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 90º 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-PIONTS 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 DIAGRAMATIC 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 "GUIDLINES 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 2018 INTERNATIONAL 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 AST REQUIRED. COORDINATE LOCATIONS OF GAS & CONDENSATE LINES WITH PLUMBING CONTRACTOR. COORDINTAE LOCATIONS OF POWER, DISCONNECTS, AND CONTROL CONDUIT WITH THE ELECTICAL 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 2018 INTERNATIONAL MECHANICAL CODE.
10. ALL EXHAUST FANS SHALL BE EQUIPED 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 INTERNATIONAL MECHANICAL CODE. DUCTS NOT REQUIRING DAMPERS SHALL COMPLY WITH SECTION 714 & 717 OF THE 2018 INTERNATIONAL 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 2018 INTERNATIONAL 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 ELECTICAL CONTRACTOR UNLESS NOTEDED 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 THIER 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.

1) DUCTS FOR KITCHEN COOKTOPS OR RANGES SHALL BE SHOWN OF METAL WITH A SMOOTH INTERIOR.

a) DUCTS FOR DOMESTIC CLOTHES DRYERS SHALL BE INSTALLED IN ACCORDANCE WITH IMC 504.0.

b) DUCTS FOR DOMESTIC CLOTHES DRYERS SHALL BE RIGID METALLIC DUCTS WITH A MINIMUM MILL THICKNESS OF 16 (0.016-INCH), SHALL HAVE A MINIMUM 4-INCH DIAMETER AND A SMOOTH INTERIOR. THE COMBINED HORIZONTAL AND VERTICAL LENGTH OF THE DUCTS OF THE DUCTS SHALL BE 14-FEET, WHICH SHALL BE REDUCED BY 2-FEET FOR EVERY 90-DEGREE ELBOW IN EXCESS OF TWO ELBOWS.

c) LISTED CLOTHES DRYER TRANSITION DUCTS NOT MORE THAN 6-FEET IN LENGTH SHALL BE PERMITTED TO CONNECT THE DRYER TO THE EXHAUST DUCTS AS LONG AS THEY ARE NOT CONCEALED WITHIN CONSTRUCTION, AND THEY ARE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

LEGEND

AxB		DUCT WORK (WIDTHxDEPTH)
AxB		LINED DUCT WORK (WIDTHxDEPTH DIMENSIONS ARE FOR I.D.)
		SUPPLY DUCT, SECTION
		RETURN DUCT, SECTION
		EXHAUST DUCT, SECTION
R. 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 REPRESNENTATIVE 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 0.00	MECH GENERAL NOTES AND SPECIFICATIONS.	NTS
M 0.01	MECHANICAL CODE CHECKING.	NTS
M 1.01	BASEMENT PLAN - MECHANICAL LAYOUT.	1/4"=1'-0"
M 1.02	FIRST FLOOR - MECHANICAL LAYOUT.	1/4"=1'-0"
M 1.03	SECOND FLOOR - MECHANICAL LAYOUT.	1/4"=1'-0"
M 1.04	THIRD FLOOR - MECHANICAL LAYOUT.	1/4"=1'-0"
M 1.05	FOURTH FLOOR - MECHANICAL LAYOUT.	1/4"=1'-0"
M 1.06	ROOF PLAN - MECHANICAL LAYOUT.	1/4"=1'-0"
M 2.01	MECHANICAL EQUIPMENT SCHEDULE.	NTS
M 3.01	HEAT LOAD CALCULATIONS.	NTS
M 4.01	MECHANICAL EQUIPMENT DATA SHEETS.	NTS
M 5.01	MECHANICAL GENERAL DETAILS.	NTS

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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:

B SQUARE TOWER PROJECT

TITLE:

MECHANICAL GENERAL NOTES & SPECIFICATIONS.

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

DRAWING NO.: **M0.00**

REV.:

INTERNATIONAL MECHANICAL CODE CHECKING:

DUCT SIZING, THICKNESS & INSULATION

PLEASE REFER TO TABLE 506.2(1) FOR MINIMUM S HEET METAL THICKNESS FOR ROUND DUCTS

Insulation of Ducts.

