTILIZED FOR 20 AMP CIRCUITS PERTAINING TO DISTANCES (IN FEET) INDICATED:

120VOLT, 1PH	CONDUCTOR	240 VOLT, (1PH)
0-64	#12AWG	0-129
65--106	#10AWG	130-212
107-160	#8AWG	213-321

NOTE: BASED ON 75ºc COPPER CONDUCTORS INSTALLED IN EMT WITH 16AMP LOAD @ 85% P.F.

21. CONTRACTOR SHALL REVIEW ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS AND SHALL PROVIDE LIGHTS, SWITCHES, RECEPTACLES, EQUIPMENT CONNECTIONS, ETC., AND ASSOCIATED CIRCUITING IN NEW AND REMODELED AREAS, EVEN IF SUCH AREAS ARE NOT SHOWN ON ELECTRICAL DRAWINGS. LAYOUTS, FIXTURE TYPES, QUANTITIES AND SPACING SHALL BE IN ACCORDANCE WITH SIMILAR AREAS ON THIS PROJECT. CONTRACTOR SHALL INCLUDE COSTS FOR THE ABOVE IN HIS BID. IN ADDITION, CONTRACTOR SHALL PROVIDE LAYOUT DRAWINGS FOR WORK IN SUCH AREAS AND SUBMIT FOR APPROVAL PRIOR TO ROUGH-IN.
22. WIRE SHALL BE COPPER, 75 DEGREES C RATED FOR GENERAL USE. FOR WIRING WITHIN 3 INCHES OF FLUORESCENT BALLASTS WIRE SHALL BE COPPER, MINIMUM 90 DEGREES C RATED. SIZES INDICATED ARE FOR INSTALLATION IN A MAXIMUM 30 DEGREES C AMBIENT. CONDUCTOR AMPACITY SHALL BE DERATED FOR HIGHER AMBIENT INSTALLATIONS. 600 VOLT COMPACT ALUMINUM WIRE AND CABLE IN SIZES 1/0 AND LARGER MAY BE SUBSTITUTED FOR COPPER ON SERVICES AND FEEDERS IF AMPACITY IS EQUIVALENT TO OR GREATER
23. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING EQUIPMENT WHICH IS DAMAGED DUE TO INCORRECT FIELD WIRING PROVIDED UNDER THIS SECTION OR FACTORY WIRING IN EQUIPMENT PROVIDED UNDER THIS SECTION.
24. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT OR INSTALLATION METHODS.
25. ELECTRICAL SYSTEMS SHALL BE COMPLETE, OPERABLE AND READY FOR CONTINUOUS OPERATION AT COMPLETION OF PROJECT.
26. RECEPTACLES WHICH ARE SHOWN WALL MOUNTED ON THE ELECTRICAL DRAWINGS ON WALLS WHICH, ON THE ARCHITECTURAL DRAWINGS AND ELEVATIONS ARE SHOWN AS GLASS OR PARTITIONS, SHALL BE FLUSH FLOOR DUPLEX RECEPTACLES MOUNTED ADJACENT TO BAS OR WALLS.
27. RECEPTACLES AT COUNTER SHALL BE MOUNTED WITH THEIR LONG AXIS HORIZONTAL AT +46" UNLESS NOTED.
28. FLUSH FLOOR RECEPTACLE OUTLETS SHALL BE WIREMOLD 862 SERIES. PROVIDE CARPET OR TILE FLANGE TO MATCH FLOOR FINISH.
29. THE COLOR OF THE DEVICES AND COVER PLATES SHALL BE AS DIRECTED BY ARCHITECT. IN DAMP OR WET LOCATIONS COVER PLATES SHALL BE STAINLESS STEEL. IN DRY LOCATIONS COVER PLATES SHALL BE SMOOTH HIGH ABUSE NYLON OR EQUIVALENT. PROVIDE COVER PLATES FOR SWITCHES, RECEPTACLES, TELEPHONE, TELEVISION, COMPUTER AND J-BOX OUTLETS AS REQUIRED.
30. ROMEX CABLE WITH A GROUNDING CONDUCTOR MAY BE USED WHERE PERMITTED BY BOTH THE N.E.C. AND LOCAL ORDINANCES.
31. DISCONNECT SWITCHES SHALL BE GENERAL DUTY TYPE. FUSIBLE SWITCHES SHALL ACCEPT CLASS 'R' FUSES ONLY AND REJECT ALL OTHERS.
32. FINAL CONNECTIONS TO VIBRATING EQUIPMENT SHALL BE WITH FLEX (LIQUIDTIGHT FOR EXTERIOR APPLICATIONS) AND APPROVED FITTINGS. DO NOT SECURE CONDUITS, DISCONNECTS OR DEVICES TO DUCTWORK OR MECHANICAL EQUIPMENT.
33. THE ENGINEER OF RECORD HAS PERFORMED SHORT CIRCUIT CALCULATIONS AND THE AIC RATINGS INDICATED FOR EACH DEVICE IS ADEQUATE TO PROTECT THE EQUIPMENT AND THE ELECTRICAL SYSTEM.
34. THE ENGINEER OF RECORD HAS PERFORMED VOLTAGE DROP CALCULATIONS AND ALL BRANCH CIRCUITS AND FEEDERS COMPLY WITH NEC 210-19(A) FPN NO4.
35. THE CONTRACTOR SHALL PROVIDE 120V CONNECTION TO NEAREST MAINTENANCE RECEPTACLE WHERE REQUIRED FOR CONDENSATE PUMPS ASSOCIATED WITH FAN COIL UNITS. COORDINATE WITH MECHANICAL CONTRACTOR.
36. THE CONTRACTOR SHALL COORDINATE THE SPECIFIC LOCATION, MOUNTING HEIGHT, ROTATION, TYPE, COLOR, ETC. OF ALL DEVICES PRIOR TO INSTALLATION.
37. CONNECTIONS TO HYDROMASSAGE BATHTUBS, JACCUZZI TUBS OR SIMILAR EQUIPMENT SHALL BE MADE IN ACCORDANCE WITH ARTICLE 680.70 OF THE NEC. PROVIDE BONDING AS REQUIRED BY ARTICLE 680.74 OF THE NEC.
38. ALL INDOOR FLUORESCENT FIXTURES THAT UTILIZE DOUBLE-ENDED LAMPS AND CONTAIN BALLAST(S) THAT CAN BE SERVICED IN PLACE OR BALLASTED LUMINARIES THAT ARE SUPPLIED FROM MULTIWIRE BRANCH CIRCUITS AND CONTAIN BALLAST(S) THAT CAN BE SERVICED IN PLACE SHALL COMPLY WITH 410.73 (G) OF THE NEC.
39. CEILING MOUNTED SMOKE AND CARBON MONOXIDE DETECTORS PER NFPA 72, SECTION R314 MUST COMPLY WITH U.L. 2075 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
40. ALL SMOKE DETECTORS AND COMBINATION SMOKE/CARBON MONOXIDE DETECTORS SHALL BE HARDWIRED ON SAME CIRCUIT AND HAVE A BATTERY BACKUP SYSTEM.
41. WHEN MORE THAN EITHER ONE (1) SMOKE ALARM OR MORE THAN ONE (1) CARBON MONOXIDE ALARM IS REQUIRED TO BE INSTALLED WITHIN AN INDIVIDUAL DWELLING UNIT, ALL ALARM DEVICES SHALL BE INTERCONNECTED IN SUCH A MANNER THAT THE ACTUATION OF ONE ALARM WITH ACTIVATE ALL OF THE ALARMS IN THE INDIVIDUAL UNIT. SMOKE AND CARBON MONOXIDE ALARMS SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS. (IRC SECTION R3143 AS AMENDED)
    A. SMOKE ALARMS IN EACH SLEEPING ROOM.
    B. SMOKE ALARMS OUTSIDE OF EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS.
    C. SMOKE ALARMS ON EACH ADDITIONAL STORY OF THE DWELLING INCLUDING BASEMENTS BUT NOT INCLUDING CRAWL SPACE AND UNINHABITABLE ATTICS. IN DWELLINGS OR DWELLING UNITS WITH SPLIT LEVELS AND WITHOUT AN INTERVENING DOOR BETWEEN THE ADJACENT LEVELS, A SMOKE ALARM INSTALLED ON THE UPPER LEVEL SHALL SUFFICE FOR THE ADJACENT LOWER LEVEL PROVIDED THAT THE LOWER LEVEL IS LESS THAN ONE FULL STORY BELOW THE UPPER LEVEL.
    D. CARBON MONOXIDE ALARMS OUTSIDE OF SLEEPING AREAS IN THE IMMEDIATE VICINITY OF THE BEDROOMS IN DWELLING UNITS WITHIN WHICH FUEL-FIRED APPLIANCES ARE INSTALLED AND IN DWELLING UNITS THAT HAVE ATTACHED GARAGES.
    E. CARBON MONOXIDE ALARMS WITHIN EACH BEDROOM WHICH CONTAINS A FUEL-FIRED APPLIANCE.
43. ALL BRANCH CIRCUITS THAT SUPPLY 125-VOLT, SINGLE PHASE, 15 AND 20 AMP BRANCH CIRCUITS SUPPLYING OUTLETS INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, DENS, BEDROOMS, SUNROOMS, RECREATION ROOMS, CLOSETS, HALLWAYS, OR SIMILAR ROOMS OR AREAS SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER, COMBINATION-TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT. NEC ARTICLE 210.12 (A).
44. ALL ATTIC ACCESSES SHALL BE PROVIDED WITH A SWITCHED LIGHT AND 120 VOLT GFI OUTLET AT OR NEAR THE FORCED AIR UNIT. LOCATE LIGHT SWITCH AT THE ATTIC ACCESS OPENING.

LIGHTING SCHEDULE

SYMBOL	DESCRIPTION	MANUF.	MODEL	LUMINAIRE TYPE	COLOR / FINISH	REMARKS
PL	LED Damp Rated High Bay, 63W,9000LM	Lithonia	Lithonia Lighting JCBL 9000LM	LED		
FL	1' x 4' Fluorescent 2 lamp light ,40w	Lithonia		Fluorescent Light		
SW	4" Open and Wallwash LEDNew Construction Downlight	Lithonia	Lithonia Lighting LBRA ALO3 (2000LM) SWWH (4000K) MR LSS WD 80CRI 4 INCH	LED		
WSI	Wall Scone (indoor), 60w, incandescent			Incandescent		
EXIT	Emergency LED Exit Sign Combo with 90-Minute Battery Backup and Adjustable Ultra-Bright LED Lamps	Ciata	UPC: 782298960395			
	Emergency Lights LED with Backup Battery with Adjustable Heads, 90 minutes of illumination	Ciata	UPC: 810030944492	1Watt (2LEDx 0.5watt) per lamp head		

NOTES:
1. THIS PLAN SHALL BE USED IN CONJUNCTION WITH THE ELECTRICAL, MECHANICAL AND PLUMBING PLANS. COORDINATION REQUIRED. NOTIFY ARCHITECT IN CASE OF DISCEPANCIES FOUND. MANUFACTURERS AND MODELS ARE SHOWN FOR CODE COMPLIANCE AND BIDDING PURPOSES ONLY. PRIOR ORDERING / INSTALLING ANY LIGHT FIXTURES CONTRACTOR SHALL PROVIDE SAMPLES AND CUT SHEETS TO OWNER FOR APPROVAL AND CONFIRM MANUFACTURER, MODEL, COLOR AND BUDGET / COSTS.

NOTES:
1. FIXTURES SHALL HAVE APPROPRIATE U.L. LABEL (i.e., DAMP OR WET) AS REQUIRED BY CODES AND ORDINANCES.
2. FIXTURES SHALL INCLUDE ALL ACCESSORIES NECESSARY FOR INSTALLATION ACCORDING TO MANUFACTURER'S SHOP DRAWINGS AND AS REQUIRED BY CODES AND LOCAL ORDINANCES.
3. PRIOR TO ORDERING ANY LIGHTING EQUIPMENT, THE CONTRACTOR SHALL COORDINATE ALL FIXTURE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND CEILING CAVITY DEPTHS.
4. ALL LAMPS SHALL BE PROVIDED AND INSTALLED ACCORDING TO THE ATTACHED FIXTURE SCHEDULE AND SPECIFICATIONS ENSURE COMPATIBILITY BETWEEN FIXTURE, LAMP(S) AND BALLAST(S). (OSRAM SYLVANIA SERIES)
5. CONTRACTOR SHALL VERIFY FIXTURE VOLTAGES AND CEILING TRIM COMPATIBILITY PRIOR TO ORDERING FIXTURE.
6. PROVIDE APPROVED FIRE-RATED ENCLOSURES FOR ALL LIGHTING FIXTURES LOCATED IN FIRE-RATED CEILINGS.
7. LIGHTING FIXTURE CATALOG NUMBERS ARE SERIES TYPE ONLY. PROVIDE ALL NECESSARY HARDWARE AS REQUIRED BY THE SPECIFICATIONS, DRAWINGS, AND PROJECT CONDITIONS FOR A COMPLETE INSTALLATION.
8. ALL FIXTURES SHALL BE ORDERED WITH APPROPRIATE BALLAST(S) THAT HAVE U.L. AND CB, LABELS. ALL BALLASTS MUST CONFORM TO TITLE 24 AND/OR IECC REQUIREMENTS FOR PERFORMANCE. PROVIDE MULTIPLE BALLASTS FOR DUAL LEVEL SWITCHING AND WIRING (i.e. TANDEM) AS INDICATED ON THE PLANS.
9. UPON INITIAL ENERGIZING OF ALL NEW FLUORESCENT LAMPS, A CONTINUOUS PERIOD OF 30 HOURS SHALL OCCUR PRIOR TO DE-ENERGIZING OF LAMPS FOR MANUFACTURER REQUIRED
10. ALL FLUORESCENT BALLASTS SHALL BE ELECTRONIC TYPE. PROVIDE END OF LIFE (EOL) SHUT-DOWN PROTECTION FOR COMPACT FLUORESCENT LAMPS.
11. ENSURE COMPATIBILITY OF ALL LIGHTING SYSTEM COMPONENTS, ESPECIALLY DIMMED SYSTEMS. FIXTURES, LAMPS, BALLAST(S), AND DIMMING SYSTEMS/INDIVIDUAL CONTROLS MUST BE FACTORY CERTIFIED COMPATIBLE FOR FULL RANGE OF DIMMING COMPATIBILITY.
12. PROVIDE CLEARANCES FROM COMBUSTIBLES, A MINIMUM OF 3/4" (OTHER THAN AT POINTS OF SUPPORT) AND 3" FROM INSULATION FOR RECESSED LIGHTING FIXTURES WHICH ARE NON-IC RATED.
13. PROVIDE A MINIMUM OF TWO (2) #12 SUPPORT WIRES ATTACHED TO BUILDING FRAME IN ADDITION TO T-BAR CLIPS FOR FLUORESCENT FIXTURES RECESSED IN SUSPENDED T-BAR CEILING.
14. FIXTURES WITH EMERGENCY BATTERY BACKUP SHALL BE WIRED AHEAD OF ANY LOCAL SWITCHING IN COMPLIANCE WITH NEC ARTICLE 700.
15. EMERGENCY LIGHTING UNITS SHALL BE EQUIPPED WITH FACTORY-INSTALLED INTEGRAL TEST SWITCHES.
16. PROVIDE DOOR-TO-FRAME AND LENS-TO-DOOR GASKETING, INVERTED LENS, AND FOOD SERVICE RATING FOR ALL FIXTURES LOCATED IN FOOD SERVICE AREAS.
17. FLUORESCENT LUMINARIES THAT UTILIZE DOUBLE-ENDED LAMPS AND CONTAIN BALLAST(S) THAT CAN BE SERVICED IN PLACE, OR BALLASTED LUMINAIRES THAT ARE SUPPLIED FROM MULTI- WIRE BRANCH CIRCUITS AND CONTAIN BALLAST(S) THAT CAN BE SERVICED IN PLACE, SHALL HAVE DISCONNECTING MEANS EITHER INTERNAL OR EXTERNAL TO EACH LUMINAIRE SO TO DISCONNECT SIMULTANEOUSLY FROM THE SOURCE OF SUPPLY ALL CONDUCTORS OF THE BALLAST (INCLUDING THE GROUNDED CONDUCTOR IF ANY). IN ACCORDANCE WITH NEC ARTICLE 410, THE LINE-SIDE TERMINALS OF THE DISCONNECTING MEANS SHALL BE LOCATED SO AS TO BE ACCESSIBLE TO QUALIFIED PENSIONS BEFORE SERVICING OR MAINTAINING THE BALLAST.
18. ALL FLUORESCHENT LAMPS SHALL BE OF A LOW MERCURY DESIGN, HAVE A MINIMUM CRI RATING OF 85 AND 3500K COLOR TEMPERATURE UNLESS NOTED OTHERWISE.

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REV. NO.	DESCRIPTION	DATE	BY

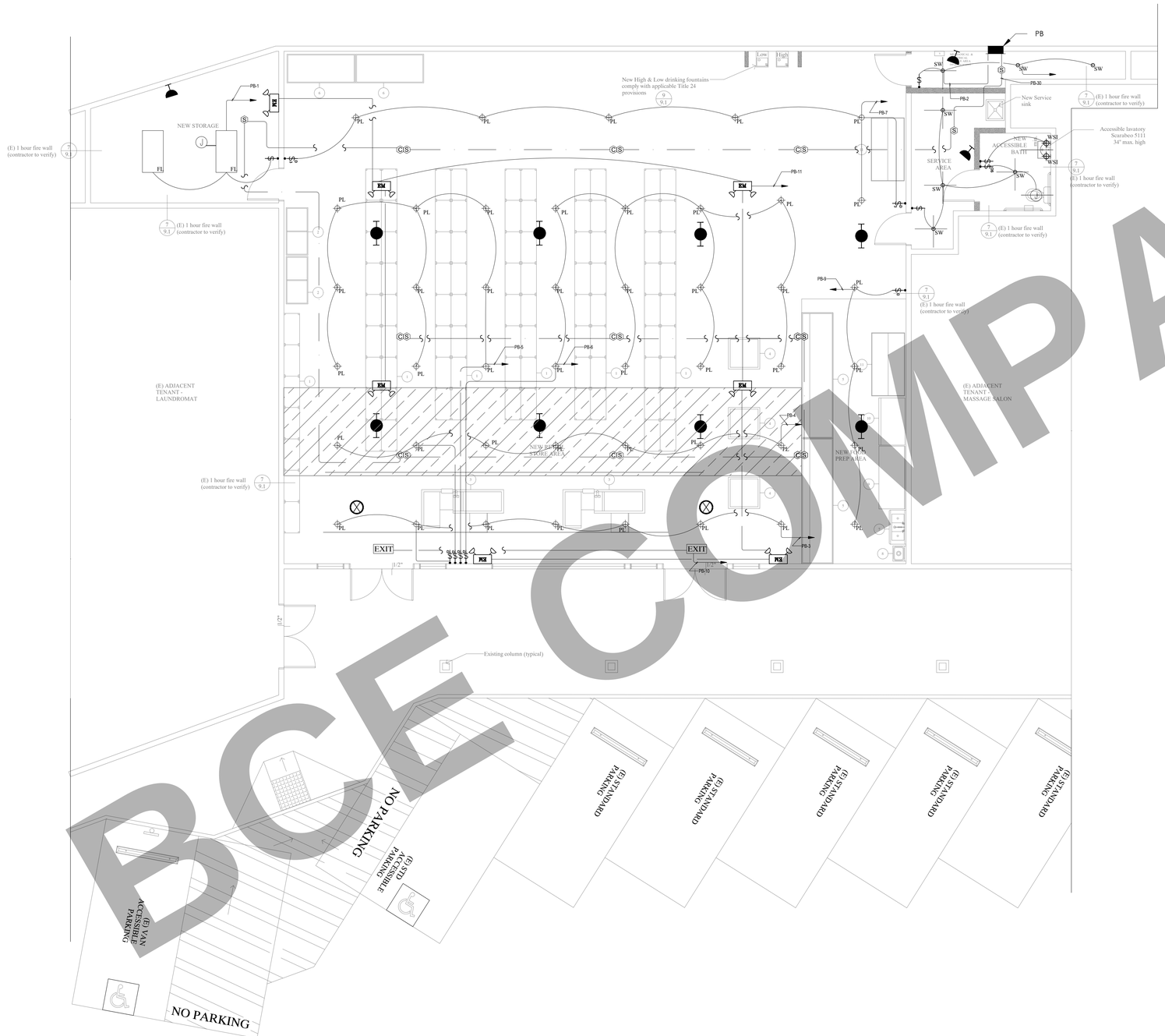
PROJECT

TITLE:
ELECTRICAL SPECIFICATIONS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
E 1 . 0 1

REV.