General. Air ducts conveying air at temperatures exceeding 140°F (60°C) shall be insulated to maintain an insulation surface temperature of not more than 140°F (60°C). Factory-made air ducts and insulations intended for installation on the exterior of ducts shall be legibly printed with the name of the manufacturer, the thermal resistance (R) value at installed thickness, flame-spread index, and smoke developed index of the composite material. Internal duct liners and insulation shall be installed in accordance with SMACNA HVAC Duct Construction standards – Metal and Flexible. **[OSHPD 1, 1R, 2, 3, 4 & 5]** *Cold air ducts shall be insulated wherever necessary or to prevent condensation.*

Exceptions:

(1) Factory-installed plenums, casings, or ductwork furnished as part of HVAC equipment tested and rated in accordance with approved energy efficiency standards.

(2) Ducts or plenums located in conditioned spaces where heat gain or heat loss will not increase energy use.

(3) For runouts less than 10 feet (3048 mm) in length to air terminals or air outlets, the rated R-value of insulation need not exceed R-3.5.

(4) Backs of air outlets and outlet plenums exposed to unconditioned or indirectly conditioned spaces with face areas exceeding 5 square feet (0.5m^2) need not exceed R-2; those 5 square feet (0.5m^2) or smaller need to be insulated.

(5) Ducts and plenums used exclusively for evaporative cooling systems.

Insulation and Ducts. Portions of the air distribution system installed in or on buildings for heating and cooling shall be R-8. Where the mean outdoor dew-point temperature in a month exceeds 60°F (16°C), vapor retarders shall be installed on conditioned-air supply ducts. Vapor retarders shall have a water vapor permeance not exceeding 0.5 perm [2.87 E-11 kg/(Pa.s.m^2)] where tested in accordance with Procedure A in ASTM E96.

Insulation shall not be required where the ducts are within the conditioned space. [ASHRAE 90.2:6.4]

Duct Sizing. Duct systems shall be sized in accordance with ACCA Manual D or other methods approved by the Authority Having Jurisdiction with the velocity in the main duct not exceed 1000 feet per minute (ft/min) (5.08m/s) and the velocity in the secondary branch duct not to exceed 600 ft/min (3.048 m/s).

CONDENSATE DRAIN:

Condensate Wastes and Control.
Condensate Disposal. 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 drain system, equipment shall drain by means of an indirect waste pipe. The Waste pipe shall have a slope of not less than ⅛ 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.

Condensate Waste Pipe Material and Sizing.
Condensate waste pipes from air-cooling coils shall be sized in accordance with the equipment capacity as specified in Table 310.3. The material of the piping shall comply with the pressure and temperature rating of the appliance or equipment, and shall be approved for use with the liquid being discharged.

MINIMUM CONDENSATE WASTE PIPE SIZE

EQUIPMENT CAPACITY IN TONS OF REFRIGERATION	MINIMUM CONDENSATE PIPE DIAMETER (inches)
Up to 20	¾
21 – 40	1
41 – 90	1 ¼
91 – 125	1 ½
126 – 250	2

For SI units: 1 ton of refrigeration = 3.52 kW, 1 inch = 25 mm

Cleanouts. 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.

Point of Discharge. 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.

Condensate Waste From Air-Conditioning Coils. Where the condensate waste from air-conditioning coils discharges by direct connection to a lavatory tailpiece or to an approved accessible inlet on a bathtub overflow, the connection shall be located in the area controlled by the same person controlling the air-conditioned space.

AIR INTAKE AND EXHAUST:

Outdoor Air Intake Protection. Required outdoor-air intakes shall be covered with a screen having not less than ¼ of an inch (6.4 mm) openings, and shall have not more than ½ of an inch (12.7 mm) openings.

Weather Protections. Outdoor air intakes that are part of the mechanical ventilation system shall be designed to manage rain entrainment, to prevent rain intrusion, and manage water from snow in accordance with ASHRAE 62.1.

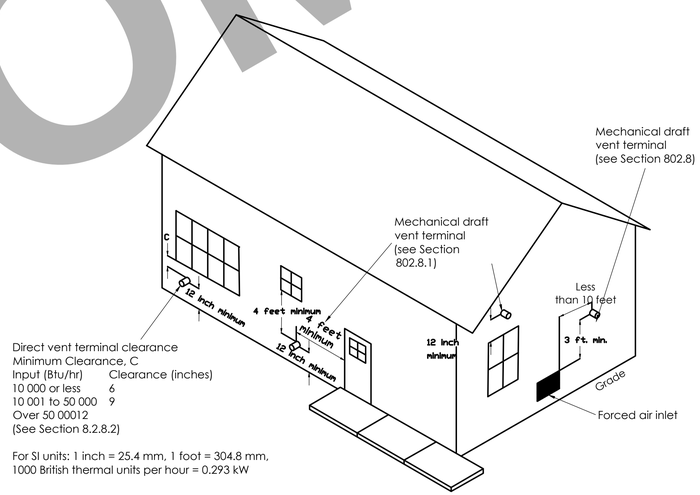
Bathroom Exhaust Fans. [HCD 1 & HCD 2] *Each bathroom shall be mechanically ventilated in accordance with Division 4.5 of the INTERNATIONAL Green Building Standards Code (CALGreen).*

Exhaust Outlets. *Exhaust outlets shall be located a minimum of 10 feet (3048 mm) above adjoining grade and 10 feet (3048 mm) from doors, occupied areas, and operable windows.*

Exception: *Airborne infection isolation rooms shall comply with Section 414.1.*

Minimum Screen Mesh Size. Screens shall be not less than ¼ of an inch (6.4 mm) mesh. [NFPA 54:9.3.7.2]

Prohibited Source. Outside or return air for a heating or cooling air system shall not be taken from the following locations:
(1) Less than 10 feet (3048 mm) in distance from an appliance vent outlet, a vent opening of a plumbing drainage system, or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside-air inlet.
(2) Less than 10 feet (3048 mm) above the surface of an abutting public way, sidewalk, street, alley, or driveway.



EXIT TERMINALS OF MECHANICAL DRAFT AND DIRECT-VENT VENTING SYSTEMS [NFPA 54: FIGURE A.12.9]

GAS CLOTHES DRYER:

Exhaust Opening Protection. Exhaust openings terminating to the outdoors shall be covered with a corrosion-resistant screen having not less than ¼ of an inch (6.4 mm) openings, and shall have not more than ½ of an inch (12.7 mm) openings.
Exception: Clothes dryers.

Clothes Dryers. A clothes dryer exhaust duct shall not be connected to a vent connector, gas vent, chimney, and shall not terminate into a crawl space, attic, or other concealed space. Exhaust ducts shall not be assembled with screws or other fastening means that extend into the duct and that are capable of catching lint, and that reduce the efficiency of the exhaust system.

Provisions for Makeup Air. Make up air shall be provided in accordance with the following:
(1) Makeup air shall be provided for Type 1 clothes dryers in accordance with the manufacturer's instructions. [NFPA 54: 10.4.3.1] Where a closet is designed for the installation of a clothes dryer, an opening of not less than 100 square inches (0.065 m^2) for makeup air shall be provided in the door or by other approved means.
(2) Provision for makeup air shall be provided for Type 2 clothes dryers, with a free area of not less than 1 square inch (0.0006 m^2) for each 1000 British thermal units per hour (Btu/g)(0.293 kW) total input rating of the dryer(s) installed [NFPA 54:10.4.3.2].