LIST OF SYMBOLS AND SERVICES

PL	PL -Round Led High Bay Light, 63
FL	1' x 4' Fluorescent 2 lamp light ,40w
GFI /W.P	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED WITH GROUND FAULT CIRCUIT INTERRUPTER (FLOOR)
$S_?	LIGHT SWITCH - WALL MOUNTED @ +48" AFF UNLESS NOTED SUBSCRIPTS: S2 = 2-POLE SWITCH S3 = 3 WAY SWITCH S4 = 4 WAY SWITCH D = DIMMER SWITCH K = KEY OPERATED SWITCH M = MOMENTARY CONTACT SWITCH P = SWITCH WITH PILOT LIGHT T = TIMER OS=WITH BUILT IN OCCUPANCY SENSOR
	120/240V, 1PH, 3W LOAD CENTER
GFI	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED WITH GROUND FAULT CIRCUIT INTERRUPTER
	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED
J	JUNCTION BOX - WALL MOUNTED - HEIGHT AS INDICATED
J	JUNCTION BOX
YxYYA	NON-FUSED DISCONNECT SWITCH - SIZE AS INDICATED
	CONDUITS IN CEILING
	CONDUITS UNDER TILES
	Secondary Sidelit Daylit Zone
	Primary Sidelit Daylit Zone
INSTALLATION HEIGHTS: h1: 24 in h2: 42 in h3: 48 in h4: 72 in h5: 94 in h6: 60 in	
SW	SW- 4" Downlight Capri R4, 30w
EXIT	Emergency LED Exit Sign Combo with 90-Minute Battery Backup and Adjustable Ultra-Bright LED Lamps
EM	Emergency Lights LED with Backup Battery with Adjustable Heads, 90 minutes of illumination
	DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED (FLOOR)
WSI	Wall Scone (indoor), 60w, incandescent
	360-degree View Occupancy Sensor (covering 251 to 500 ft2)
	Daylighting sensor
	partial ON occupancy sensor wall mounted

GENERAL NOTES

1. ALL 120 VOLT, SINGLE PHASE 15 AND 20 AMPERE BRANCH CIRCUIT SUPPLYING OUTLETS INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, DENS, BEDROOMS, SUNROOMS, RECREATION ROOMS, CLOSETS, HALLWAYS, OR SIMILAR AREAS SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER, COMBINATION TYPE INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT. (NEC ARTICLE 210.12(A))
2. IN EVERY KITCHEN, FAMILY ROOM, DINING ROOM, LIVING ROOM, PARLOR, LIBRARY, DEN, SUNROOM, BEDROOM, RECREATION ROOM OR SIMILAR ROOM OR AREA OF DWELLING UNITS RECEPTACLE OUTLETS SHALL BE INSTALLED IN ACCORDANCE WITH THE GENERAL PROVISIONS SPECIFIED IN THE FOLLOWING ARTICLES.
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   b. NEC article 210.52(a) (2) AS AMENDED WALL SPACE. ANY WALL 24-INCHES OR MORE IN LENGTH SHALL BE PROVIDED WITH A RECEPTACLE OUTLET. WALL SPACE SHALL INCLUDE AROUND CORNERS. THE FIRST SLIDING PANEL OF A SLIDING DOOR. FIXED ROOM DIVIDERS SUCH AS A FREESTANDING BAR TYPE COUNTER. WALL SPACE NED NOT INCLUDE THE SPACE BEHIND OPERABLE DOORS. AND NEED NOT INCLUDE ENTRIES, HALLWAYS ETC.. LESS THAN 5-FEET WIDE LOCATED IN BEDROOMS.
   c. NEC ARTICLE 210.52(A) (3) AS AMENDED FLOOR RECEPTACLES.
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1. JUNCTION BOX FOR EXHAUST FAN
2. JUNCTION BOX FOR STORAGE EXHAUST FAN
3. DISCONNECT SWITCH FOR ELECTRICAL WATER HEATER
4. DISCONNECT SWITCH FOR AHU
5. DISCONNECT SWITCH FOR OUTDOOR UNIT
6. FURNISH AND INSTALL SMOKE OR COMBINATION SMOKE AND CARBON MONOXIDE DETECTOR AS REQUIRED .INTERLOCK WITH OTHER DETECTORS

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REV. NO.	DESCRIPTION	DATE	BY

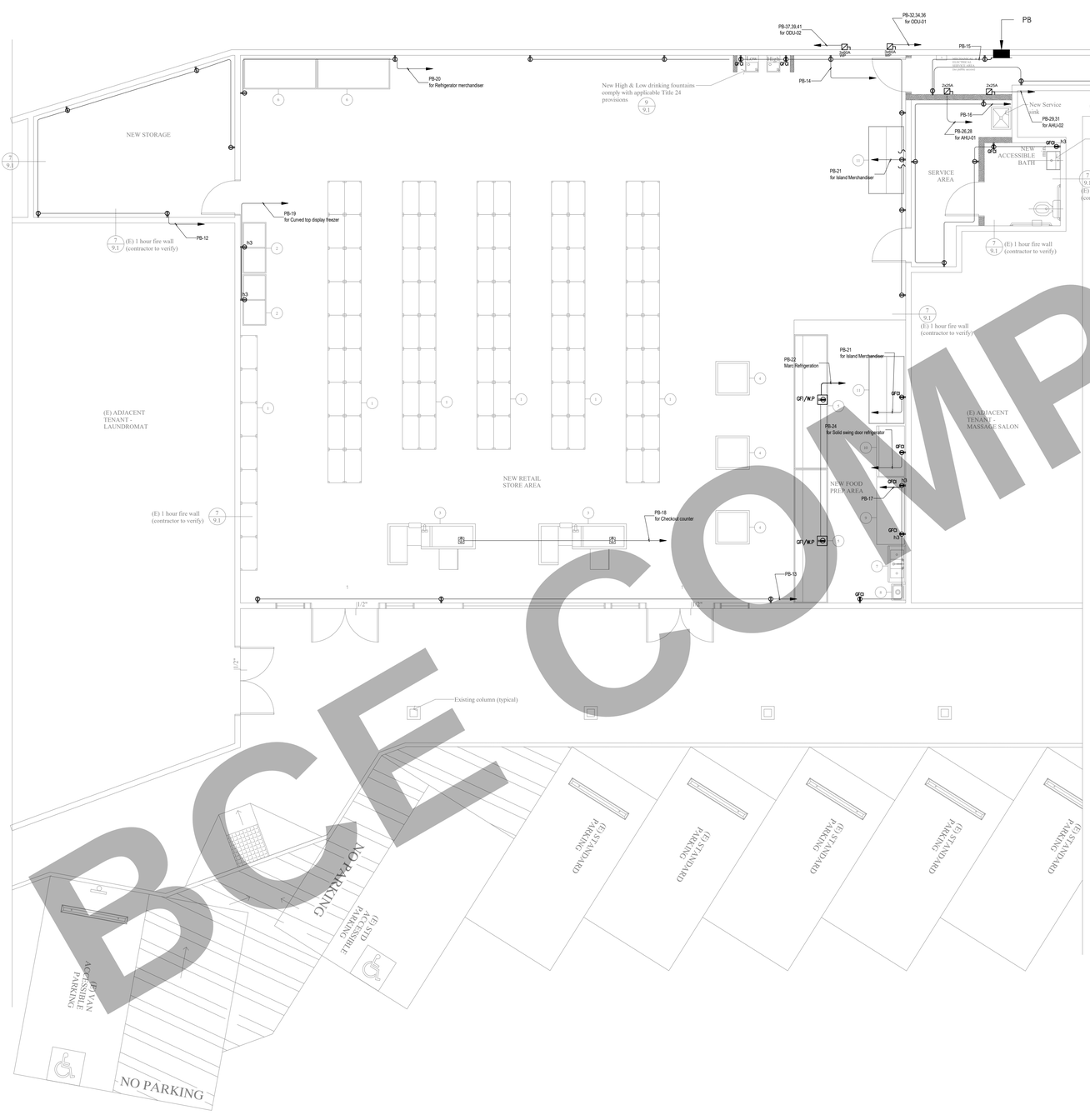
PROJECT

TITLE:
MAIN FLOOR - LIGHTING LAYOUT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

DRAWING NO.
E 2 . 0 1

REV.



LIST OF SYMBOLS AND SERVICES

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REV. NO.	DESCRIPTION	DATE	BY

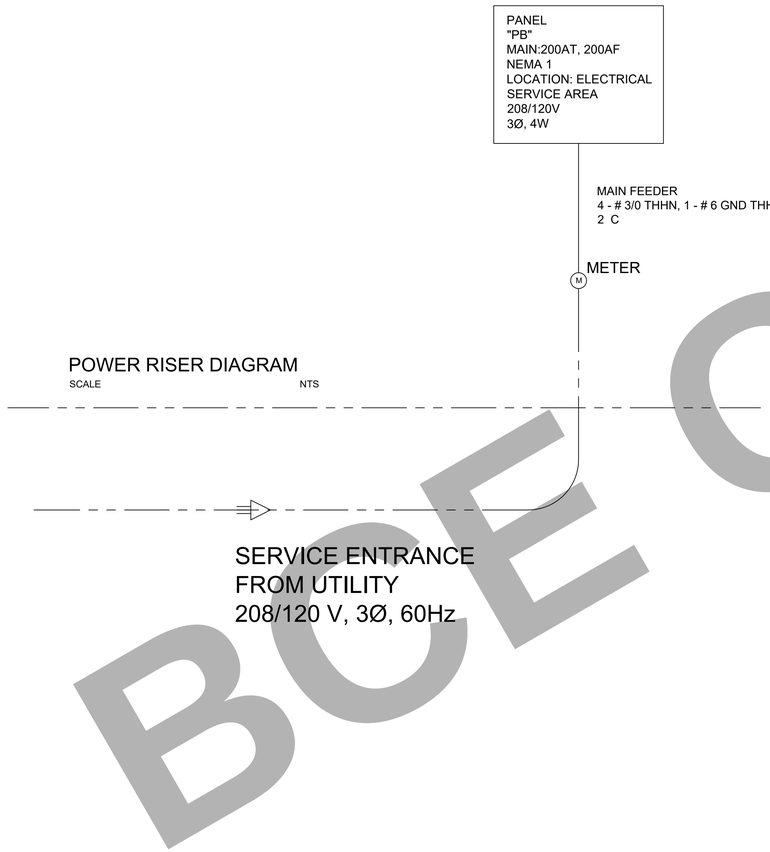
PROJECT

TITLE:
MAIN FLOOR - POWER LAYOUT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

DRAWING NO.
E 3 . 0 1

REV.



Location: CORRIDOR				CONNECTED LOAD			DEMAND TOTAL
*	LOAD SUMMARY	CL	DF	A	B	C	
L	Lighting	6.17	1.00	1.26	2.27	2.63	6.17
R	Convenience Recept	14.24	0.70	5.76	2.82	5.66	9.97
H	Heating (Space)	5.50	1.00	2.75	2.75		5.50
C	Cooling		1.00				
A	HVAC	31.82	1.00	11.71	10.06	10.06	31.82
P	Process		1.00				
O	Other Continuous		1.25				
K	Kitchen		0.65				
N	Noncontinuous		1.00				
M	Motor		1.00				
	Total	**57.73**		21.48	17.89	18.35	53.46

Total Demand Load (KVA)	53.46
Total Demand Current (A)	148.38
Min. Feeder Ampacity (A)	185.47

PB	
PANELBOARD DESIGNATION	
SYSTEM VOLTAGE	208/120V, 3Φ, 4W
BUS SIZE	200
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-3P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #6G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	SERIES RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	50
FEEDER V. DROP (%)	0.640
FAULT CURRENT	
KAIC RATING	22
ENCLOSURE	TYPE 3R

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	C	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING AT NEW STORAGE	L	2X 12 AWG	- #12G	20A-1P	0.10	0.51			0.41	20A-1P	2X 12 AWG	- #12G	LIGHTING MECHANICAL AND ELECTRICAL ROOM & SERVICE AREA	L	2
3	LIGHTING AT NEW RETAIL STORE AREA (1)	L	2X 12 AWG	- #10G	20A-1P	0.88		1.75		0.88	20A-1P	2X 12 AWG	- #12G	LIGHTING AT NEW RETAIL STORE AREA (2)	L	4
5	LIGHTING AT NEW RETAIL STORE AREA (3)	L	2X 12 AWG	- #10G	20A-1P	1.13			2.63	1.50	20A-1P	2X 12 AWG	- #12G	LIGHTING AT NEW RETAIL STORE AREA (4)	L	6
7	LIGHTING AT NEW RETAIL STORE AREA (5)	L	2X 12 AWG	- #10G	20A-1P	0.75	0.75				20A-1P			SPARE	L	8
9	LIGHTING AT NEW FOOD PREPARATION AREA	L	2X 12 AWG	- #10G	20A-1P	0.50		0.52		0.02	20A-1P	2X 12 AWG	- #12G	EXIT LIGHTING	L	10
11	EMERGENCY LIGHTING	L	2X 12 AWG	- #10G	20A-1P	0.01			1.63	1.62	20A-1P	2X 12 AWG	- #12G	SOCKETS AT NEW STORAGE	R	12
13	SOCKETS AT NEW RETAIL STORE AREA (1)	R	2X 12 AWG	- #12G	20A-1P	0.81	3.24			2.43	20A-1P	2X 12 AWG	- #12G	SOCKETS AT NEW RETAIL STORE AREA (2)	R	14
15	SOCKETS LIGHTING MECHANICAL AND ELECTRICAL ROOM	R	2X 12 AWG	- #12G	20A-1P	1.08		2.70		1.62	20A-1P	2X 12 AWG	- #12G	SOCKETS AT SERVICE AREA AND NEW BATH	R	16
17	SOCKETS AT NEW FOOD PREPARATION AREA	R	2X 12 AWG	- #12G	20A-1P	0.81			1.53	0.72	20A-1P	2X 12 AWG	- #12G	SOCKETS FOR CHECKOUT COUNTER	R	18
19	SOCKETS FOR CURVED TO DISPLAY FREEZER	R	2X 12 AWG	- #12G	20A-1P	0.84	2.52			1.68	20A-1P	2X 12 AWG	- #12G	SOCKETS FOR REFRIGERATOR MERCHANDISER	R	20
21	SOCKET FOR ISLAND MERCHANDISER (1)	R	2X 12 AWG	- #12G	20A-1P	0.06		0.12		0.06	20A-1P	2X 12 AWG	- #12G	SOCKET FOR ISLAND MERCHANDISER (2)	R	22
23	SOCKET FOR MARC REFRIGERATION	R	2X 12 AWG	- #12G	20A-1P	0.86			1.51	0.65	20A-1P	2X 12 AWG	- #12G	SOCKETS FOR SOLID SWING DOOR REFRIGERATOR	R	24
25	EWH-01	H	2X 10 AWG	- #10G	25A-2P	2.75	4.41			1.66	20A-2P	2X 12 AWG	- #12G	AHU-01	A	26
27		H				2.75		4.41		1.66					A	28
29	AHU-02	A	2X 12 AWG	- #12G	20A-1P	1.66			2.66	1.00	20A-1P	2X 12 AWG	- #12G	SMOKE DETECTORS	R	30
31		A				1.66	5.86			4.20	50A-3P	3X 8 AWG	- #10G	ODU-01	A	32
33	SPARE				20A-2P			4.20		4.20					A	34
35									4.20	4.20					A	36
37	ODU-02	A	3X 8 AWG	- #10G	50A-3P	4.20	4.20							SPACE		38
39		A				4.20		4.20						SPACE		40
41		A				4.20			4.20					SPACE		42
		(KVA)														
					Total Connected Load		21.48	17.89	18.35							

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REV. NO.	DESCRIPTION	DATE	BY

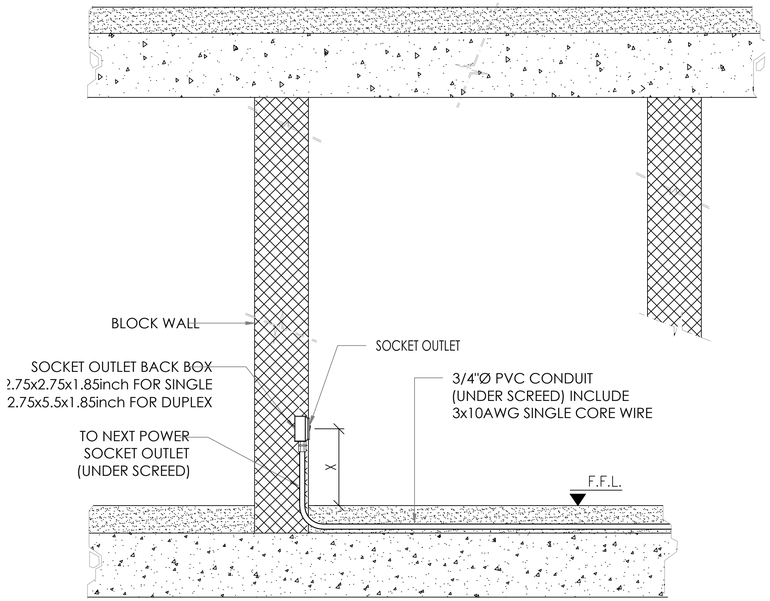
PROJECT

TITLE:
PANEL SCHEDULES & SINGLE LINE DIAGRAM

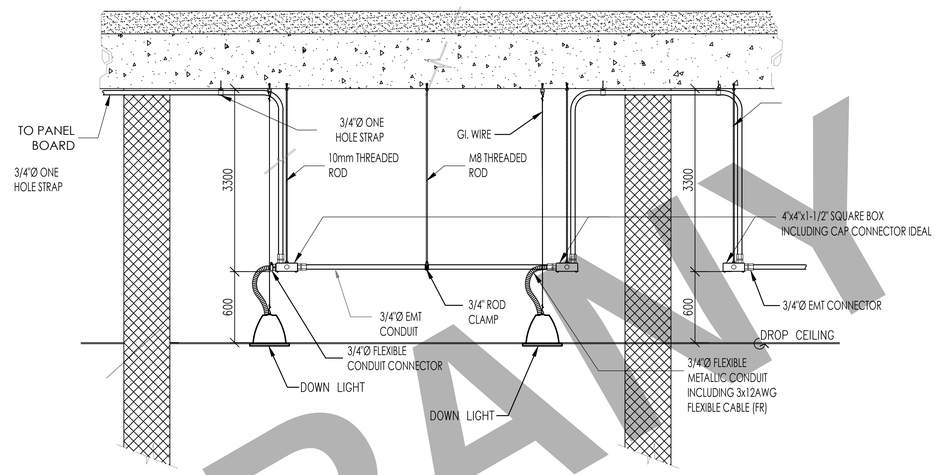
PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
E 4 . 0 1

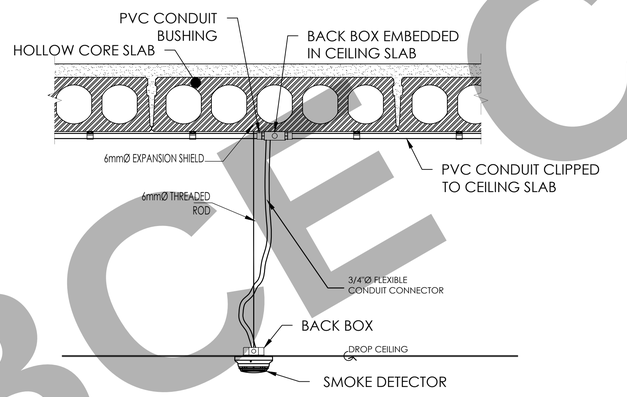
REV.



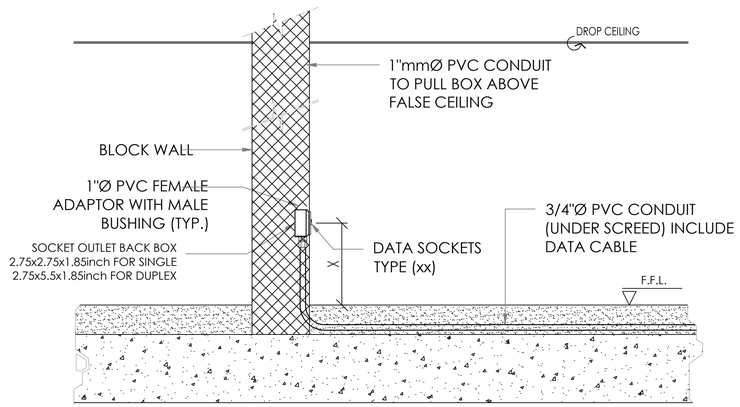
POWER - WALL MOUNTED SOCKET INSTALLATION DETAIL



LIGHTING - RECESSED MOUNTING INSTALLATION DETAIL



CEILING SLAB CLIPPED CONDUIT MOUNTED TO FALSE CEILING SMOKE DETECTOR - INSTALLATION DETAIL



LOW CURRENT-WALL MOUNTED DATA POINT INSTALLATION DETAIL

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

TITLE:
GENERAL DETAILS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
E 5 . 0 1

REV.