Length Limitation
Unless otherwise permitted or required by the dryer manufacturer's instructions and approved by the Authority Having Jurisdiction, domestic dryer moisture exhaust ducts shall not exceed a total combined horizontal and vertical length of 14 feet (4267 mm), including two 90 degree (1.57 rad) elbows. A length of 2 feet (610 mm) shall be deducted for each 90 degree (1.57 rad) elbow in excess of two

Exhaust Ducts for Type 2 Clothes Dryers. Exhaust ducts for Type 2 clothes dryers shall comply with the following:
(1) Exhaust ducts for Type 2 clothes dryers shall comply with Section 504.4. [NFPA 54:10.4.5.1]
(2) Exhaust ducts for Type 2 clothes dryers shall be constructed of sheet metal or other noncombustible material. Such ducts shall be equivalent in strength and corrosion resistance to ducts 0.0195 of an inch (0.4953 mm) thick. [NFPA 54:10.4.5.2]
(3) Type 2 clothes dryers shall be equipped or installed with lint-controling means. [NFPA 54:10.4.5.3]
(4) Exhaust ducts for Type 2 clothes dryers shall be installed with a clearance of not less than 6 inches (152 mm) from adjacent combustible material. Where exhaust ducts for Type 2 clothes dryers are installed with reduced clearances, the adjacent combustible material shall be protected in accordance with Table 303.10.1. [NFPA 54:10.4.5.4]
(5) Where ducts pass through walls, floors, or partitions, the space around the duct shall be sealed with noncombustible material. [NFPA54:10.4.5.4]

FACTORY-MADE AIR DUCTS

FACTORY-MADE AIR DUCTS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181 AND INSTALLED IN ACCORDANCE WITH THE TERMS OF THEIR LISTING, THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, AND SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE.

FACTORY-MADE AIR DUCTS SHALL NOT BE USED FOR VERTICAL RISERS IN AIR-DUCT SYSTEMS SERVING MORE THAN TWO STORIES AND SHALL NOT PENETRATE A FIRE-RESISTANCE-RATED ASSEMBLY OR CONSTRUCTION.

FACTORY-MADE AIR DUCTS SHALL BE INSTALLED WITH NOT LESS THAN 4 INCHES (102 MM) OF SEPARATION FROM EARTH, EXCEPT WHERE INSTALLED AS A LINER INSIDE OF CONCRETE, TILE, OR METAL PIPE AND SHALL BE PROTECTED FROM PHYSICAL DAMAGE.

THE TEMPERATURE OF THE AIR TO BE CONVEYED IN A DUCT SHALL NOT EXCEED 250°F (121° C). FLEXIBLE AIR CONNECTORS SHALL NOT BE PERMITTED.

RECTANGULAR DUCTS

SUPPORTS FOR RECTANGULAR DUCTS SHALL BE INSTALLED ON TWO OPPOSITE SIDES OF EACH DUCT AND SHALL BE RIVETED, BOLTED, OR METAL SCREWED TO EACH SIDE OF THE DUCT AT INTERVALS SPECIFIED.

METAL DUCTS

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.

METAL DUCTS SHALL BE INSTALLED WITH NOT LESS THAN 4 INCHES (102 MM) SEPARATION FROM EARTH. DUCTS SHALL BE INSTALLED IN A BUILDING WITH CLEARANCES THAT WILL RETAIN THE FULL THICKNESS OF FIRE-PROOFING ON STRUCTURAL MEMBERS.

COMBUSTIBLES WITHIN DUCTS OR PLENUMS

MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL BE NONCOMBUSTIBLE 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.

EXCEPTIONS:
1. RETURN-AIR AND OUTSIDE-AIR DUCTS, PLENUMS, OR CONCEALED SPACES THAT SERVE A DWELLING UNIT.
2. AIR FILTERS IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 311.2.
3. WATER EVAPORATION MEDIA IN AN EVAPORATIVE COOLER.
4. CHARCOAL FILTERS WHERE PROTECTED WITH AN APPROVED FIRE SUPPRESSION SYSTEM.
5. PRODUCTS LISTED AND LABELED FOR INSTALLATION WITHIN PLENUMS IN ACCORDANCE WITH SECTION 602.2.1 THROUGH SECTION 602.2.3.
6. SMOKE DETECTORS.
7. DUCT INSULATION, COVERINGS, AND LININGS AND OTHER SUPPLEMENTARY MATERIALS INSTALLED IN ACCORDANCE WITH SECTION 604.0.
8. MATERIALS IN A HAZARDOUS FABRICATION AREA INCLUDING THE AREAS ABOVE AND BELOW THE FABRICATION AREA SHARING A COMMON AIR RECIRCULATION PATH WITH THE FABRICATION AREA.

NOTES ON DUCTS MATERIAL & CONSTRUCTION:

FLEXIBLE AIR DUCTS

FLEXIBLE AIR DUCTS SHALL COMPLY WITH UL 181, AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE.

FLEXIBLE AIR DUCT INSTALLATIONS SHALL COMPLY WITH THE FOLLOWING:
1. DUCTS SHALL BE INSTALLED USING THE MINIMUM REQUIRED LENGTH TO MAKE THE CONNECTION.
2. HORIZONTAL DUCT RUNS SHALL BE SUPPORTED AT NOT MORE THAN 4 FEET (1219 MM) INTERVALS.
3. VERTICAL RISERS SHALL BE SUPPORTED AT NOT MORE THAN 6 FEET (1829 MM) INTERVALS.
4. SAG BETWEEN SUPPORT HANGERS SHALL NOT EXCEED 1/2 INCH (12.7 MM) PER FOOT (305 MM) OF SUPPORT SPACING.
5. SUPPORTS SHALL BE RIGID AND SHALL BE NOT LESS THAN 1 1/2 INCHES (38 MM) WIDE AT POINT OF CONTACT WITH THE DUCT SURFACE.
6. DUCT BENDS SHALL BE NOT LESS THAN ONE DUCT DIAMETER BEND RADIUS.
7. SCREWS SHALL NOT PENETRATE THE INNER LINER OF NON-METALLIC FLEXIBLE DUCTS UNLESS PERMITTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
8. FITTINGS FOR ATTACHING NON-METALLIC DUCTS SHALL BE BEADED AND HAVE A COLLAR LENGTH OF NOT LESS THAN 2 INCHES (51 MM) FOR ATTACHING THE DUCT.

EXCEPTION: A BEAD SHALL NOT BE REQUIRED WHERE METAL WORM-GEAR CLAMPS ARE USED OR WHERE ATTACHING METALLIC DUCTS USING SCREWS IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
9. DUCT INNER LINER SHALL BE INSTALLED AT NOT LESS THAN 1 INCH (25.4 MM) ON THE COLLAR AND PAST THE BEAD PRIOR TO THE APPLICATION OF THE TAPE AND MECHANICAL FASTENER. WHERE MASTIC IS USED INSTEAD OF TAPE, THE MASTIC SHALL BE APPLIED IN ACCORDANCE THE MASTIC MANUFACTURER'S INSTRUCTIONS.
10. DUCT OUTER VAPOR BARRIERS SHALL BE SECURED USING TWO WRAPS OF APPROVED TAPE. A MECHANICAL FASTENER SHALL BE PERMITTED TO BE USED IN PLACE OF, OR IN COMBINATION WITH, THE TAPE.
11. FLEXIBLE AIR DUCTS SHALL NOT PENETRATE A FIRE-RESISTANCE-RATED ASSEMBLY OR CONSTRUCTION.
12. THE TEMPERATURE OF THE AIR TO BE CONVEYED IN A FLEXIBLE AIR DUCT SHALL NOT EXCEED 250°F (121 °C).
13. FLEXIBLE AIR DUCTS SHALL BE SEALED IN ACCORDANCE WITH SECTION 603.10.