Operator
Telephone
Fax
e-Mail

Table of contents

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e-Mail

prado / Luminaire parts list

2 Pieces — Lithonia Lighting CPANL 1x4 24/33/44LM 40K - 44LM CPANL Switchable Lumen LED Flat Panel, 1x4, 24/33/44LM, 4000 K CCT, - 44LM
Article No.: CPANL 1x4 24/33/44LM 40K - 44LM
Luminous flux (Luminaire): 4482 lm
Luminous flux (Lamps): 4482 lm
Luminaire Wattage: 40.3 W
Luminaire classification according to CIE: 100
CIE flux code: 45 77 95 100 100
Fitting: 1 x User defined (Correction Factor 1.000).
See our luminaire catalog for an image of the luminaire.

45 Pieces — Lithonia Lighting JCBL 9000LM ACFR 40K 80CRI JCBL, 9,000 Lumens, Acrylic Frosted Reflector, 4000K Color Temperature, 80 Color Rendering Index
Article No.: JCBL 9000LM ACFR 40K 80CRI
Luminous flux (Luminaire): 9533 lm
Luminous flux (Lamps): 9533 lm
Luminaire Wattage: 63.0 W
Luminaire classification according to CIE: 87
CIE flux code: 61 79 91 87 100
Fitting: 1 x User defined (Correction Factor 1.000).
See our luminaire catalog for an image of the luminaire.

7 Pieces — Lithonia Lighting LBR4 ALO3 (2500LM) SWW1 (4000K) AR LSS WD 80CRI 4 INCH LBR DOWNLIGHT 2500LM 4000K CLEAR SEMI-SPECULAR WIDE 80 CRI
Article No.: LBR4 ALO3 (2500LM) SWW1 (4000K) AR LSS WD 80CRI
Luminous flux (Luminaire): 2884 lm
Luminous flux (Lamps): 2884 lm
Luminaire Wattage: 31.8 W
Luminaire classification according to CIE: 100
CIE flux code: 94 100 100 100 100
Fitting: 1 x User defined (Correction Factor 1.000).
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Operator
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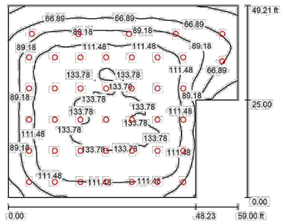
Fax
e-Mail

retail-store area / Summary



Height of Room: 15.000 ft, Light loss factor: 0.80 — Values in Footcandles, Scale 1:193

Surface	ρ [%]	E_{av} [fc]	E_{min} [fc]	E_{max} [fc]	u0
Workplane	/	104	32	141	0.303
Floor	20	99	38	134	0.388
Ceiling	80	37	17	276	0.456
Walls (6)	50	51	25	99	/

Workplane:
Height: 2.493 ft
Grid: 64 x 64 Points
Boundary Zone: 0.000 ft
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.508, Ceiling / Working Plane: 0.357.

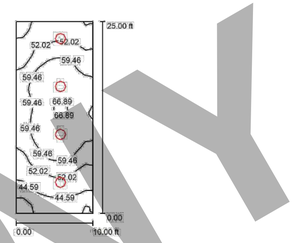
Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	41	Lithonia Lighting JCBL 9000LM ACFR 40K 80CRI JCBL, 9,000 Lumens, Acrylic Frosted Reflector, 4000K Color Temperature, 80 Color Rendering Index (1.000)	9533	9533	63.0
		Total:	390840	Total: 390840	2583.0

Specific connected load: 0.98 W/sq ft = 0.09 W/sq ft/10 fc (Ground area: 2634.26 sq ft)

Operator
Telephone
Fax
e-Mail

food preparation / Summary



Height of Room: 16.000 ft, Mounting Height: 16.000 ft, Light loss factor: 0.80 — Values in Footcandles, Scale 1:98

Surface	ρ [%]	E_{av} [fc]	E_{min} [fc]	E_{max} [fc]	u0
Workplane	/	55	34	67	0.613
Floor	20	46	31	56	0.673
Ceiling	80	32	13	277	0.418
Walls (4)	50	35	17	126	/

Workplane:
Height: 2.493 ft
Grid: 64 x 32 Points
Boundary Zone: 0.000 ft
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.678, Ceiling / Working Plane: 0.581.

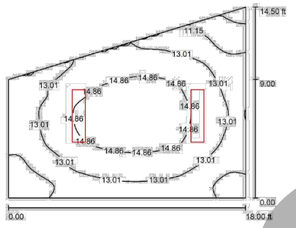
Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	4	Lithonia Lighting JCBL 9000LM ACFR 40K 80CRI JCBL, 9,000 Lumens, Acrylic Frosted Reflector, 4000K Color Temperature, 80 Color Rendering Index (1.000)	9533	9533	63.0
		Total:	38131	Total: 38131	252.0

Specific connected load: 1.01 W/sq ft = 0.18 W/sq ft/10 fc (Ground area: 250.01 sq ft)

Operator
Telephone
Fax
e-Mail

storage / Summary



Height of Room: 16.000 ft, Mounting Height: 16.000 ft, Light loss factor: 0.80 — Values in Footcandles, Scale 1:57

Surface	ρ [%]	E_{av} [fc]	E_{min} [fc]	E_{max} [fc]	u0
Workplane	/	13	8.85	16	0.666
Floor	20	11	8.06	13	0.734
Ceiling	80	5.31	3.23	8.07	0.609
Walls (4)	50	11	3.49	31	/

Workplane:
Height: 2.493 ft
Grid: 64 x 64 Points
Boundary Zone: 0.000 ft
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.856, Ceiling / Working Plane: 0.400.

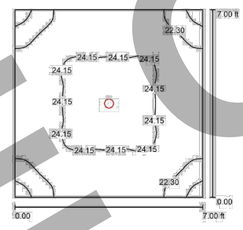
Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	2	Lithonia Lighting CPANL 1x4 24/33/44LM 40K - 44LM CPANL Switchable Lumen LED Flat Panel, 1x4, 24/33/44LM, 4000 K CCT, - 44LM (1.000)	4482	4482	40.3
		Total:	8963	Total: 8963	80.6

Specific connected load: 0.38 W/sq ft = 0.29 W/sq ft/10 fc (Ground area: 211.50 sq ft)

Operator
Telephone
Fax
e-Mail

accessible bath / Summary



Height of Room: 12.000 ft, Mounting Height: 12.000 ft, Light loss factor: 0.80 — Values in Footcandles, Scale 1:28

Surface	ρ [%]	E_{av} [fc]	E_{min} [fc]	E_{max} [fc]	u0
Workplane	/	23	19	25	0.832
Floor	20	17	15	17	0.927
Ceiling	80	3.41	2.61	3.92	0.765
Walls (4)	50	9.64	2.54	21	/

Workplane:
Height: 2.493 ft
Grid: 64 x 64 Points
Boundary Zone: 0.000 ft
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.420, Ceiling / Working Plane: 0.146.

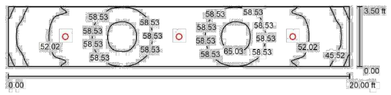
Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	1	Lithonia Lighting LBR4 ALO3 (2500LM) SWW1 (4000K) AR LSS WD 80CRI 4 INCH LBR DOWNLIGHT 2500LM 4000K CLEAR SEMI-SPECULAR WIDE 80 CRI (1.000)	2884	2884	31.8
		Total:	2884	Total: 2884	31.8

Specific connected load: 0.65 W/sq ft = 0.28 W/sq ft/10 fc (Ground area: 49.00 sq ft)

Operator
Telephone
Fax
e-Mail

mech and elec room / Summary



Height of Room: 9.000 ft, Mounting Height: 9.000 ft, Light loss factor: 0.80 — Values in Footcandles, Scale 1:44

Surface	ρ [%]	E_{av} [fc]	E_{min} [fc]	E_{max} [fc]	u0
Workplane	/	55	36	68	0.649
Floor	20	40	29	49	0.721
Ceiling	80	8.86	6.15	11	0.695
Walls (4)	50	22	6.34	74	/

Workplane:
Height: 2.493 ft
Grid: 128 x 32 Points
Boundary Zone: 0.000 ft
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.411, Ceiling / Working Plane: 0.160.

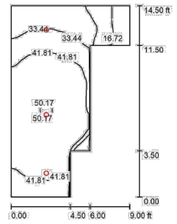
Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	3	Lithonia Lighting LBR4 ALO3 (2500LM) SWW1 (4000K) AR LSS WD 80CRI 4 INCH LBR DOWNLIGHT 2500LM 4000K CLEAR SEMI-SPECULAR WIDE 80 CRI (1.000)	2884	2884	31.8
		Total:	8653	Total: 8653	95.4

Specific connected load: 1.36 W/sq ft = 0.25 W/sq ft/10 fc (Ground area: 70.00 sq ft)

Operator
Telephone
Fax
e-Mail

service area / Summary



Height of Room: 12.000 ft, Mounting Height: 12.000 ft, Light loss factor: 0.80 — Values in Footcandles, Scale 1:57

Surface	ρ [%]	E_{av} [fc]	E_{min} [fc]	E_{max} [fc]	u0
Workplane	/	39	11	50	0.277
Floor	20	31	13	40	0.413
Ceiling	80	7.05	2.76	10	0.391
Walls (8)	50	16	2.62	68	/

Workplane:
Height: 2.493 ft
Grid: 64 x 64 Points
Boundary Zone: 0.000 ft
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.429, Ceiling / Working Plane: 0.180.

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	3	Lithonia Lighting LBR4 ALO3 (2500LM) SWW1 (4000K) AR LSS WD 80CRI 4 INCH LBR DOWNLIGHT 2500LM 4000K CLEAR SEMI-SPECULAR WIDE 80 CRI (1.000)	2884	2884	31.8
		Total:	8653	Total: 8653	95.4

Specific connected load: 1.05 W/sq ft = 0.27 W/sq ft/10 fc (Ground area: 90.75 sq ft)

CLIENT:

ADDRESS:

NOTES:

1. ALL DIMENSIONS HEREIN ARE IN IMPERIAL UNITS UNLESS STATED OTHERWISE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
PHOTOMETRIC STUDY REPORT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
E 6 . 0 1

REV.

PLUMBING SPECIFICATIONS

THE WORK INCLUDES MODIFICATION TO THE EXISTING PLUMBING SYSTEM AND PROVIDING NEW MATERIALS, FITTINGS AND ACCESSORIES NECESSARY FOR A COMPLETE FUNCTIONING PLUMBING SYSTEM. THE WORK ALSO INCLUDES ROUGH-IN AND FINAL CONNECTIONS TO FOOD SERVICE EQUIPMENT AND BEVERAGE DISPENSING EQUIPMENT PROVIDED BY OTHERS. ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND/OR ORDINANCES AND IS SUBJECT TO INSPECTION. HOOK-UP CHARGES, PERMITS AND ALL OTHER EXPENSES RELATED TO A COMPLETE AND FUNCTIONING PLUMBING SYSTEM ARE INCLUDED AS A PART OF THIS SECTION. WARRANTY: PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. THE INTENT OF THE DRAWINGS IS TO INDICATE THE GENERAL EXTENT OF WORK REQUIRED FOR THE PROJECT. THE DRAWINGS FOR PLUMBING WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, FIXTURES AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS. REFER TO MANUFACTURER'S STANDARD ROUGH-IN DRAWINGS FOR PLUMBING FIXTURE INSTALLATION REQUIREMENTS. COMPLY WITH ALL APPLICABLE ADA INSTALLATION REQUIREMENTS. COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. PIPING SYSTEMS - GENERAL: ALL PIPING SHALL BE RUN PARALLEL TO BUILDING LINES AND SUPPORTED AND ANCHORED AS REQUIRED TO FACILITATE EXPANSION AND CONTRACTION. ALL PIPING SHALL BE CONCEALED EXCEPT IN UNFINISHED SPACES. INSTALL AS REQUIRED TO MEET ALL CONSTRUCTION CONDITIONS AND TO ALLOW FOR INSTALLATION OF OTHER WORK SUCH AS DUCTS AND ELECTRICAL CONDUIT. AT ALL CONNECTIONS BETWEEN FERROUS PIPING AND NONFERROUS PIPING, PROVIDE AN ISOLATING DIALECTIC UNION. ALL HANGERS SHALL BE COMPATIBLE WITH PIPING MATERIAL TO PREVENT CORROSION. PROVIDE ALL FITTINGS, ACCESSORIES, OFFSETS, AND MATERIALS NECESSARY TO FACILITATE THE PLUMBING SYSTEM'S FUNCTIONING AS INDICATED BY THE DESIGN AND THE EQUIPMENT INDICATED. FIXTURES/EQUIPMENT FURNISHED BY OTHERS: PLUMBING CONTRACTOR SHALL PROVIDE UTILITY CONNECTIONS REQUIRED SUCH AS WATER, GAS, AIR, SUPPLIES, WASTE OUTLET, TRAPS, ETC. AT ALL PLUMBING TYPE FIXTURES OR EQUIPMENT FURNISHED BY OWNER, GENERAL CONTRACTOR, FOOD SERVICE CONTRACTOR, EQUIPMENT SUPPLIER, ETC. INCLUDED ARE STOP VALVES, ESCUTCHEONS, AND CHROME PLATED BRASS TUBING WITH COMPRESSION FITTINGS. SEWER AND WASTE PIPING: PROVIDE ALL DRAINS AND SEWERS WITHIN THE SPACE WITH CONNECTION TO THE EXISTING DRAINAGE SYSTEMS ON-SITE. SANITARY DRAINAGE PIPING ABOVE FLOOR SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE, FITTINGS AND CONNECTIONS. SANITARY DRAINAGE PIPING BELOW GRADE SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE WITH SOLVENT WELD FITTINGS MAY BE USED (WHERE PERMITTED BY CODE/LOCAL AUTHORITIES). ALL DRAINAGE PIPING SHALL BE UNIFORMLY PITCHED, 1/4" PER FOOT UNLESS OTHERWISE REQUIRED BY EXISTING CONDITIONS, OR INDICATED ON THE DRAWINGS. VENTS: PROVIDE A COMPLETE SYSTEM OF STANDARD WEIGHT CAST IRON NO-HUB VENT RISERS WHERE THE CEILING SPACE IS USED AS A RETURN AIR PLENUM OR USE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE (WHERE PERMITTED BY CODE/LOCAL AUTHORITIES) WHERE THERE IS A DUCTED RETURN AIR SYSTEM. DO NOT USE PVC PIPE IN RETURN AIR PLENUM SPACES. THE VENT SYSTEM SHALL BE CARRIED THROUGH THE ROOF WITH APPROPRIATE FLASHING. CONDENSATE AND INDIRECT DRAIN PIPING:PIPING ABOVE FLOOR SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE, FITTINGS AND CONNECTIONS. PIPING BELOW GRADE SHALL BE CO-EXTRUDED PVC DWV(SCHEDULE 40) PIPE WITH SOLVENT WELD FITTINGS. CLEANOUTS: PROVIDE CLEANOUTS AT THE END OF EACH HORIZONTAL RUN, AND AT THE BASE OF ALL VERTICAL WASTE AND DRAIN PIPES. CLEANOUTS SHALL BE OF THE SAME SIZE AS THE PIPES THEY SERVE, CONFORMING TO CODE REQUIREMENTS. PROVIDE SUITABLE WALL OR FLOOR CLEANOUTS WITH ACCESSORIES TO OBSCURE FROM VIEW. WATER DISTRIBUTION PIPING: LAYOUT WATER PIPING SO THAT THE ENTIRE SYSTEM CAN BE DRAINED. HOT AND COLD WATER PIPING SHALL BE 1/2" MIN. CPVC PIPE WITH SOLVENT FITTING. PROVIDE WATER HAMMER ARRESTERS AT EACH FIXTURE OR GROUP OF FIXTURES AS REQUIRED. INSTALL CHROME PLATED BRASS ESCUTCHEON PLATES AT ALL PENETRATIONS THROUGH FINISHED SURFACES (INCLUDING CABINET INTERIORS). PIPE INSULATION: INSULATE (AS ALLOWED BY CODE) ALL LISTED SERVICE PIPING AS FOLLOWS. DOMESTIC COLD/HOT WATER, HOT WATER RETURN, STORM WATER PIPING. PROVIDE 1" PREFORMED FIBERGLASS, ASJ/SS-11, FLAME SPREAD 25, SMOKE DEVELOPED 50, ASTM C-547. FOR CONDENSATE PIPING PROVIDE 1/2" THICK INSULATION OF SAME CHARACTERISTICS AS LISTED FOR 1" ABOVE. WHERE PERMITTED BY LOCAL CODES, PROVIDE 1/2" SELF-ADHESIVE UNICELLULAR FOAM PIPE INSULATION WITH PRE-FORMED PVC FITTING COVERS - EQUAL TO SELF-ADHESIVE ARMSTRONG 2000 WITH K FACTOR OF 0.27 AT 75 DEGREES MEAN TEMPERATURE. INSULATE ANY EXPOSED CONDENSATE PIPING WITH WASTE TEMPERATURE BELOW 60 DEGREES F. SHUTOFF VALVES, WITH UNIONS SHALL BE PROVIDED FOR SERVICE TO EACH PLUMBING FIXTURE, FOOD SERVICE EQUIPMENT ITEM OR OTHER EQUIPMENT ITEM, TO FACILITATE ISOLATION FOR REPAIR OR REPLACEMENT. VALVES SHALL BE EQUAL TO JENKINS #902-T BALL VALVE, CHROME-FINISHED BRONZE, TEFLON SEATS AND PACKING, 400 LB. W.O.G., SOLDER END. ACCESS PANELS SHALL BE PROVIDED WHERE CONCEALED CONTROL DEVICES, VALVES, ETC. ARE CONCEALED WITHIN WALLS. WHERE ACCESS FOR ADJUSTMENT AND MAINTENANCE IS POSSIBLE THROUGH LAY-IN SUSPENDED CEILINGS, ACCESS PANELS ARE NOT REQUIRED. PIPING SYSTEM- PVC SCHEDULE 40, SCHEDULE 80 AND CPVC PIPE WITH SOLVENT FITTINGS SHALL BE USED WHERE PERMITTED BY CODE/LOCAL AUTHORITIES. INSTALLATION: THOROUGHLY CLEAN ITEMS BEFORE INSTALLATION. CAP PIPE OPENINGS TO EXCLUDE DIRT UNTIL FIXTURES ARE INSTALLED AND FINAL CONNECTIONS HAVE BEEN MADE. PROCEED AS RAPIDLY AS CONSTRUCTION WILL PERMIT. SET FIXTURES LEVEL AND IN PROPER ALIGNMENT. INSTALL SUPPLIES IN PROPER ALIGNMENT WITH FIXTURES. INSTALL SILICONE SEALANT BETWEEN FIXTURES AND ADJACENT MATERIAL, FOR SANITARY JOINT, AND OMIT ESCUTCHEONS. REPAIR EXISTING PLUMBING SYSTEM COMPONENTS DAMAGED BY CONSTRUCTION OPERATIONS AND RESTORE TO ORIGINAL CONDITIONS. TEST WATER SYSTEM UNDER 150 PSIG HYDROSTATIC PRESSURE, FOR FOUR (4) HOURS MINIMUM. WHEN TESTING INDICATES MATERIALS OR WORKMANSHIP IS DEFICIENT, REPLACE OR REPAIR AS REQUIRED, AND REPEAT TEST UNTIL STANDARDS ARE ACHIEVED. ROOF PENETRATIONS SHALL COMPLY WITH "SMACNA" AND "NRCA" STANDARDS, AND WITH THE REQUIREMENTS OF THE EXISTING ROOFING WARRANTY, IF APPLICABLE. DO NOT PERFORM ROOFING PENETRATIONS IN A MANNER WHICH WOULD VOID OR OTHERWISE LIMIT THE EXISTING ROOFING WARRANTY.

GENERAL NOTES

1. THE INTENT OF THESE PLANS AND SPECIFICATIONS IS TO INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND SERVICES NECESSARY TO FURNISH, INSTALL, TEST, AND ADJUST A COMPLETE WORKABLE PLUMBING INSTALLATION AS SHOWN, PRESCRIBED, OR REASONABLY IMPLIED BUT NOT LIMITED TO THAT EXPLICITLY INDICATED IN THE CONTRACT DOCUMENTS, BUT NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE INTENT THEREOF.
2. THE ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE 2022 CALIFORNIA PLUMBING CODE, 2022 CALIFORNIA BUILDING CODE, 2022 CALIFORNIA ENERGY CONSERVATION CODE AND ALL OTHER APPLICABLE CODES AND REGULATIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION. IN THE EVENT OF CONFLICT BETWEEN SPECIFICATIONS, CODES, AND REGULATIONS, THE MORE RESTRICTIVE SHALL APPLY.
3. COORDINATE ENTIRE INSTALLATION OF THE PLUMBING SYSTEM WITH THE WORK OF OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. FIELD VERIFY ALL DIMENSIONS AND CONDITIONS. REPORT ANY DISCREPANCIES, IN WRITING, TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.
4. 5 CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS WITH ALL CHANGES NOTED THEREON AT THE COMPLETION OF THE PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS. PROVIDE ONE YEAR WARRANTY ON ALL PARTS AND LABOR.
6. THE DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO SHOW SCOPE. CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES TO PROVIDE THE BEST ARRANGEMENT OF ALL DUCT, PIPE, CONDUIT, ETC.
7. ALL CUTTING AND PATCHING OF THE EXISTING STRUCTURE SHALL BE PROVIDED UNDER OTHER SECTIONS OF THE WORK. PROVIDE NECESSARY REQUIREMENTS TO THE PROJECT SUPERINTENDENT.
8. ALL HOT WATER PIPING AND RE-CIRCULATION PIPING (EXCEPT RUNOUTS 12 FT. OR SHORTER TO INDIVIDUAL FIXTURES) SHALL BE INSULATED TO MEET THE REQUIREMENTS OF THE 2022 CALIFORNIA ENERGY CONSERVATION CODE
9. CONDENSATE DRAINS SHALL BE PROVIDED FOR EACH AIR CONDITIONING UNIT. HORIZONTAL CONDENSATE DRAINS ABOVE ANY CEILING SHALL BE INSULATED WITH MIN. 3/8" THICK CLOSED CELL INSULATION.
10. PIPING:

A. WASTE, VENT, AND STORM DRAIN PIPING SHALL BE CO-EXTRUDED PVC SCHEDULE 40) PIPE
B. WATER PIPE SHALL BE CPVC PIPE
C. CONDENSATE PIPING SHALL BE CO-EXTRUDED PVC (SCHEDULE 40) PIPE
D. ALL PIPING NOT ENCLOSED IN CONDITION SPACE OR AT EXTERIOR WALLS SHALL BE INSULATED.
E. PIPING: PVC SCHEDULE 40, SCHEDULE 80 AND CPVC PIPING WITH SOLVENT WELD FITTINGS SHALL BE USED WHERE PERMITTED BY CODE/LOCAL AUTHORITIES

11. ALL VENTS OR EXHAUSTS SHALL BE AT LEAST 10 FT. AWAY OR 3 FT. ABOVE ANY WINDOW, DOOR, OPENING, OR AIR INTAKE.
12. CLEANOUTS SHALL BE INSTALLED PER THE CALIFORNIA PLUMBING CODE.
13. PROVIDE WATER TIGHT FLASHINGS WHEREVER PIPES PASS THROUGH EXTERIOR WALLS, ROOFS, OR FLOORS.
14. PROVIDE ISOLATION FOR ALL PIPES THAT COME IN CONTACT WITH THE STRUCTURE.
15. LOCATION OF EXISTING UTILITIES AND POINTS OF CONNECTION ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS AND DEPTHS OF EXISTING UTILITIES AND SERVICES PRIOR TO STARTING WORK OF THIS SECTION. IF INDICATED POINTS OF CONNECTION CANNOT BE MADE TO EXISTING UTILITIES AS FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO INSTALLING ANY WORK WHICH MAY BE AFFECTED.
16. VALVES SHALL BE NIBCO, JENKINS, HAMMOND, RED & WHITE OR APPROVED EQUAL. SERVICE PRESSURE SHALL BE SUITABLE FOR SERVICE INTENDED. THE MAIN WATER SHUT OF VALVE SHALL BE A FULL PORT BALL TYPE AND APPROVED FOR SERVICE INTENDED.
17. CONTRACTOR SHALL PROVIDE ALL SHUT OFF VALVES AS NECESSARY TO ISOLATE ANY EQUIPMENT, PLUMBING ITEMS, OR FIXTURES, THAT MAY NEED SERVICING OR ARE SUBJECT TO FAILURE WHETHER OR NOT SUCH VALVES ARE SHOWN ON THE DRAWINGS.
18. PROVIDE HANGERS AND SUPPORTS AS REQUIRED. PLUMBERS TAPE AND WIRE ARE NOT ACCEPTABLE.
19. CONTRACTOR IS RESPONSIBLE FOR HIS OWN TRENCHING, BACKFILL, AND COMPACTION OF TRENCHES NECESSARY TO COMPLETE HIS SCOPE OF WORK. BACKFILLED TRENCHES SHALL BE RETURNED TO THEIR ORIGINAL GRADE UNLESS NOTED OTHERWISE.
20. CONTRACTOR SHALL AFFIX A MAINTENANCE LABEL TO ALL EQUIPMENT REQUIRING ROUTINE MAINTENANCE AND SHALL PROVIDE MAINTENANCE AND OPERATIONAL MANUALS IN ACCORDANCE WITH THE SPECIFICATIONS.
21. ALL EQUIPMENT THAT REQUIRES KEYS OR SPECIAL TOOLS TO OPERATE SHALL SUPPLY THE OWNER WITH TWO OF ANY SUCH KEYS OR TOOLS FOR EACH PIECE OF EQUIPMENT THAT REQUIRE THE SAME.
25. ANY CHANGE OR DEVIATION FROM THESE PLANS OR SPECIFICATIONS SHALL REQUIRE THE APPROVAL, IN WRITING, OF THE ENGINEER PRIOR TO COMMENCEMENT OF SUCH WORK.
26. ALL PLUMBING, ELECTRICAL LINES SHALL BE CONCEALED WITHIN THE THE BUILDING STRUCTURE TO AS GREAT EXTENT AS POSSIBLE. ALL LINES NOT CONCEALED SHALL BE SECURED 6" OFF THE FLOOR AND 3/4" FROM THE WALLS USING STANDOFF BRACKETS
27. AN APPROVED BACK-FLOW PREVENTOR SHALL BE PROPERLY INSTALLED UPSTREAM OF ANY POTENTIAL HAZARD BETWEEN THE POTABLE WATER SUPPLY AND SOURCE OF CONTAMINATION.

PLUMBING LEGEND

SYMBOL	ABBRV.	DESCRIPTION
	SS or W	NEW SEWER OR WASTE
	V	NEW VENT
	CW	NEW COLD WATER
	HW	NEW HOT WATER
	G	NEW GAS
	CD	NEW CONDENSATE DRAIN
CA	CA	COMPRESSED AIR
	FCO	FLOOR CLEANOUT
	WCO	WALL CLEANOUT
	FD	FLOOR DRAIN
	FS	FLOOR SINK
	TP	TRAP PRIMER & TRAP PRIMER PIPING
	SOV	SHUT-OFF VALVE
	CV	CHECK VALVE
	PRV	BACKFLOW PREVENTER W SOV'S
	T & P	
	DN	PIPE DOWN
	UP	PIPE UP
	POC	POINT OF CONNECTION
7	-	PLUMBING NOTE CALL-OUT
	ABV	ABOVE
	AFF	ABOVE FINISH FLOOR
	AP	ACCESS PANEL
	BEL	BELOW
	BLDG	BUILDING
	CLG	CEILING
	CONT	CONTINUATION
	EL	ELEVATION
	FIN	FINISH
	FL	FLOOR
	GR	GRADE
	NTS	NOT TO SCALE
	OC	ON CENTER
	S= %	SLOPE AT A PERCENTAGE
	SHT	SHEET
	TYP	TYPICAL
	VTR	VENT THRU ROOF

PLUMBING / GENERAL NOTES

BATHROOMS: PROVIDE AN EXHAUST FAN (AT LEAST 50 CFM) DUCTED TO THE OUTSIDE (MINIMUM 4" DIAMETER FLEX DUCT WITH A MAXIMUM LENGTH OF 70'))WITH A MINIMUM VENTILATION RATE OF 100 CFM, IDENTIFY THE REQUIREMENT FOR A BACK-DRAFT DAMPER ON THE DUCT, AN ENERGY STAR COMPLIANT EXHAUST FAN THAT IS CONTROLLED BY A HUMIDITY SENSOR THAT IS CAPABLE OF BEING ADJUSTED BETWEEN ≤ 50-PERCENT TO 80-PERCENT HUMIDITY; AND A SEPARATE SWITCH FROM THE LIGHT UNLESS THE FAN IS ALLOWED TO OPERATE WITH THE LIGHT SWITCHED OFF.

NOTE THAT ALL PLUMBING VENTS SHALL TERMINATE NOT LESS THAN 6" ABOVE ROOF NOR LESS THAN 1' FROM ANY VERTICAL SURFACE. VENTS SHALL TERMINATE NOT LESS THAN 10' FROM OR 3' ABOVE ANY WINDOW, DOOR OPENING AIR INTAKE, OR VENT SHAFT NOR 3' FROM LOT LINE.
IF WATER PRESSURE EXCEEDS 80 PSI, AND EXPANSION TANK AND AN APPROVED PRESSURE REGULATOR SHALL BE INSTALLED.
NON-REMOVABLE BACK FLOW PREVENTER OR BIBB-TYPE VACUUM BREAKER WILL BE INSTALLED ON ALL EXTERIOR HOSE BIBS. HOT WATER RE-CIRCULATING SYSTEM IS INSTALLED, THE ENTIRE LENGTH OF HOT WATER PIPES SHALL BE INSULATED.

NOTES:
1-Projects which disturb less than one acre of soil shall manage storm water drainage during construction by one of the following: A. Retention basins. B. Where storm water is conveyed to a public drainage system, water shall be filtered by use of a barrier system, wattle or other approved method.
2-Site grading or drainage system will manage all surface water flows to keep water from entering buildings (swales, water collection, French drains, etc.). CGC Section 4.106.3. Exception: Additions not altering the drainage path.
3-The plans that a minimum of 65% of construction waste is to be recycled. CGC Section 4.408.1.
4-The contractor shall submit a Construction Waste Management Plan, per CGC Section 4.408.2.
5-The builder is to provide an operation manual (containing information for maintaining appliances, etc.) for the owner at the time of final inspection. CGC Section 4.410.1.

WATER SAVING STANDARDS

THE WATER-SAVING PERFORMANCE STANDARDS FOR A PLUMBING FIXTURE ARE THOSE ESTABLISHED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), CURRENT REVISION, OR THE FOLLOWING STANDARDS, WHICHEVER ARE THE MORE RESTRICTIVE.
1-THE MAXIMUM FLOW FROM A SINK OR LAVATORY FAUCET OR A FAUCET AERATOR SHALL NOT EXCEED 0.5 GALLONS OF WATER PER MINUTE AT A PRESSURE OF 60 POUNDS PER SQUARE INCH WHEN TESTED IN ACCORDANCE WITH ANSI TESTING PROCEDURES.
2- THE MAXIMUM VOLUME OF WATER PER FLUSH FROM A TOILET SHALL NOT EXCEED AN AVERAGE OF 1.28 GALLONS WHEN TESTED IN ACCORDANCE WITH ANSI TESTING PROCEDURES

SPECIAL NOTICE TO CONTRACTORS

1. ALL CONTRACTORS (GENERAL CONTRACTOR AND SUB-CONTRACTORS) BIDDING THIS PROJECT ARE REQUIRED TO VISIT THE JOB SITE AND VERIFY THE EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID. CONTRACTORS ARE TO CAREFULLY REVIEW ALL CONSTRUCTION DOCUMENTS AND NOTE ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED AT THE JOB SITE PRIOR TO SUBMISSION OF ANY BID. THE BUILDING OWNER REPRESENTATIVE LISTED BELOW MAY BE CONTACTED FOR ACCESS TO THE JOB SITE.
2. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING THE LOCATION AND CONDITION OF ALL POINTS OF CONNECTION, LOCATION AND CONDITION OF ALL BUILDING (ROOF/FLOOR/CEILING) PENETRATIONS, LOCATION AND CONDITION OF ALL UTILITIES AND BUILDING SYSTEMS INCLUDING, BUT NOT LIMITED TO, GAS, WATER, SEWER, VENT, ELECTRICAL, BUILDING MECHANICAL SYSTEMS, DUCT CONNECTIONS, EXHAUST/OUTSIDE AIR CONNECTIONS, SECURITY, FIRE ALARM, DATA, AND PHONE PRIOR TO SUBMISSION OF THEIR BID.
3. ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED SHALL BE BROUGHT TO THE ATTENTION, IN WRITING, TO THE ARCHITECT AND/OR ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

PLUMBING LIST OF DRAWINGS (LoD):

SHEET TAG	TITLE	SCALE
P 0.01	PLUMBING GENERAL NOTES AND SPECIFICATIONS	NTS
P 1.01	MAIN FLOOR - WATER SUPPLY LAYOUT	3/16" = 1'- 0"
P 1.02	WATER SUPPLY & WASTE PLUMBING FIXTURE SCH. &W.H. SCH.	NTS
P 2.01	MAIN FLOOR - SEWER LAYOUT	3/16" = 1'- 0"
P 2.02	ROOF - SEWER LAYOUT	3/16" = 1'- 0"
P 3.01	PLUMBING GENERAL DETAILS	NTS
P 4.01	WATER SUPPLY ISOMETRIC RISER DIAGRAM	NTS
P 4.02	INDIRECT WASTE & SEWER ISOMETRIC RISER DIAGRAM	NTS

CLIENT:

ADDRESS:

NOTES:

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2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
PLUMBING GENERAL NOTES AND SPECIFICATIONS

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
P 0.01

REV.

CPC-420.2-Sink faucets shall have a maximum flow rate of not more than 2.2 gpm at 60 psi (8.3 L/m at 414 kPa).

CPC-407.2.1-The maximum flow rate for public lavatory faucets shall not exceed 0.5 gpm at 60 psi (1.9 L/m at 414 kPa).

CPC-420.2.2-The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons (6.81 L) per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons (8.32 L) per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons (6.81 L) per minute at 60 psi

CPC-504.3-504.3.1 Listed Water Heaters
The clearances shall not be such as to interfere with combustion air, draft hood clearance and relief, and accessibility for servicing. Listed water heaters shall be installed in accordance with their listings and the manufacturer's installation instructions.
504.3.2 Unlisted Water Heaters
Unlisted water heaters shall be installed with a clearance of 12 inches (305 mm) on all sides and rear. Combustible floors under unlisted water heaters shall be protected in an approved manner. [NFPA 54:10.27.2.2]

CPC-504.4-A water heater installation shall be provided with overpressure protection using an approved, listed device installed in accordance with the terms of its listing and the manufacturer's installation instructions.

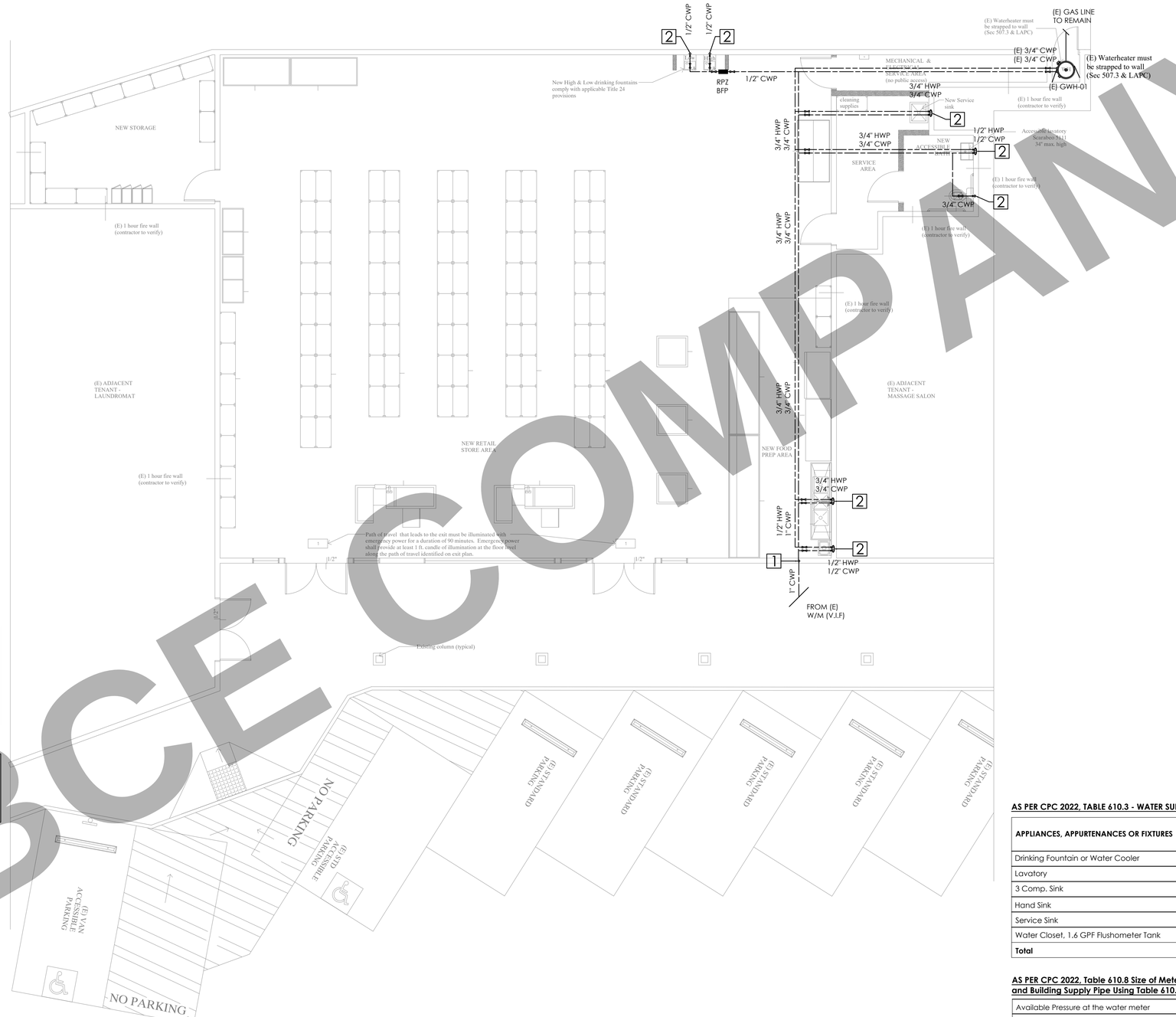
CPC-504.5-A water heater installation or a hot water storage vessel installation shall be provided with overtemperature protection by means of an approved, listed device installed in accordance with the terms of its listing and the manufacturer's installation instructions.

CPC-507.4-A water heater supported from the earth shall rest on level concrete or other approved base extending not less than 3 inches (76 mm) above the adjoining ground level.G163

CPC-606.1-Valves up to and including 2 inches (50 mm) in size shall be copper alloy or other approved material. Sizes exceeding 2 inches (50 mm) shall be permitted to have cast iron or copper alloy bodies. Each gate or ball valve shall be a fullway or full-port type with working parts of the non-corrosive material.

CPC-606.2-A fullway valve controlling outlets shall be installed on the discharge side of each water meter and each unmetered water supply. Water piping supplying more than one building on one premise shall be equipped with a separate fullway valve to each building, so arranged that the water supply can be turned on or off to an individual or separate building provided

CPC-608.2-Where static water pressure in the water supply piping is exceeding 80 psi (552 kPa), an approved-type pressure regulator preceded by an adequate strainer shall be installed and the static pressure reduced to 80 psi (552 kPa) or less.



GENERAL NOTES:

1. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE EXACT PIPE SIZES, INVERT ELEVATIONS, PRESSURES FOR LOCATIONS OF ANY SEWER, WATER PIPING AND WATER METER WITH CIVIL UTILITIES DRAWINGS, AND ANY OTHER ENGINEER AS APPLICABLE.
2. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE PIPE ROUTING WITH ALL OTHER TRADES AND EXISTING FIELD CONDITIONS.
3. REFER TO MECHANICAL PLANS FOR PLUMBING SPECIFICATION OF MATERIAL, INSULATION AND INSTALLATION REQUIREMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR ROUGH-IN COORDINATION AND LOCATIONS. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS AND FIXTURES.
5. CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED CUTTING AND PATCHING.
6. ALL NOTCHING, BORING, AND CUTTING OF HOLES IN WALL STUDS AND FLOOR JOISTS SHALL BE PERFORMED BASED ON THE LATEST ADOPTED AND APPROVED EDITION OF THE BUILDING CODE.
7. ALL PLUMBING FIXTURES SHALL BE OF WATER CONSERVATION TYPE AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.
8. ALL WATER PIPING SHALL BE INSTALLED ON INTERIOR SIDE OF THE BUILDING WALL INSULATION.
9. CONTRACTOR SHALL PROVIDE VALVES LOCATED ABOVE LAY-IN CEILING OR 24"x24" CEILING ACCESS PANEL COORDINATE FINAL LOCATION AND SIZE WITH ARCHITECT. PROVIDE BALANCING VALVES FOR HOT WATER RETURN SYSTEM AS REQUIRED.
10. ALL SANITARY DRAINAGE PIPING 4" AND SMALLER SHALL BE SLOPED AT $\frac{1}{4}$" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT $\frac{1}{8}$" PER FOOT.
11. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT $\frac{1}{8}$" PER FOOT AND PROVIDE ACCESSIBLE CLEANOUTS AT ALL CHANGES OF DIRECTION.
12. VENTS THAT TERMINATE AT THE ROOF SHALL BE A MINIMUM OF 10' FROM ANY FRESH AIR INTAKE.
13. REFER TO THE PLUMBING DIAGRAMS FOR GUIDANCE OF INSTALLATION INTENT. CONTRACTOR IS TO PROVIDE ALL COMPONENTS NECESSARY TO MEET THE DESIGN INTENT, WHETHER SHOWN IN DIAGRAM OR NOT.