CLIENT:

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4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

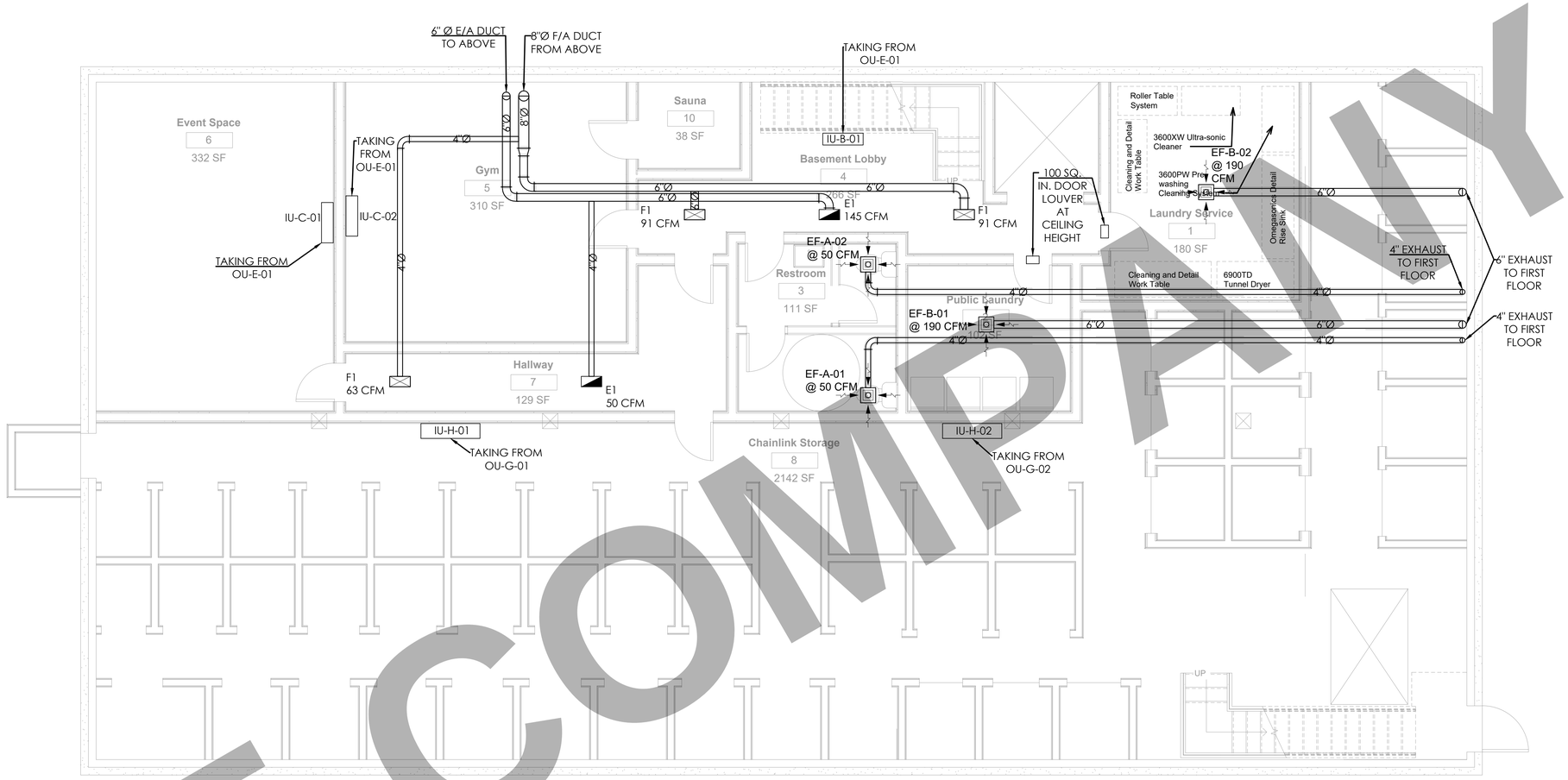
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
MECHANICAL CODE CHECKING.

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

DRAWING NO.: **M0.01**

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.
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8. DUCT DIMENSIONS SHOWN ARE CLEAR INSIDE DIMENSIONS.
9. CONTRACTOR TO CONFIRM ADEQUATE RETURN AIR PATH BACK TO MAIN AIR HANDLING UNIT.