WATER SUPPLY SHEET NOTES:

1 — DCW, DHW RISE TO HIGH LEVEL.

2 — DCW/DHW/RHW TO FIXTURE CONNECTION.

ALL WATER PIPES ARE CPVC PIPES

AS PER CPC 2022, TABLE 610.3 - WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZES

APPLIANCES, APPURTENANCES OR FIXTURES	MINIMUM FIXTURE BRANCH PIPE SIZE (Inches)	PUBLIC (WSFU)	NUMBER OF FIXTURES	TOTAL WSFU
Drinking Fountain or Water Cooler	1/2	0.50	2	1
Lavatory	1/2	1.00	1	1
3 Comp. Sink	1/2	2.00	1	2
Hand Sink	1/2	1.50	1	1.5
Service Sink	1/2	3.00	1	3
Water Closet, 1.6 GPF Flushometer Tank	1/2	2.50	1	2.5
Total			**7**	**11**

AS PER CPC 2022, Table 610.8 Size of Meter and Building Supply Pipe Using Table 610.4:

Available Pressure at the water meter	45.00
Elevation from Water Meter to Highest Fixture	9.00
Available Pressure	40.50
Total Developed Length	150.00
WSFU from Table 610.3	11.00
Water Meter Size (inches)	0.75
Building Supply Pipe Size (Inches)	1.00

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CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
MAIN FLOOR - WATER SUPPLY LAYOUT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

DRAWING NO. **P 1 . 0 1**

REV.

Plumbing Fixtures Schedule - Water Supply

Fixture ID	Fixture	Manufacturer	Model	SW	V	CW	HW	Description
WCFT-1	Water Closet - Flush Tank	American Standard	Townsend Vormax	-	-	1/2"	-	High Efficiency, Ultra Low Consuption (1.28 GPF) Meets EPA WaterSense
CLF-1	Commercial Lavatory Faucet	American Standard	Paradigm	-	-	1/2"	1/2"	Lead-Free: Faucet contains <0.25% Total Lead content Flow Rate: 1.5 GPM @ 60 PSI.
CMS-1	Commercial Mop Sink	Advance Tabco	8-OP-16	-	-	1/2"	1/2"	Deep drawn sink bowl, Leg Mounted, 430 Stainless Steel
3-Comp	3-Compartment Sink	Serv-Ware	CS3CWP1410	-	-	1/2"	1/2"	Stainless Steel, 18 Gauge, Leg Mounted
HS-1	Hand Sink	Royal Industries	ROYHSW15SP	-	-	1/2"	1/2"	Bowl Splash with Wrist Blade Faucet
LSD-1	Liquid Soap Dispenser	American Standard	4503.12	-	-	-	-	Strong, pump for frequent usage, Brass protects body against corrosion and ensures long product life

Plumbing Fixtures Schedule - Waste

Fixture ID	Fixture	Manufacturer	Model	SW	V	CW	HW	Description
WCFT-1	Water Closet - Flush Tank	American Standard	Townsend Vormax	3"	2"	-	-	High Efficiency, Ultra Low Consuption (1.28 GPF) Meets EPA WaterSense
CMS-1	Commercial Mop Sink	Advance Tabco	8-OP-16	2"	1-1/2"	-	-	Deep drawn sink bowl, Leg Mounted, 430 Stainless Steel
CL-1	Commercial Lavatory	American Standard	DECORUM	2"	1-1/2"	-	-	Wall Hung Lavatory, ADA & TAS Compliant Recessed Self-draining deck with minimal backsplash
CPT-1	Commercial P Trap	Advance Tabco	K-351	1-1/2"	-	-	-	Chrome Plated P-Trap, Heavy Duty
CFD-1	Commercial Floor Drain	Advance Tabco	FD-1 SSG	4"	1-1/2"	-	-	14 gauge Stainless Steel, with Strainer Basket with handle Custom Sizes Available. Optional SS Grate & Anti Splash
CFS-1	Commercial Floor Sink	Advance Tabco	9-OP-20	3"	1-1/2"	-	-	16 Gauge Stainless Steel, Not for Potable Water. Custom Sizes Available.
3-Comp	3-Compartment Sink	Serv-Ware	CS3CWP1410	1-1/2"	1-1/2"	-	-	Stainless Steel, 18 Gauge, Leg Mounted
HS-1	Hand Sink	Royal Industries	ROYHSW15SP	2"	1-1/2"	-	-	Bowl Splash with Wrist Blade Faucet

SCHEDULE No. 1
GAS WATER HEATER SCHEDULE

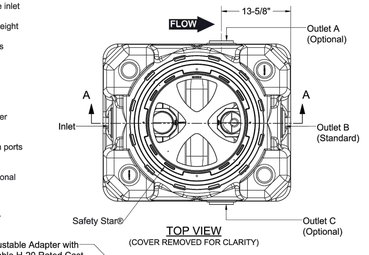
TAG	(E) GWH-01
LOCATION	PREP
MANUFACTURER	AO SMITH
MODEL	GT12UT40
TYPE	GAS
CAPACITY (GALLONS)	40
INPUT GAS MBH	40
WATER CONNECTION SIZE	3/4"

SPECIFICATIONS
Notes:
1. 4" FPT inlet/outlet with 4" plain end adapters, single inlet and triple outlet.
2. Unit weight - w/ cast iron cover: 148 lbs. (For wet weight add 542 lbs.)
3. Maximum operating temperature: 150º F continuous
4. Capacities - Liquid: 65 gal.;
   Grease: 439.5 lbs. (60 gal.) @50GPM
   Grease: 287.2 lbs. (43 gal.) @75GPM
   Solids: 13 gal.
5. For gravity drainage applications only.
6. Do not use for pressure applications.
7. Cover placement allows full access to tank for proper maintenance.
8. Vent not required unless per local code.
9. Engineered inlet and outlet diffusers with inspection ports are removable to inspect / clean piping.
10. Integral air relief / Anti-siphon / Sampling access.
11. Adjustable cover adapters provide up to 4" of additional height.
12. Designed for below-grade, above-grade, indoor or outdoor installations.
13. Safety Star®, access restrictor built into each cover adapter, prevents accidental entry to tanks (450 lb rating).

ENGINEER SPECIFICATION GUIDE
Schier Great Basin™ grease interceptor model # GB-50 shall be lifetime guaranteed and made in USA of seamless, rotationally-molded polyethylene with minimum 3/8" uniform wall thickness. Interceptor shall be furnished for above or below-grade installation with adjustable cover adapter and three outlet options. Interceptor shall be certified to ASME A112.14.3 (Type D) and CSA B481.1. Interceptor flow rate shall be 50 GPM or 75 GPM. Interceptor grease capacity shall be 439.5 lbs. Cover shall provide water/gas-tight seal and have minimum 16,000 lbs. load capacity.

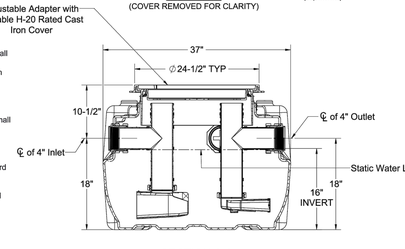
CERTIFIED PERFORMANCE
Great Basin™ hydromechanical grease interceptors are third party performance-tested and listed by IAPMO to ASME #A112.14.3 and CSA B481.1 grease interceptor standards and greatly exceed requirements for grease separation and storage.
They are compliant to the Uniform Plumbing Code and the International Plumbing Code.

Type D certification does not require a flow control

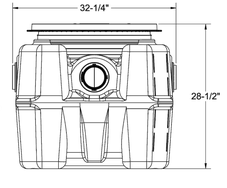


TOP VIEW
(COVER REMOVED FOR CLARITY)


ISOMETRIC VIEW



SECTION A-A



END VIEW

SPECIFICATION SHEET

MODEL NUMBER:	PART NUMBER: 4025-009-01			
GB-50	DESCRIPTION: GB-50 GREASE INTERCEPTOR 50 GPM / 75 GPM, 4" INLET/OUTLET, H-20 RATED CAST IRON COVER			
	DWG BY: T.ASAY	DATE: 8/16/2022	REV: -	ECO: -

SCHIER
6455 Woodland Dr
Shawnee, KS 66218
Tel: 913-951-3300
Fax: 913-951-3399
schierproducts.com

CLIENT:

ADDRESS:

NOTES:
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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

TITLE:
WATER SUPPLY & WASTE PLUMBING FIXTURE SCH. & W.H. SCH.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
P 1 . 0 2

REV.

CMC-310.1-Condensate from air washers, air-cooling coils, condensing appliances, and the overflow from evaporative coolers and similar water-supplied equipment or similar air-conditioning equipment shall be collected and discharged to an approved plumbing fixture or disposal area. Where discharged into the drainage system, equipment shall drain by means of an indirect waste pipe. The waste pipe shall have a slope of not less than 1/8 inch per foot (10.4 mm/m) or 1 percent slope and shall be of approved corrosion-resistant material not smaller than the outlet size in accordance with Section 310.3 or Section 310.4 for air-cooling coils or condensing appliances, respectively. Condensate or wastewater shall not drain over a public way.

CPC-801.2-Indirect waste piping shall discharge into the building drainage system through an air gap or air break as set forth in this code. Where a drainage air gap is required by this code, the minimum vertical distance as measured from the lowest point of the indirect waste pipe or the fixture outlet to the flood-level rim of the receptor shall be not less than 1 inch (25.4 mm).

CPC-1014.3.4-Each grease interceptor shall be so installed and connected that it shall be easily accessible for inspection, cleaning, and removal of the intercepted grease. A gravity grease interceptor that complies with IAPMO Z1001 shall not be installed in a building where food is handled. Location of the grease interceptor shall meet the approval of the Authority Having Jurisdiction.

CMC-310.3.1-Condensate drain lines shall be configured or provided with a cleanout to permit the clearing of blockages and for maintenance without requiring the drain line to be cut.

CMC-310.5-Air-conditioning condensate waste pipes shall connect indirectly, except where permitted in Section 310.6, to the drainage system through an air gap or air break to trapped and vented receptors, dry wells, leach pits, or the tailpiece of plumbing fixtures. A condensate drain shall be trapped in accordance with the appliance manufacturer's instructions or as approved.

CPC-411.2-The effective flush volume of all water closets shall not exceed 1.28 gallons (4.8 L) per flush when tested in accordance with ASME A112.19.2/CSA B45.1.

CPC-602.3-No plumbing fixture, device, or construction shall be installed or maintained, or shall be connected to a domestic water supply, where such installation or connection provides a possibility of polluting such water supply or cross-connection between a distributing system of water for drinking and domestic purposes and water that becomes contaminated by such plumbing fixture, device, or construction unless there is provided a backflow prevention device approved for the potential hazard.

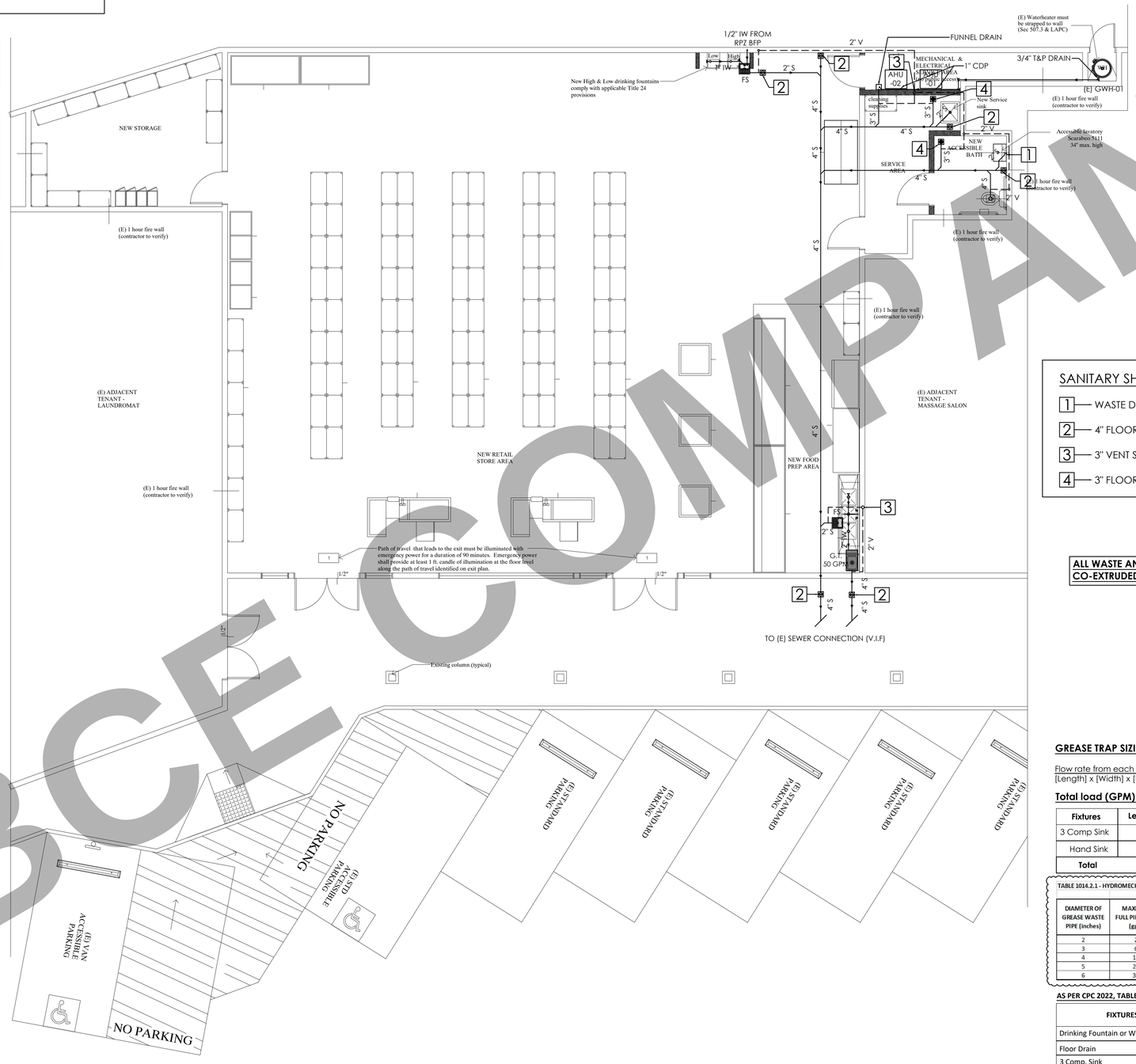
CPC-703.2-Table 703.2 shows the maximum number of fixture units allowed on a vertical or horizontal drainage pipe, building drain, or building sewer of a given size; the maximum number of fixture units allowed on a branch interval of a given size; and the maximum length (in feet and meters) of a vertical drainage pipe of a given size.

CPC-707.4-1- Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal
Exceptions:
Cleanouts shall be permitted to be omitted on a horizontal drain line less than 5 feet in length unless such line is serving sinks or urinals.
2- each run of piping, that is more than 100 feet in total developed length.
3-A cleanout shall be provided in a drainage line for each aggregate horizontal change in direction exceeding 135 degrees.

CPC-707.9-Each cleanout in piping 2 inches (50 mm) or less in size shall be so installed that there is a clearance of not less than 18 inches (457 mm) by 18 inches (457 mm) in front of the cleanout. Cleanouts in piping exceeding 2 inches (50 mm) shall have a clearance of not less than 24 inches (610 mm) by 24 inches (610 mm) in front of the cleanout.

CPC-707.8-Each cleanout, unless installed under an approved cover plate, shall be above grade, readily accessible, and so located as to serve the purpose for which it is intended. Cleanouts located under cover plates shall be so installed as to provide the clearances and accessibility required by this section.

CPC-801.3.1-Except for refrigeration coils and ice-making machines, the size of the indirect waste pipe shall be not smaller than the drain on the unit, but shall be not smaller than 1 inch (25 mm), and the maximum developed length shall not exceed 15 feet (4572 mm). Indirect waste pipe for ice-making machines shall be not less than the drain on the unit and in no case less than 3/4 of an inch (20 mm). Indirect waste pipes exceeding 5 feet (1524 mm), but less than 15 feet (4572 mm) in length shall be directly trapped, but such traps need not be vented



SANITARY SHEET NOTES:

1. WASTE DROP AND 2" VENT RISE.
2. 4" FLOOR CLEAN-OUT.
3. 3" VENT STACK TO ABOVE.
4. 3" FLOOR DRAIN.

ALL WASTE AND VENT PIPES ARE CO-EXTRUDED PVC SHCD. 40 PIPES

GENERAL NOTES:

1. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE EXACT PIPE SIZES, INVERT ELEVATIONS, PRESSURES FOR LOCATIONS OF ANY SEWER, WATER PIPING AND WATER METER WITH CIVIL UTILITIES DRAWINGS, AND ANY OTHER ENGINEER AS APPLICABLE.
2. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE PIPE ROUTING WITH ALL OTHER TRADES AND EXISTING FIELD CONDITIONS.
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5. CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED CUTTING AND PATCHING.
6. ALL NOTCHING, BORING, AND CUTTING OF HOLES IN WALL STUDS AND FLOOR JOISTS SHALL BE PERFORMED BASED ON THE LATEST ADOPTED AND APPROVED EDITION OF THE BUILDING CODE.
7. ALL PLUMBING FIXTURES SHALL BE OF WATER CONSERVATION TYPE AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.
8. ALL WATER PIPING SHALL BE INSTALLED ON INTERIOR SIDE OF THE BUILDING WALL INSULATION.
9. CONTRACTOR SHALL PROVIDE VALVES LOCATED ABOVE LAY-IN CEILING OR 24"x24" CEILING ACCESS PANEL COORDINATE FINAL LOCATION AND SIZE WITH ARCHITECT. PROVIDE BALANCING VALVES FOR HOT WATER RETURN SYSTEM AS REQUIRED.
10. ALL SANITARY DRAINAGE PIPING 4" AND SMALLER SHALL BE SLOPED AT $\frac{1}{4}$" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT $\frac{1}{8}$" PER FOOT.
11. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT $\frac{1}{8}$" PER FOOT AND PROVIDE ACCESSIBLE CLEANOUTS AT ALL CHANGES OF DIRECTION.
12. VENTS THAT TERMINATE AT THE ROOF SHALL BE A MINIMUM OF 10' FROM ANY FRESH AIR INTAKE.
13. REFER TO THE PLUMBING DIAGRAMS FOR GUIDANCE OF INSTALLATION INTENT. CONTRACTOR IS TO PROVIDE ALL COMPONENTS NECESSARY TO MEET THE DESIGN INTENT, WHETHER SHOWN IN DIAGRAM OR NOT.

GREASE TRAP SIZING:

Flow rate from each fixture:
[Length] x [Width] x [Depth] / [231] = Gallons x [0.75 fill factor] / [Drain Period (1 minute or 2 minutes)]

Total load (GPM) from fixtures discharging into the interceptor:

Fixtures	Length (Inch)	Width (Inch)	Depth (Inch)	Drain Period (min.)	GPM
3 Comp Sink	39	19.5	10	1	24.69
Hand Sink	10	12.5	6	1	2.44
Total					**27.13**

TABLE 1014.2.1 - HYDROMECHANICAL GREASE INTERCEPTOR SIZING USING GRAVITY FLOW RATE

DIAMETER OF GREASE WASTE PIPE (inches)	MAXIMUM FULL PIPE FLOW (gpm)	SIZE OF GREASE INTERCEPTOR	
		ONE-MINUTE DRAINAGE PERIOD (gpm)	TWO-MINUTE DRAINAGE PERIOD (gpm)
2	20	20	10
3	60	75	35
4	125	150	75
5	230	250	125
6	375	400	200

BASED ON 1-1MINUTE DRAIN PERIOD, MINIMUM THE GREASE TRAP WASTE PIPE SIZE IS 3"Ø

THE GREASE TRAP SELECTED IS GB-50:
- **60 gal.**
- **AT 50 GPM**
- **4"Ø WASTE**

AS PER CPC 2022, TABLE 702.1 DRAINAGE FIXTURE UNIT VALUES (DFU):

FIXTURES	MINIMUM SIZE TRAP AND TRAP ARM (inches)	PUBLIC DFU	NUMBER OF FIXTURES	TOTAL DFU
Drinking Fountain or Water Cooler	1 1/4	0.50	2.00	1.00
Floor Drain	2	2.00	3.00	6.00
3 Comp. Sink	1 1/2	3.00	1.00	3.00
Hand Sink	1 1/2	2.00	1.00	2.00
Service or Mop Basin	2	3.00	1.00	3.00
Lavatory	1 1/4	1.00	1.00	1.00
Water Closet, 1.6 GPF Flushometer Tank	3	4.00	1.00	4.00
Total			**10.00**	**20.00**

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:

MAIN FLOOR -SEWER LAYOUT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

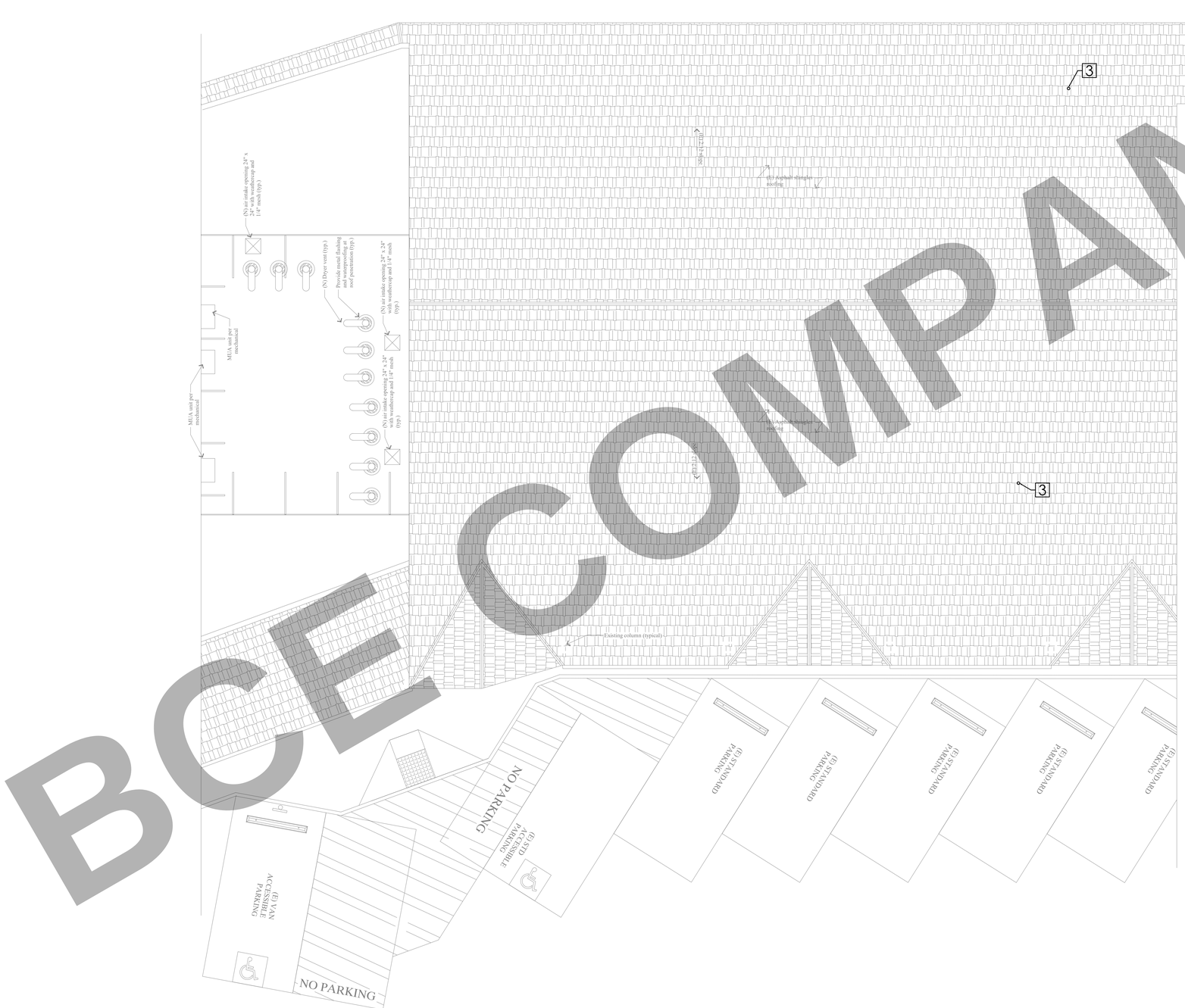
DRAWING NO.

P 2 . 0 1

REV.

CPC-906.1-Each vent pipe or stack shall extend through its flashing and shall terminate vertically not less than 6 inches (152 mm) above the roof nor less than 1 foot (305 mm) from a vertical surface. ABS and PVC piping exposed to sunlight shall be protected by water based synthetic latex paints.

CPC-906.2-Each vent shall terminate not less than 10 feet (3048 mm) from, or not less than 3 feet (914 mm) above, an openable window, door, opening, air intake, or vent shaft, or not less than 3 feet (914 mm) in every direction from a lot line, alley and street excepted.



GENERAL NOTES:

1. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE EXACT PIPE SIZES, INVERT ELEVATIONS, PRESSURES FOR LOCATIONS OF ANY SEWER, WATER PIPING AND WATER METER WITH CIVIL UTILITIES DRAWINGS, AND ANY OTHER ENGINEER AS APPLICABLE.
2. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE PIPE ROUTING WITH ALL OTHER TRADES AND EXISTING FIELD CONDITIONS.
3. REFER TO MECHANICAL PLANS FOR PLUMBING SPECIFICATION OF MATERIAL, INSULATION AND INSTALLATION REQUIREMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR ROUGH-IN COORDINATION AND LOCATIONS. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS AND FIXTURES.
5. CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED CUTTING AND PATCHING.
6. ALL NOTCHING, BORING, AND CUTTING OF HOLES IN WALL STUDS AND FLOOR JOISTS SHALL BE PERFORMED BASED ON THE LATEST ADOPTED AND APPROVED EDITION OF THE BUILDING CODE.
7. ALL PLUMBING FIXTURES SHALL BE OF WATER CONSERVATION TYPE AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.
8. ALL WATER PIPING SHALL BE INSTALLED ON INTERIOR SIDE OF THE BUILDING WALL INSULATION.
9. CONTRACTOR SHALL PROVIDE VALVES LOCATED ABOVE LAY-IN CEILING OR 24"x24" CEILING ACCESS PANEL COORDINATE FINAL LOCATION AND SIZE WITH ARCHITECT. PROVIDE BALANCING VALVES FOR HOT WATER RETURN SYSTEM AS REQUIRED.
10. ALL SANITARY DRAINAGE PIPING 4" AND SMALLER SHALL BE SLOPED AT $\frac{1}{4}$" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT $\frac{1}{8}$" PER FOOT.
11. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT $\frac{1}{4}$" PER FOOT AND PROVIDE ACCESSIBLE CLEANOUTS AT ALL CHANGES OF DIRECTION.
12. VENTS THAT TERMINATE AT THE ROOF SHALL BE A MINIMUM OF 10' FROM ANY FRESH AIR INTAKE.
13. REFER TO THE PLUMBING DIAGRAMS FOR GUIDANCE OF INSTALLATION INTENT. CONTRACTOR IS TO PROVIDE ALL COMPONENTS NECESSARY TO MEET THE DESIGN INTENT, WHETHER SHOWN IN DIAGRAM OR NOT.

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:

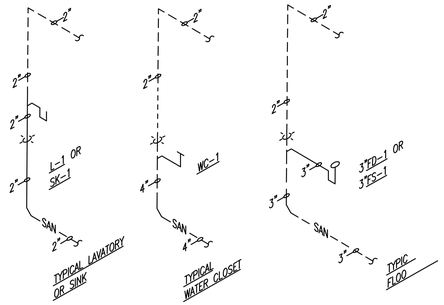
ROOF - SEWER LAYOUT

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		3/16" =1'-0"

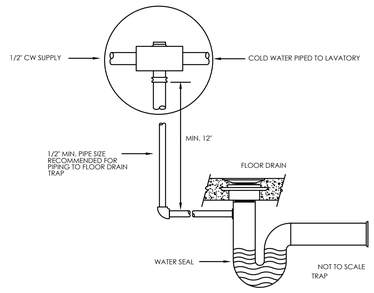
DRAWING NO.

P 2 . 0 2

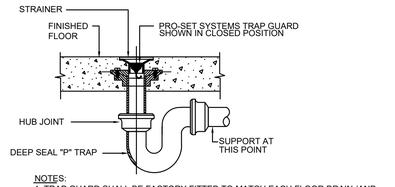
REV.



1 **TYPICAL WASTE AND VENT RISERS**
SCALE: NONE

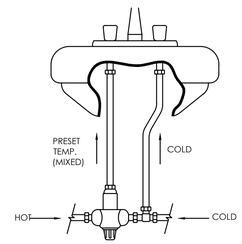


2 TRAP PRIMER

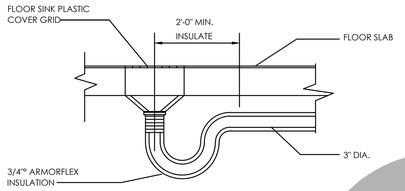


NOTES:
1. TRAP GUARD SHALL BE FACTORY FITTED TO MATCH EACH FLOOR DRAIN (AND FLOOR SINK) BY SIZE, MODEL, AND MANUFACTURER.
2. FLOOR SINK/HUB DRAIN TRAP GUARD INSTALLATION IS SIMILAR.
3. INSTALLATION OF TRAP GUARD TO BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. INSERT TRAP GUARD ONLY AFTER FINAL RODDING OF DRAINS. INSTALL TRAP GUARD WITH CLEAR SILICONE CAULK FOR GAS TITE SEAL. FOR DRAIN RODDING AFTER INSTALLATION, INSERT SEWER TAPE THROUGH LIGHTLY GREASED 1-1/2" PVC PIPE TO PROTECT TRAP GUARD.

3 **FLOOR DRAIN WITH TRAP SEAL PROTECTION**
SCALE: NONE



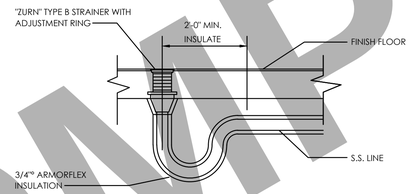
ANTI-SCALD MIXING VALVE
NO SCALE



CONTRACTOR TO REFER TO PLUMBING DRAWINGS FOR SIZE AND LOCATION OF SANITARY SEWER LINE.

NOTE:
G.C. TO INSULATE ANY DRAIN OR P-TRAP UNDER SLAB THAT NORMALLY HOLDS WATER

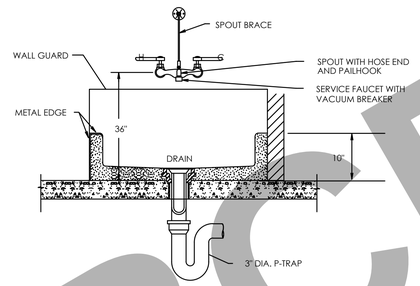
FLOOR SINK DETAIL
NO SCALE



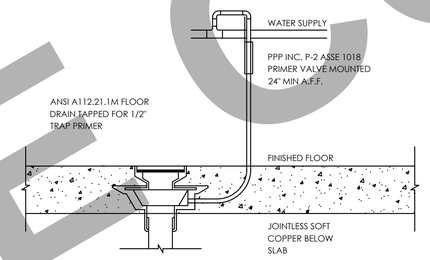
CONTRACTOR TO REFER TO PLUMBING DRAWINGS FOR SIZE AND LOCATION OF SANITARY SEWER LINE.

NOTE:
G.C. TO INSULATE ANY DRAIN OR P-TRAP UNDER SLAB THAT NORMALLY HOLDS WATER

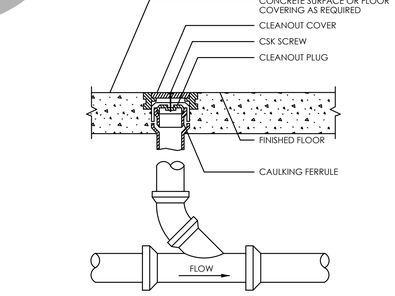
FLOOR DRAIN DETAIL
NO SCALE



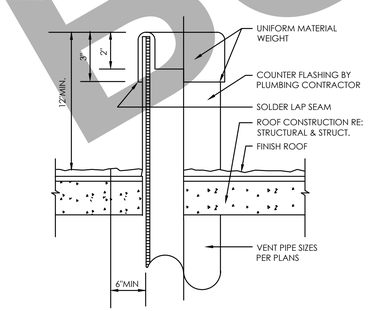
MOP SINK DETAIL
NO SCALE



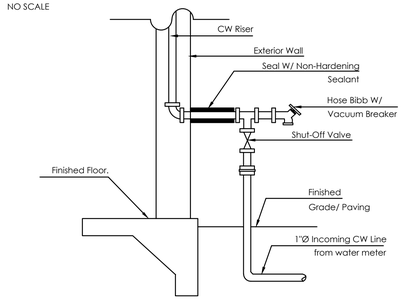
TRAP PRIMER DETAIL
NO SCALE



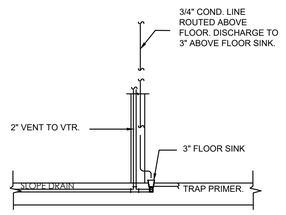
FLOOR CLEANOUT DETAIL
NO SCALE



VENT THRU ROOF DETAIL
NO SCALE



WATER ENTRY DETAIL
NO SCALE



COND. ON FLOOR SINK DETAIL
NO SCALE

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REV. NO.	DESCRIPTION	DATE	BY

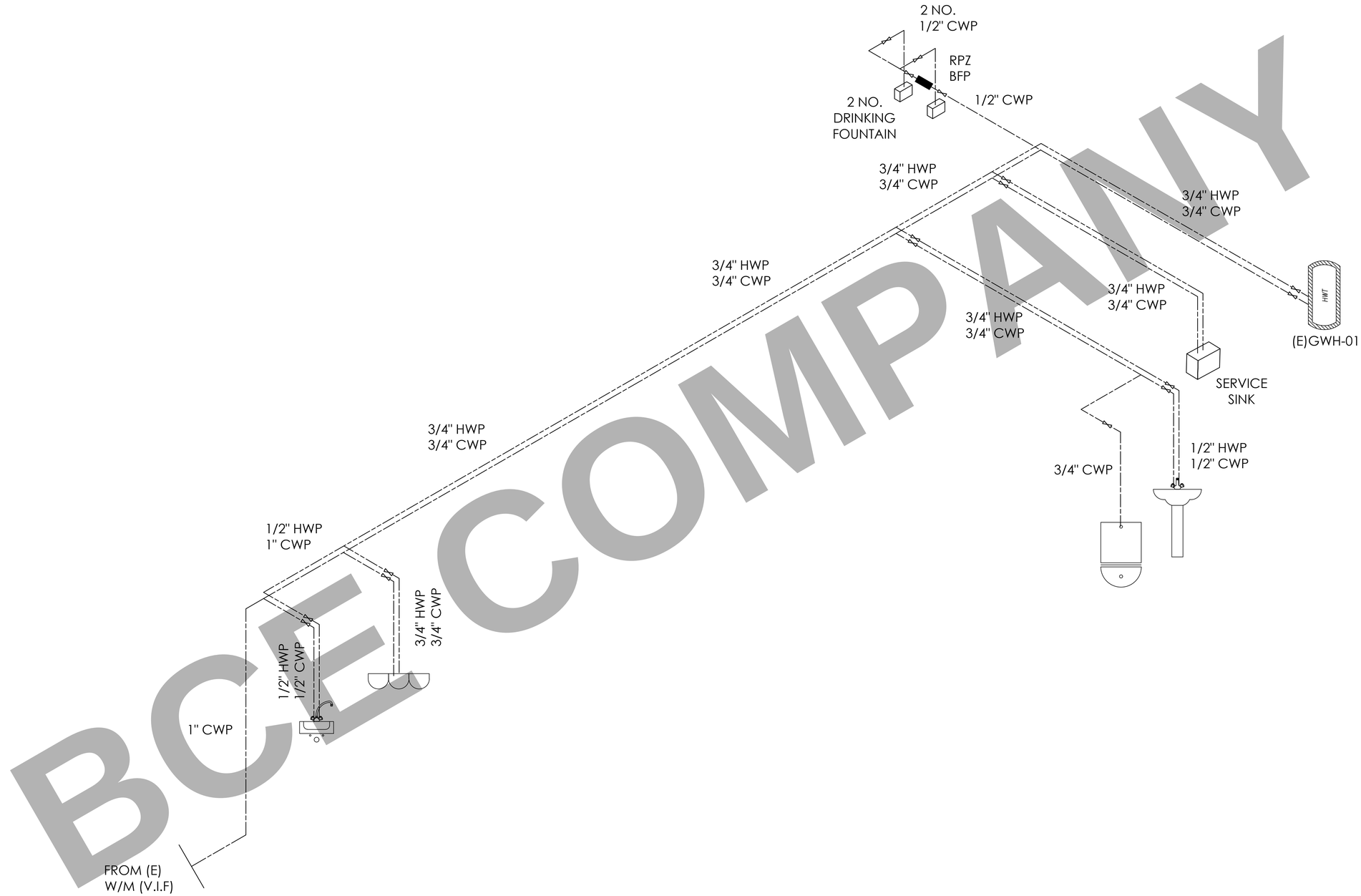
PROJECT

TITLE:
PLUMBING GENERAL DETAILS.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
P 3 . 0 1

REV.



WATER SUPPLY ISOMETRIC RISER DIAGRAM

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REV. NO.	DESCRIPTION	DATE	BY

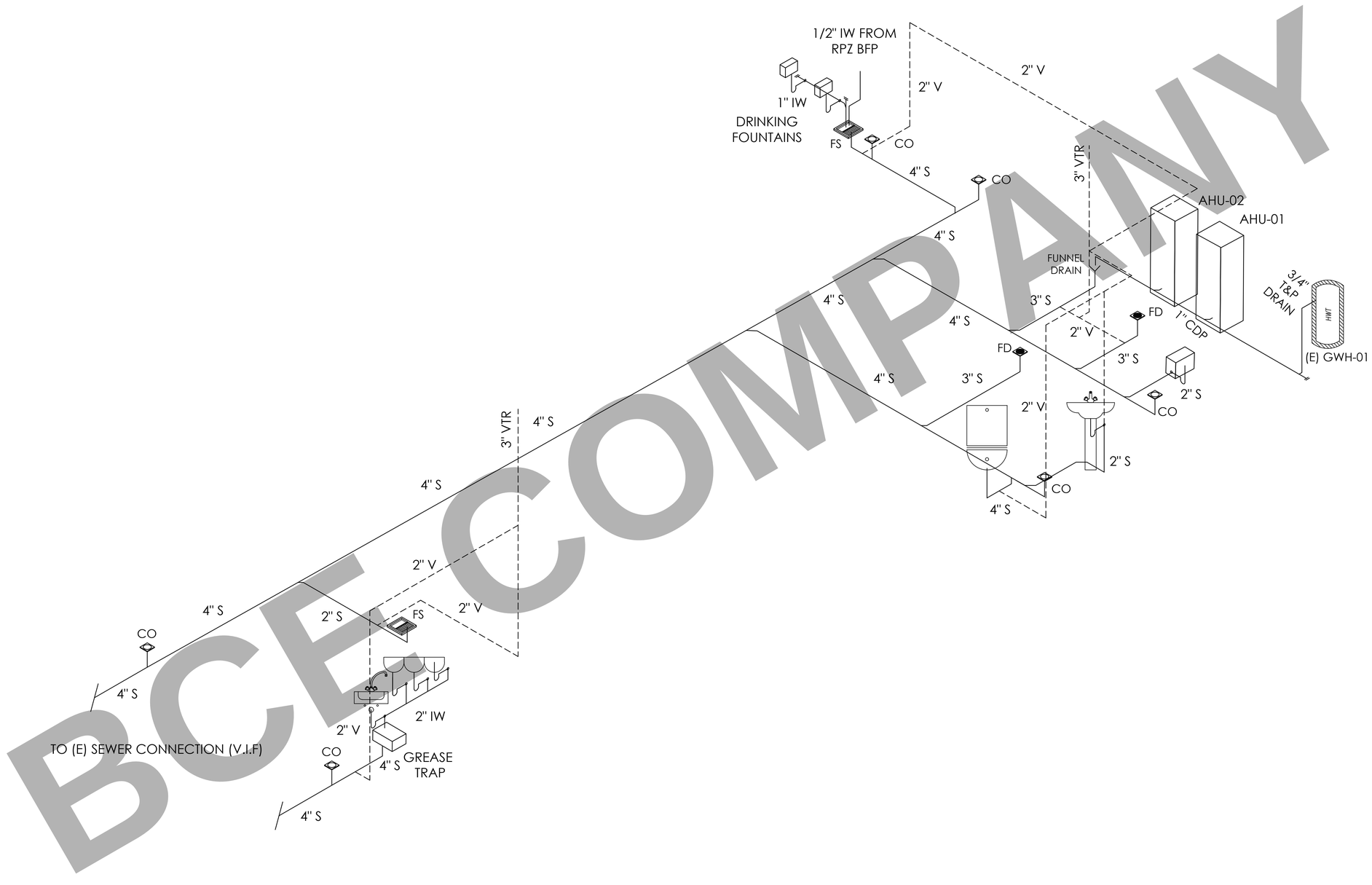
PROJECT:

TITLE:
WATER SUPPLY ISOMETRIC RISER DIAGRAM

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
P 4 . 0 1

REV.



SANITARY & INDIRECT WASTE ISOMETRIC RISER DIAGRAM

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
SANITARY & INDIRECT WASTE ISOMETRIC RISER DIAGRAM

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.
P 4 . 0 2

REV.

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ELC-6
Project Name: 100 El Prado **Report Page:** (Page 1 of 4)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

A. GENERAL INFORMATION

01	Project Location (city)	San Rafael	02	Climate Zone	2
			03	Occupancy Types Within Project:	All Other OccupanciesGroceryStoreSupportAreasWarehouse

B. PROJECT SCOPE

This table includes electrical systems that are within the scope of the permit application.

01	02	03	04	05	06	07
Electrical Service Designation/ Description	Scope of Work[1]	Rating[2] (kVA)	Utility Provided Metering System Exception to 130.5(a)/ 160.6(a)[3]	System subject to CA Elec Code Article 517 Exception to 130.5(a)and (b)	Demand Response Controls	Provides power to dwelling units/common living areas only in multifamily occupancy
Main	Add/Alt to feeders and branch circuits only	50	☐	☐	Where required, demand response controls must be specified which are capable of receiving and automatically responding to at least one standards based messaging protocol which enables demand response after receiving a demand response signal. Sections 120.2/ 160.3, 130.1/ 160.5, and 130.3/ 160.5, and mechanical, indoor lighting, and sign lighting Certificate of Compliance documents will indicate when demand response controls are required.	☐

[1]OOTNOTES: Adding only new feeders and branch circuits triggers Voltage Drop 130.5(c)/160.6(c), no other requirements from 130.5/160.6 are required.
[2] If common use areas in a multifamily are submetered, rating is for submeter size serving common use areas.
[3] Applicable if the utility company is providing a metering system that indicates instantaneous kW demand and kWh for a utility-defined period.

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STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ELC-6
Project Name: 100 El Prado **Report Page:** (Page 2 of 4)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through I. Note: If any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see applicable Table referenced below.

01		02		03		04	05	06
Service Electrical Metering 130.5(a)/ 160.6(a) (See Table F)	AND	Separation for Monitoring 130.5(b)/ 160.6(b) (See Table G)	AND	Voltage Drop 130.5(c)/ 160.6(c) (See Table H)	AND	Controlled Receptacles 130.5(d)/ 160.6(d) (See Table I)	Electric Ready 160.9 (See Table J)	Compliance Results
Yes	AND	Yes	AND	Yes	AND	Yes	Yes	COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with unedittable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. SERVICE ELECTRICAL METERING

This section does not apply to this project.

G. SEPARATION OF ELECTRICAL CIRCUITS FOR ENERGY MONITORING

This section does not apply to this project.

H. VOLTAGE DROP

This table includes entirely new or complete replacement electrical power distribution systems, or alterations that add, modify or replace both feeders and branch circuits to demonstrate compliance with 130.5(c)/ 160.6(c). For alterations, only the altered circuits must demonstrate compliance per 141.0(b)2Fiii/ 180.2(b)4Bviic.

01	02	03	04	05	
Electrical Service Designation/Description	Combined Voltage Drop on Installed Feeder/Branch Circuit Conductors Compliance Method	Location of Voltage Drop Calculations[1]	Sheet Number for Voltage Drop Calculations in Construction Documents	Field Inspector	
				Pass	Fail

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STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ELC-6
Project Name: 100 El Prado **Report Page:** (Page 3 of 4)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

H. VOLTAGE DROP

Main	☒	Voltage drop less than 5%	☐	Permitted by CA Elec Code (Exception to 130.5(c))*	Attached		☐ ☐

** NOTES: If "Permitted by CA Elec Code "" is selected under Compliance Method above, please indicate where the exception applies in the space provided below.*
[1] FOOTNOTES: Voltage drop calculations may be attached to the permit application outside the construction documents if allowed by the Authority Having Jurisdiction. Select "attached" if applicable. If calculations will be the responsibility of the installing contractor, select "Contractor Responsible".

I. CIRCUIT CONTROLS FOR 120-VOLT RECEPTACLES AND CONTROLLED RECEPTACLES

This section does not apply to this project.

J. ELECTRIC READY BUILDINGS

This section does not apply to this project.

K. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-ELC-E - Must be submitted for all buildings

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STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ELC-6
Project Name: 100 El Prado **Report Page:** (Page 4 of 4)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT
I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Mohamad Nohayli	Documentation Author Signature: **Mohamad Nohayli**
Company: InnoDez, Inc.	Signature Date: **2023.04.17**
Address: **726 Foxbrough**	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: **Pleasanton CA94566**	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT
I certify the following under penalty of perjury, under the laws of the State of California:
1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Syed P. Alam	Responsible Designer Signature: **Syed Alam**
Company: Innodez Inc.	Date Signed: 2023-04-17
Address: 726 Foxbrough	License: 27087
City/State/Zip: Pleasanton CA 94566	Phone:

Registration Number: | Generated Date/Time: | Documentation Software: EnergyPro
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STATE OF CALIFORNIA
Envelope Component Approach
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ENV-4
Project Name: 100 El Prado **Report Page:** (Page 1 of 6)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

A. GENERAL INFORMATION

01	Project Location (city)	San Rafael	05	# of Stories (Habitable Above Grade)	1
02	Zipcode	94903	06	Total Conditioned Floor Area (ft²)	3315
03	Climate Zone	2	07	Total Unconditioned Floor Area (ft²)	0
04	Occupancy Types Within Project: (select all that apply): If one occupancy constitutes >= 80% of the conditioned floor area, the entire building envelope may be designed to comply with the provisions of that occupancy per 100.0(f).		08	☐ Project includes unconditioned enclosed space(s) > 5,000 ft² under a roof with a ceiling height of at least 15 ft.[1]	

● Grocery ● Support Areas ● Warehouse ● All Other Occupancies

[1] FOOTNOTE: Enclosed spaces > 5,000 ft² directly under roof with ceiling height > 15 ft in climate zones 2 through 15 are required to meet the minimum daylighting requirements defined in 140.3(c)/ 170.2(b). Compliance with 140.3(c)/ 170.2(b) is documented in Table L. This is the only prescriptive requirement which applies to unconditioned spaces.

B. PROJECT SCOPE

This table specifies project envelope components within the permit application demonstrating compliance using the prescriptive paths outlined in 140.3/ 170.2 and 141.0(a)1/ 180.1 and 141.0(b)1 and 2/ 180.2 for additions and alterations.

My project consists of (check all that apply)			Component Types				
01			02				
☐	New Construction or Newly Conditioned Space		☐	Walls	☐	Exterior Opaque Doors	
☐	☐ One or more enclosed spaces > 5,000 ft² directly under roof with ceiling height > 15ft		☐	Roof	☐	Floors	☐ Fenestration/ Glazed Doors[1]
☐	Addition of conditioned space		☐	Walls	☐	Exterior Opaque Doors	
	☐ One or more enclosed spaces > 5,000 ft² directly under roof with ceiling height > 15ft		☐	Roof	☐	Floors	☐ Fenestration/ Glazed Doors[1]
	☐ Addition is <=700 ft²						
	☐ Addition is >700 ft²						
☒	Moration of conditioned space		☐	Roof Assembly	☒	Walls	Exterior Opaque Doors NA. for Alts.
	☐ One or more enclosed spaces > 5,000 ft² directly under roof with ceiling height > 15ft and lighting system installed for the first time		☐	Roofing Material[2]	☐	Floors	☒ Fenestration

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STATE OF CALIFORNIA
Envelope Component Approach
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ENV-4
Project Name: 100 El Prado **Report Page:** (Page 2 of 6)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

B. PROJECT SCOPE

[1]OOTNOTE: Doors that are more than 25% glass in area are considered Glazed Doors and should be documented on table K with fenestration.
[2]Roof recovers and replacements must also check "Roof Assembly" box and document compliance with insulation requirements in Table I. Roof recoots may document compliance with roof material only in Table G.

C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through L. Note: If any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see the applicable table referenced below.

Opaque Envelope Components					Fenestration	Daylighting Spaces > 5,000ft²	
Roof Assembly	Roofing Materials	Walls	Floors	Doors			Compliance Results
01	02	03	04	05	06	07	08
(See Table F)	(See Table G)	(See Table H)	(See Table I)	(See Table J)	(See Table K)	(See Table L)	COMPLIES
Yes	Yes	Yes			Yes		

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with unedittable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. ROOF ASSEMBLY SCHEDULE

This section does not apply to this project.

G. RATED ROOFING MATERIAL (COOL ROOF)

This section does not apply to this project.

Registration Number: | Generated Date/Time: | Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220101 | Compliance ID: EnergyPro-50207-0423-0274 Report Generated: 2023-04-17 13:58:02

STATE OF CALIFORNIA
Envelope Component Approach
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ENV-4
Project Name: 100 El Prado **Report Page:** (Page 3 of 6)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

H. WALL ASSEMBLY SCHEDULE

This table demonstrates compliance with prescriptive wall assembly requirements in 140.3(a)1/ 170.2(a) for new constructions, 141.0(a)/ 180.1 for additions and 141.0(b)1B/ 180.2 for alterations.

01	Indicate wall types included in the project:[1]	☐ Framed	☐ Mass (new only)	☐ Concrete Sandwich Panel (new only)	☐ SIPS	☐ ICF (new only)
		☐ Metal Panels	☐ Metal Building	☐ Spandrel/ Curtain Wall	☐ Straw Bale	☐ Log Home (new only)

[1] FOOTNOTES: Wall types indicated above as "(new only)" do not have Title 24, Part 6 requirements for alterations. New construction and additions do have requirements and should be clicked above and compliance demonstrated within this table.

I. FLOOR ASSEMBLY SCHEDULE

This section does not apply to this project.

J. EXTERIOR DOOR SCHEDULE

This section does not apply to this project.

K. FENESTRATION AND GLAZED DOOR SCHEDULE

This table demonstrates compliance with prescriptive fenestration requirements in 140.3(a)5/ 170.2(a)3 for new constructions, 141.0(a)/ 180.1 for additions, or 141.0(b)2A/ 180.2 for alterations. Exterior doors that are more than 25% glass in area are considered Glazed Doors and should be documented on this table with fenestration.

01	Indicate fenestration types included in the project:[1]	☒ Vertical (alterations)	☐ Vertical (new)	☐ Skylights	☐ Glazed Doors (new only)

[1] FOOTNOTES: Fenestration types indicated above as "(new only)" do not have Title 24, Part 6 requirements for alterations. New construction and additions do have requirements and should be clicked above and compliance demonstrated within this table.

Vertical Fenestration And Glazed Doors- U-factor, Solar Heat Gain Coefficient (RSHGC/ SHGC), Visible Transmittance (VT)	
01	☒ Calculate Area-Weighted Average U-factor for Vertical Fenestration and Glazed Doors[1]
02	☒ Calculate Area-Weighted Average (R)SHGC for Vertical Fenestration and Glazed Doors[1]
03	☒ Calculate Area-Weighted Average VT for Vertical Fenestration and Glazed Doors[1]

Registration Number: | Generated Date/Time: | Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220101 | Compliance ID: EnergyPro-50207-0423-0274 Report Generated: 2023-04-17 13:58:02

STATE OF CALIFORNIA
Envelope Component Approach
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ENV-4
Project Name: 100 El Prado **Report Page:** (Page 4 of 6)
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K. FENESTRATION AND GLAZED DOOR SCHEDULE

Vertical Fenestration And Glazed Doors- U-factor, Solar Heat Gain Coefficient (RSHGC/ SHGC), Visible Transmittance (VT)

04	05	06	07	08	09	10	11	12	13
Tag/Plan Detail ID	Fenestration Type	Occupancy & Status	U-factor/ (R)SHGC Compliance Method	VT Compliance Method	Calculation Method for Performance Values per Design[1]	Product Performance Unit	Required Product Performance	Product Performance per Design	Area ft²
W1	Fixed window	Nonresidential/ Relocatable 1 CZ: : New	Table 140.3-B/C/D	Table 140.3-B/C/D	§110.6 Defaults	U-factor (max)	0.55	0.55	100
				☐	Overhang/ Slats used for RSHGC	(R)SHGC (max)	0.67	0.67	
						VT (min)	0.8	0.804	
W2	Fixed window	Nonresidential/ Relocatable 1 CZ: : New	Table 140.3-B/C/D	Table 140.3-B/C/D	§110.6 Defaults	U-factor (max)	0.55	0.55	57
				☐	Overhang/ Slats used for RSHGC	(R)SHGC (max)	0.67	0.67	
						VT (min)	0.8	0.804	
W3	Fixed window	Nonresidential/ Relocatable 1 CZ: : New	Table 140.3-B/C/D	Table 140.3-B/C/D	§110.6 Defaults	U-factor (max)	0.55	0.55	100
				☐	Overhang/ Slats used for RSHGC	(R)SHGC (max)	0.67	0.67	
						VT (min)	0.8	0.804	

[1] FOOTNOTES: If any individual fenestration product is non-compliant, products may show compliance using an area-weighted calculation. Chromogenic glazing is not included in area-weighted calculations. Area-weighted calculation shown in separate area-weighted table below.
[2]The NA6 Default Calculation can only be used for alterations or dwelling units in buildings with <= 3 habitable stories. Alterations are limited to 200ft² of site built glazing and dwelling units are limited to 250ft² or 5% of conditioned floor area. If the fenestration does not meet these conditions, the only options for determining fenestration values are NFRC Certification or the Default Tables in 110.6.
[3] Overhangs must extend past the left and right window the same distance as the depth of the overhang or greater to show an affect on the RSHGC. If an overhang does not meet this requirement, the affect of the overhang will be ignored.
[4]Projecting includes casement and awning windows.

Registration Number: | Generated Date/Time: | Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220101 | Compliance ID: EnergyPro-50207-0423-0274 Report Generated: 2023-04-17 13:58:02

STATE OF CALIFORNIA
Envelope Component Approach
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ENV-4
Project Name: 100 El Prado **Report Page:** (Page 5 of 6)
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K. FENESTRATION AND GLAZED DOOR SCHEDULE

Area-Weighted Average U-factor, SHGC, VT Compliance Calculation for Vertical Fenestration And Glazed Doors

01	02	03	04	05
Product Performance Unit	Total Area of Fenestration (ft²)	Area-weighted Calculation for Fenestration		Compliance Results Using Area-Weighted Calculation Option
		Required	Designed	
U-Factor	257	0	0	COMPLIES
(R)SHGC	257	0	0	COMPLIES
VT	257	0	0	COMPLIES

L. DAYLIGHT IN LARGE ENCLOSED SPACES

This section does not apply to this project.

M. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-ENV-01-E - Must be submitted for all buildings

N. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Form/Title	Systems/Spaces To Be Field Verified
NRCA-ENV-02-F must be submitted for all new, added or altered fenestration.	

O. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no forms required for this project.

Registration Number: | Generated Date/Time: | Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220101 | Compliance ID: EnergyPro-50207-0423-0274 Report Generated: 2023-04-17 13:58:02

STATE OF CALIFORNIA
Envelope Component Approach
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-ENV-4
Project Name: 100 El Prado **Report Page:** (Page 6 of 6)
Project Address: 100 El Prado Ave **Date Prepared:** 4/17/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT
I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Mohamad Nohayli	Documentation Author Signature: **Mohamad Nohayli**
Company: InnoDez, Inc.	Signature Date: **2023.04.17**
Address: **726 Foxbrough**	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: **Pleasanton CA94566**	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT
I certify the following under penalty of perjury, under the laws of the State of California:
1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Syed P. Alam	Responsible Designer Signature: **Syed Alam**
Company: Innodez Inc.	Date Signed: 2023-04-17
Address: 726 Foxbrough	License: 27087
City/State/Zip: Pleasanton CA 94566	Phone:

Registration Number: | Generated Date/Time: | Documentation Software: EnergyPro
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220101 | Compliance ID: EnergyPro-50207-0423-0274 Report Generated: 2023-04-17 13:58:02

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

NOTES:

1. ALL DIMENSIONS HEREIN ARE IN IMPERIAL UNITS UNLESS STATED OTHERWISE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
T24.1

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO. **T 2 4 . 1** | REV.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
This document is used to demonstrate compliance with requirements in 110.9, 110.12(c), 130.0, 130.1, 140.6 and 141.0(b)2 for indoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in 160.5, 170.2(e) and 180.2(b)4 for indoor lighting scopes using the prescriptive path for multifamily occupancies. Multifamily includes dormitory and senior living facilities.			
Project Name:	100 El Prado	**Report Page:**	**(Page 1 of 8)**
Project Address:	100 El Prado Ave	**Date Prepared:**	5/22/2023

A. GENERAL INFORMATION

01	Project Location (city)	San Rafael	04	Total Conditioned Floor Area (ft²)	3,315
02	Climate Zone	2	05	Total Unconditioned Floor Area (ft²)	0
03	Occupancy Types Within Project (select all that apply):		06	# of Stories (Habitable Above Grade)	1

● Grocery ● Support Areas ● Warehouse ● All Other Occupancies

B. PROJECT SCOPE

This table includes any lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.6 / 170.2(e) or 141.0(b)2 / 180.2(b)4 for alterations.

Scope of Work	Conditioned Spaces		Unconditioned Spaces	
01	02	03	04	05
My Project Consists of (check all that apply):	Calculation Method	Area (ft²)	Calculation Method	Area (ft²)
☐ New Lighting System				
☐ New Lighting System - Parking Garage				
☒ Altered Lighting System	Area Category Method	3315	Area Category Method	0
Total Area of Work (ft²)	3315		0	

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 2 of 8)**
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C. COMPLIANCE RESULTS

If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Lighting in conditioned and unconditioned spaces must not be combined for compliance per 140.6(b)1 / 170.2(e)	Allowed Lighting Power per 140.6(b) / 170.2(e) (Watts)						Adjusted Lighting Power per 140.6(a) / 170.2(e) (Watts)				Compliance Results
	01	02	03	04	05		06	07		08	09
	Complete Building 140.6(c)1	Area Category 140.6(c)2 / 170.2(e)4	Area Category Additional 140.6(c)2b5 / 170.2(e)4Av (+)	Tailored 140.6(c)3 / 170.2(e)4B (+)	**Total Allowed** (Watts)		Total Designed (Watts)	Adjustments: PAF Lighting Control Credits 140.6(a)2 / 170.2(e)1B (-)		**Total Adjusted** (Watts) *Includes Adjustments	**05 must be >= 08 140.6 / 170.2(e)**
	(See Table I)	(See Table I)	(See Table J)	(See Table K)			(See Table F)	(See Table P)			
Conditioned		3,092.6	1,015		4,108	≥	3,245	0	=	3245	COMPLIES
Unconditioned						≥			=		
Controls Compliance (See Table H for Details)											COMPLIES
Rated Power Reduction Compliance (See Table Q for Details)											

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 3 of 8)**
Project Address:	100 El Prado Ave	**Date Prepared:**	5/22/2023

F. INDOOR LIGHTING FIXTURE SCHEDULE

This table includes all planned permanent and portable lighting other than dwelling unit/ hotel/ motel room lighting. Multifamily dwelling unit and hotel/motel room lighting is documented in Table T. If using Table T to document lighting in multifamily common use areas providing shared provisions for living, eating, cooking or sanitation, those luminaires are not included here.

Designed Wattage: Conditioned Spaces

01	02	03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description	Modular (Track) Fixture	Small Aperture & Color Change[1]	Watts per luminaire[2]	How is Wattage determined	Total Number of Luminaires	Excluded per 140.6(a)3 / 170.2(e)2C	Design Watts	Field Inspector	
									Pass	Fail
FL	FL - 1'x4' Fluorescent 2 Lamp Light	No	NA	40	Mfr. Spec	2	No	80	☐	☐
PL	PL-Round LED High Bay Light	No	NA	63	Mfr. Spec	45	No	2,835	☐	☐
SW	SW-4" Downlight Capri R4	No	NA	30	Mfr. Spec	7	No	210	☐	☐
WS	WS-Wall Sconce	No	NA	60	Mfr. Spec	2	No	120	☐	☐
						Total Designed Watts: CONDITIONED SPACES		3,245		

[1]*FOOTNOTE: Design Watts for small aperture and color changing luminaires which qualify per 140.6(a)4B / 170.2(e)2D is adjusted to be 75% /80% of their rated wattage. Table F automatically makes this adjustment, the permit applicant should enter full rated wattage in column 05.*

[2]*Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per 130.0(c) / 160.5(b). Wattage used must be the maximum rated for the luminaire, not the lamp.*

G. MODULAR LIGHTING SYSTEMS

This section does not apply to this project.

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

This table includes lighting controls for conditioned and unconditioned spaces.

Building Level Controls

01	02	03	
		Field Inspector	
		Pass	Fail
Mandatory Demand Response 110.12(c)	Shut-off controls 130.1(c) / 160.5(b)4C		

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 4 of 8)**
Project Address:	100 El Prado Ave	**Date Prepared:**	5/22/2023

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

Required >= 4,000W subject to multilevel: Whole Building Auto Time Switch ☐ ☐

Area Level Controls

04	05	06	07	08	09	10	11	12	
Area Description	Complete Building or Area Category Primary Function Area	Manual Area Controls 130.1(a) / 160.5(b)4A	Multi-Level Controls 130.1(b) / 160.5(b)4B	Shut-Off Controls 130.1(c) // 160.5(b)4C	Primary/Sky lit Daylighting 130.1(d) / 160.5(b)4D	Secondary Daylighting 130.1(d) / 160.5(b)4D	Interlocked Systems 140.6(a)1/ 170.2(e)2A	Field Inspector	
								Pass	Fail
New Storage	Commercial Industrial Storage Area	Readily Accessible	NA: General Ltg <= 0.5W/SF	Occupancy Sensor	NA: Rm < 24sf Glazing	NA: Rm < 24sf Glazing	No	☐	☐
New Retail	Retail Merchandise Sales	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
Mech & Electrical Room	Electrical Mechancial Telephone Room	Readily Accessible	NA: Enclosed area <100SF	Occupancy Sensor	NA: Rm < 24sf Glazing	NA: Rm < 24sf Glazing	No	☐	☐
Service Area	Lounge	Readily Accessible	NA: Enclosed area <100SF	Occupancy Sensor	NA: Rm < 24sf Glazing	NA: Rm < 24sf Glazing	No	☐	☐
Restroom	Restroom	Readily Accessible	NA: Restrooms	Occupancy Sensor	NA: Rm < 24sf Glazing	NA: Rm < 24sf Glazing	No	☐	☐
						13			
						Plan Sheet Showing Daylit Zones:			

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

Each area complying using the Complete Building or Area Category Methods per 140.6(b) are included in this table. Column 06 indicates if additional lighting power allowances per 140.6(c) or adjustments per 140.6(a) are being used .

Conditioned Spaces

01	02	03	04	05	06	
Area Description	Complete Building or Area Category Primary Function Area	Allowed Density (W/ft²)	Area (ft²)	Allowed Wattage (Watts)	Additional Allowance / Adjustment	
					Area Category	PAF

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 5 of 8)**
Project Address:	100 El Prado Ave	**Date Prepared:**	5/22/2023

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

New Storage	Commercial Industrial Warehouse	0.4	210	84	No	No
New Retail	Grocery Sales	1	2,900	2,900	Yes	No
Mech & Electrical Room	Electrical Mechancial Telephone Room	0.4	62	24.8	No	No
Service Area	Lounge	0.55	92	50.6	No	No
Restroom	Restroom	0.65	51	33.2	No	No
		TOTALS:	3,315	3,092.6	See Tables J, or P for detail	

J. ADDITIONAL ALLOWANCE: AREA CATEGORY METHOD QUALIFYING LIGHTING SYSTEM

All areas indicated in Table I as using an additional allowance using the Area Category Method have been included in this table to calculate the additional allowance per Table 140.6-C /170.2-M

Conditioned Spaces

01	02	03	04	05	06	07	08	09	10
Area Description	Primary Function Area	Applicable Qualifying Lighting System from Table 140.6-C	Allowed Density (W/ft² or W/lf or W/unit)	Ltg Area, Length or ATM/Mirror (ft², lf or #)	Extra Allowance (Watts)	Luminaire Name or Item Tag	Watts per Luminaire	Number of Luminaires	Total Design Watts
New Retail	Grocery Sales	DecorativeDisplay A	0.35	2900	1015.0	PL	63	45	2835
Total Design Watts	Calculated Allowance (Watts):	Total Additional Allowance for this area:							
2835	1015.0	1015.0							
		11							
Total Additional Allowance (Watts) CONDITIONED SPACES		1015.0							

K. TAILORED METHOD GENERAL LIGHTING POWER ALLOWANCE

This section does not apply to this project.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 6 of 8)**
Project Address:	100 El Prado Ave	**Date Prepared:**	5/22/2023

L. ADDITIONAL LIGHTING ALLOWANCE: TAILORED WALL DISPLAY

This section does not apply to this project.

M. ADDITIONAL LIGHTING ALLOWANCE: TAILORED FLOOR AND TASK LIGHTING

This section does not apply to this project.

N. ADDITIONAL LIGHTING ALLOWANCE: TAILORED DECORATIVE /SPECIAL EFFECTS

This section does not apply to this project.

O. ADDITIONAL LIGHTING ALLOWANCE: TAILORED VERY VALUABLE MERCHANDISE

This section does not apply to this project.

P. POWER ADJUSTMENT: LIGHTING CONTROL CREDIT (POWER ADJUSTMENT FACTOR (PAF))

This section does not apply to this project.

Q. RATED POWER REDUCTION COMPLIANCE FOR ONE-FOR-ONE ALTERATIONS

This section does not apply to this project.

R. 80% LIGHTING POWER FOR ALL ALTERATIONS - CONTROLS EXCEPTIONS

This section does not apply to this project.

S. DAYLIGHT DESIGN POWER ADJUSTMENT FACTOR (PAF)

This section does not apply to this project.

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 7 of 8)**
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T. DWELLING UNIT LIGHTING

This section does not apply to this project.

U. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-LTI-E - Must be submitted for all buildings

V. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Form/Title	Systems/Spaces To Be Field Verified
NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	Whole Building Time Switch; New Storage; New Retail; Mech & Electrical Room; Service Area; Restroom;
NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	New Retail;
NRCA-LTI-04-A - Must be submitted for demand responsive lighting controls.	Whole Building Demand Response;

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	100 El Prado	**Report Page:**	**(Page 8 of 8)**
Project Address:	100 El Prado Ave	**Date Prepared:**	5/22/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Mohamad Nohayli	**Mohamad Nohayli**
Company: InnoDez, Inc.	Signature Date: 2023-05-22
Address: **726 Foxbrough**	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: **Pleasanton CA94566**	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Syed P. Alam	**Syed Alam**
Company: Innodez Inc.	Date Signed: 2023-05-22
Address: 726 Foxbrough	License: 27087
City/State/Zip: Pleasanton CA 94566	Phone:

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

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3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
T24.2

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.	REV.
T 2 4 . 2	

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 1 of 10)
Project Address:	100 El Prado Ave	Date Prepared:	4/17/2023

This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, or 141.0(b)2 for alterations.

A. GENERAL INFORMATION

01	Project Location (city)	San Rafael	04	Total Conditioned Floor Area	3315
02	Climate Zone	2	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

● Grocery ● Support Areas ● Warehouse ● All Other Occupancies

B. PROJECT SCOPE

This table includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, 170.2(b) or 141.0(b)2 and 180.2(b)2 for alterations.

01	02	03
Air System(s)	Wet System Components	Dry System Components
☒ Heating Air System	☐ Water Economizer	☐ Air Economizer
☒ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
Mechanical Controls	☐ System Piping	☒ Fan Systems
☒ Mechanical Controls (existing to remain, altered or new)	☐ Cooling Towers	☒ Ductwork (existing to remain, altered or new)
	☐ Chillers	☒ Ventilation
	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 2 of 10)
Project Address:	100 El Prado Ave	Date Prepared:	4/17/2023

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary 110.1, 110.2, 140.4, 170.2(c)	AND	Pumps 140.4(k), 170.2(c)4I	AND	Fans/ Economizers 140.4(c), 140.4(e), 170.2(c)	AND	System Controls 110.2, 120.2, 140.4(f), 170.2(c)	AND	Ventilation 120.1, 160.2	AND	Terminal Box Controls 140.4(d), 170.2(c)4B	AND	Distribution 120.3, 140.4(l), 160.2, 160.3	AND	Cooling Towers 110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES
Mandatory Measures Compliance (See Table Q for Details)												COMPLIES			

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
Heat Pump	2	Single zone	New/ Addition		☐

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 3 of 10)
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F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
Name or Item Tag	Equipment Category per Tables 110.2, 140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available[1] 140.4(a) and 170.2(c)1	Equipment Sizing per Mechanical Schedule (kBtu/h) 140.4(a&b), 170.2(c)1 & 170.2(c)2						
				Heating Output[2,3]			Cooling Output[2,3]		Load Calculations[3,4]	
				Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
Heat Pump	Unitary Heat Pumps	Air-cooled, split (3 phase)	NA: Load Controls	124.91	90	0	142.88	80	51.57	163.16

[1] *FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per 140.4(a) and 170.2(c)1. Healthcare facilities are excepted.*
[2] *It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.*
[3] *If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.*
[4] *Authority Having Jurisdiction may ask for load calculations used for compliance per 140.4(b) and 170.2(c).*

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
Name or Item Tag	Size Category (Btu/h)	Heating Mode				Cooling Mode		
		Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
Heat Pump	>=65,000 and <135,000		COP	3.4	3.2	EER IEER	11 14.1	12.2 11.7

G. PUMPS

This section does not apply to this project.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 4 of 10)
Project Address:	100 El Prado Ave	Date Prepared:	4/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	Heat Pump	Quantity	2	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	6,000	Site Elevation	40	Economizer	NA: Special OA filtration
01	02	03	04						05	06	07	08	09	10	11
Fan Name or Item Tag	Fan Type	Qty	Component						Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Electrical Input Power (kW)
SF	Supply	2	Base Allowance for system serving spaces <=6 floors away						3,000		696		Manufacturer provided		0.89
			MERV 13-16 Filter upstream of thermal conditioning equipment						3,000		417				
			Hydronic/DX cooling coil or heat pump coil						3,000		417				
									Fan System Allowance (kW)[3]		3.06		Fan System Electrical Output (kW)		1.78

[1] *FOOTNOTES: Fans serving spaces with design background noise goals below NC35*
[2] *Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.*

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

01	02	03	04	05	06	07	08	09	10	11
Fan System Name	Qty	Hours of Operation per Year	Design Supply Airflow Rate	Outdoor Airflow	% Outdoor Air at Full Design Airflow	Exemptions to Exhaust Air Heat Recovery Requirement per 140.4(c) & 170.2(c4O	Exhaust Air Heat Recovery 140.4(q) & 170.2(c)4O	Type Of Heat Recovery Rating	Required Recovery Ratio	Energy Recovery Bypass

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 5 of 10)
Project Address:	100 El Prado Ave	Date Prepared:	4/17/2023

Fan Energy Index (FEI)

01	02	03
Name or Item Tag	FEI Exception	FEI

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in 110.2 and 120.2 and prescriptive controls in 140.4(f) and (n), 170.2(c)4D 170.2(c)4L or requirements in 141.0(b)2E 180.2(b)2 for altered space conditioning systems.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft²)	Thermostats 110.2(b) & (c)[1], 120.2(a), 160.3(a)2A or 141.0(b)2E & 180.2(b)2	Shut-Off Controls 120.2(e) & 160.3(a)2D	Isolation Zone Controls 120.2(g) & 160.3(a)2E	Demand Response 110.12 120.2(b) & 160.3(a)2B	Supply Air Temp. Reset 140.4(f) & 170.2(c)4D	Window Interlocks per 140.4(n) & 170.2(c)4D
Heat Pump	Single zone	<= 25,000 ft²	Setback	Auto Timer Switch	4 Hour Timer	EMCS	NA: Would increase energy use	Provided

[1] *FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.*

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in 120.1 120.2(e)3B 140.4(p) and 140.4(q) for all nonresidential and hotel/motel and d:t24refnolink/}160.2, 160.3(e)3D, 170.2(e)4N, 170.2(e)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☒	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per 120.1(c)2.
Nonresidential and Hotel/ Motel Multifamily Common Use Ventilation Systems		

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

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J. VENTILATION AND INDOOR AIR QUALITY

04	05			06		07
System Name	Heat Pump	System Design OA CFM Airflow[1]	497	System Design Transfer Air CFM	0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
						Provided
08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)[3] & 160.2(c)3				Exh. Vent per 120.1(c)4 & 160.2(c)4			DCV or Sensor Controls per 120.1(d)3, 120.1(c)5, and 120.1(e)3[3] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft²)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
New Storage	Warehouse	210			31.5	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type
New Retail	Supermarket	2900			725	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type
Mech & Electrical Room	All others	62			0	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type
Service Area	All others	92			13.8	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type
Restroom	Toilet, private	51			0	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 7 of 10)
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J. VENTILATION AND INDOOR AIR QUALITY

17	Total System Required Min OA CFM	770	18	Ventilation for this System Complies?	Yes

[1] *FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system*
[2] *Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.*
[3] *Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.*
[4] *See Standards Tables 120.1-A and 120.1-B.*
[5] *For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.*
[6] *120.2(e)3 requires systems serving rooms that are required by 130.1(e) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft² or smaller, multipurpose rooms less than 1,000 ft², classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by 130.1(c).*

Multifamily Dwelling Unit Ventilation Systems

☐	Check the box if the system is using continuous ventilation to meet the ventilation requirements per 160.2(b)2AivB2							
19	20	21	22	23	24	25	26	27
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(b) & 160.2(b)2				Ventilation per Design		Local Exhaust	Air Filtration per 120.1(c) & 160.2(b)1
	Conditioned Floor Area (ft²)	# of Bedrooms	# of Dwelling Units	Required Min OA CFM[1]	Supply Air CFM	Exhaust CFM		
28	Is this a balanced system[4]				29	Meeting Outside Air Requirements?		

[1] *FOOTNOTES: Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.*
[2] *Kitchen range hood will be verified per NA7.18.1 to confirm model is rated by HVI or AHAM.*
[3] *Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.*
[4] *A balanced ventilation system provides ventilation airflow to each dwelling-unit at a rate equal to or greater than the required minimum rate, but not more than twenty percent.*

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 8 of 10)
Project Address:	100 El Prado Ave	Date Prepared:	4/17/2023

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in 120.3 and mandatory requirements found in 120.4(g) for duct sealing.

01	☐	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Duct Leakage Testing

The answers to the questions below apply to the following duct systems:	Heat Pump	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	No
		Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	No
		Duct leakage testing per CMC Section 603.10.1 required for these systems?	Yes

11	No	The scope of the project includes only duct systems serving healthcare facilities
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.
13	Yes	The space conditioning system serves less than 5,000 ft² of conditioned floor area.
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A
18		All ductwork is an extension of an existing duct system
19		Ductwork serving individual dwelling unit
20		< 25 ft of new or replacement space conditioning ducts installed
21	R-8	Dust Insulation R-value

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 9 of 10)
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M. COOLING TOWERS

This section does not apply to this project.

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	Standard Heat Pump;
NRCA-MCH-03-A - Constant Volume Single Zone HVAC NOTE: This form does not automatically move to 'Yes'. If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	Standard Heat Pump;
NRCA-MCH-11-A Automatic Demand Shed Controls	Standard Heat Pump;
NRCA-MCH-16-A Supply Air Temperature Reset Controls	Standard Heat Pump;
NRCA-MCH-18-A Energy Management Control Systems	Standard Heat Pump;

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	Plan sheet or construction document location: M-Sheets

CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

NOTES:

1. ALL DIMENSIONS HEREIN ARE IN IMPERIAL UNITS UNLESS STATED OTHERWISE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:
T24.3

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.: **T 2 4 . 3**

REV.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	100 El Prado	Report Page:	(Page 10 of 10)
Project Address:	100 El Prado Ave	Date Prepared:	4/17/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Mohamad Nohayli	**Mohamad Nohayli**
Company:	Signature Date:
InnoDez, Inc.	**2023.04.17**
Address: **726 Foxbrough**	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: **Pleasanton CA94566**	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Syed P. Alam	**Syed Alam**
Company:	Date Signed:
Innodez Inc.	2023-04-17
Address:	License:
726 Foxbrough	27087
City/State/Zip:	Phone:
Pleasanton CA 94566	

STATE OF CALIFORNIA
Domestic Water Heating System
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-PLB-E
Project Name:	100 El Prado	Report Page:	(Page 1 of 3)
Project Address:	100 El Prado Ave	Date Prepared:	4/19/2023

This document is used to demonstrate compliance for nonresidential occupancies with requirements in 110.1, 110.3, 120.3, and 140.5, and with requirements in 141.0 for additions and alterations, for domestic water heating scopes using the prescriptive path. For high-rise residential and hotel/motel occupancies compliance is demonstrated with requirements in 110.1, 110.3, 160.4 and 170.2(d), and with requirements 180.1 for additions and 180.2 for alterations.

A. GENERAL INFORMATION

01	Project Location (city)	San Rafael	02	Climate Zone	2
03	Occupancy Types Within Project (select all that apply):				

● Grocery ● Support Areas ● Warehouse ● All Other Occupancies

B. PROJECT SCOPE

This table includes domestic water heating systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive paths outlined in 140./ 170.2(d) and 141.0(a)/ 180.1, or 141.0(b)2N / 180.2 for additions or alterations. Solar water heating systems are documented on the NRCC-SAB compliance document. Combined hydronic water heating systems are documented on the NRCC-MCH compliance document.

01	02	03		
My project consists of (check all that apply):	System Type[1,2]	System Components		
☐ New system (DHW system being installed for the first time in newly constructed building)		☐ Equipment	☐ Distribution	☐ Controls
☐ System Alteration (equipment, distribution or controls)		☐ Equipment	☐ Distribution	☐ Controls

[1] *FOOTNOTES: Point of use water heaters, or other non-central systems used to serve nonresidential spaces, are considered individual systems.*
[2] *Dwelling units refers to hotel/motel guest rooms and units in a multifamily residential occupancy.*
[3] *DHW systems serving 2 or more dwelling units are considered "Central Systems" for multifamily occupancies*

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with water heating requirements. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conons" refer to Table D. or the table indicated as not compliant for guidance.

01	02	03	04
Domestic Hot Water Equipment	Distribution Systems	Controls	**Compliance Results**
Table F	Table G	Table H	
Yes	Yes	Yes	COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

STATE OF CALIFORNIA
Domestic Water Heating System
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-PLB-E
Project Name:	100 El Prado	Report Page:	(Page 2 of 3)
Project Address:	100 El Prado Ave	Date Prepared:	4/19/2023

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. DOMESTIC HOT WATER EQUIPMENT

This section does not apply to this project.

G. DOMESTIC HOT WATER DISTRIBUTION SYSTEM

This section does not apply to this project.

H. DOMESTIC HOT WATER CONTROLS

This section does not apply to this project.

I. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-PLB-E - Must be submitted for all buildings

J. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no forms required for this project.

K. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no forms required for this project.

STATE OF CALIFORNIA
Domestic Water Heating System
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-PLB-E
Project Name:	100 El Prado	Report Page:	(Page 3 of 3)
Project Address:	100 El Prado Ave	Date Prepared:	4/19/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Mohamad Nohayli	**Mohamad Nohayli**
Company:	Signature Date:
InnoDez, Inc.	**2023.04.17**
Address: **726 Foxbrough**	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: **Pleasanton CA94566**	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

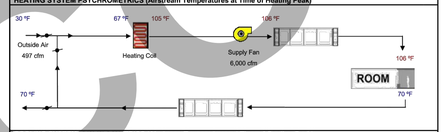
Responsible Designer Name:	Responsible Designer Signature:
Syed P. Alam	**Syed Alam**
Company:	Date Signed:
Innodez Inc.	2023-04-19
Address:	License:
726 Foxbrough	27087
City/State/Zip:	Phone:
Pleasanton CA 94566	

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

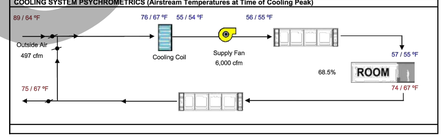
Project Name	Date
100 El Prado	4/17/2023
System Name	Floor Area
Heat Pump	3,315

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
			CFM	Sensible	Latent	CFM	Sensible
Number of Systems	2	Total Room Loads	5,932	110,107	104,975	489	18,875
Heating System		Return Vented Lighting		0			
Output per System	90,000	Return Air Ducts		5,505			944
Total Output (Btuh)	180,000	Return Fan		0			0
Output (Btuh/sqft)	54.3	Ventilation	497	7,867	-12,121	497	21,371
Cooling System		Supply Fan		6,069			6,069
Output per System	90,000	Supply Air Ducts		5,505			944
Total Output (Btuh)	180,000						
Total Output (Tons)	15.0	TOTAL SYSTEM LOAD		134,844	92,854		36,085
Total Output (Btuh/sqft)	54.3						
Total Output (sqft/Ton)	221.0						
Air System		**HVAC EQUIPMENT SELECTION**					
CFM per System	2,000						
Airflow (cfm)	6,000	Standard Heat Pump		142,880	40,967		124,911
Airflow (cfm/sqft)	1.81						
Airflow (cfm/Ton)	400.0						
Outside Air (%)	8.3%	Total Adjusted System Output (Adjusted for Peak Design conditions)		142,880	40,967		124,911
Outside Air (cfm/sqft)	0.15						
Note: values shown are at ARI conditions		TIME OF SYSTEM PEAK		Jul 2 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



CLIENT:

ADDRESS:

CONFIDENTIALITY STATEMENT:

ALL DRAWINGS AND WRITTEN MATERIALS APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE DESIGNER AND THE SAME MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT CONSENT OF THE DESIGNER.

NOTES:

1. ALL DIMENSIONS HEREIN ARE IN IMPERIAL UNITS UNLESS STATED OTHERWISE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DESIGNER, ENGINEER OR SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR MUST CHECK ALL DIMENSION AT SITE BEFORE COMMENCING WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT

TITLE:

T24.4

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.: **T 2 4 . 4**

REV.