CLIENT:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

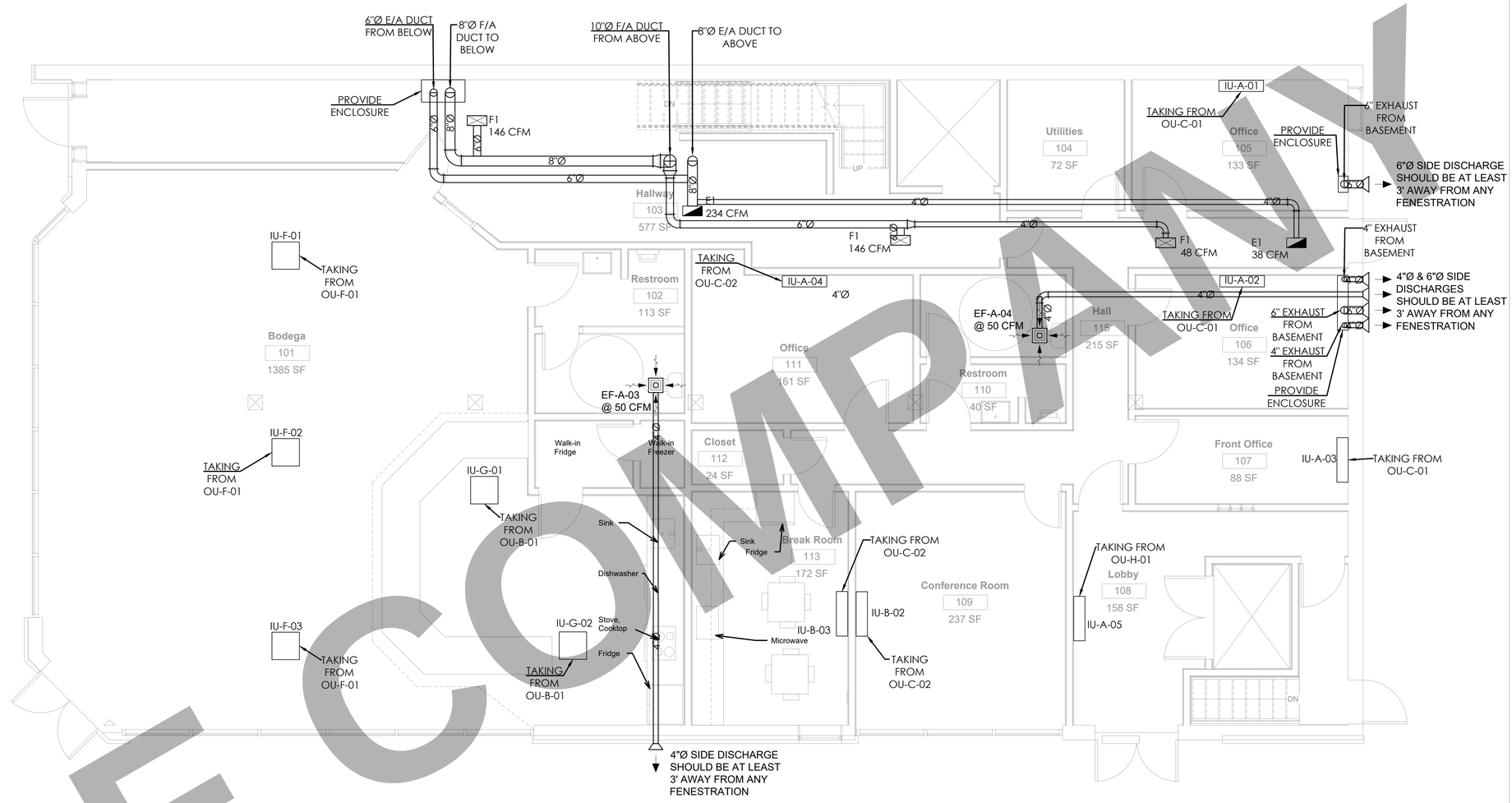
B SQUARE TOWER PROJECT

TITLE:

BASEMENT PLAN - MECHANICAL LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.	REV.
M1.01	



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REV. NO.	DESCRIPTION	DATE	BY

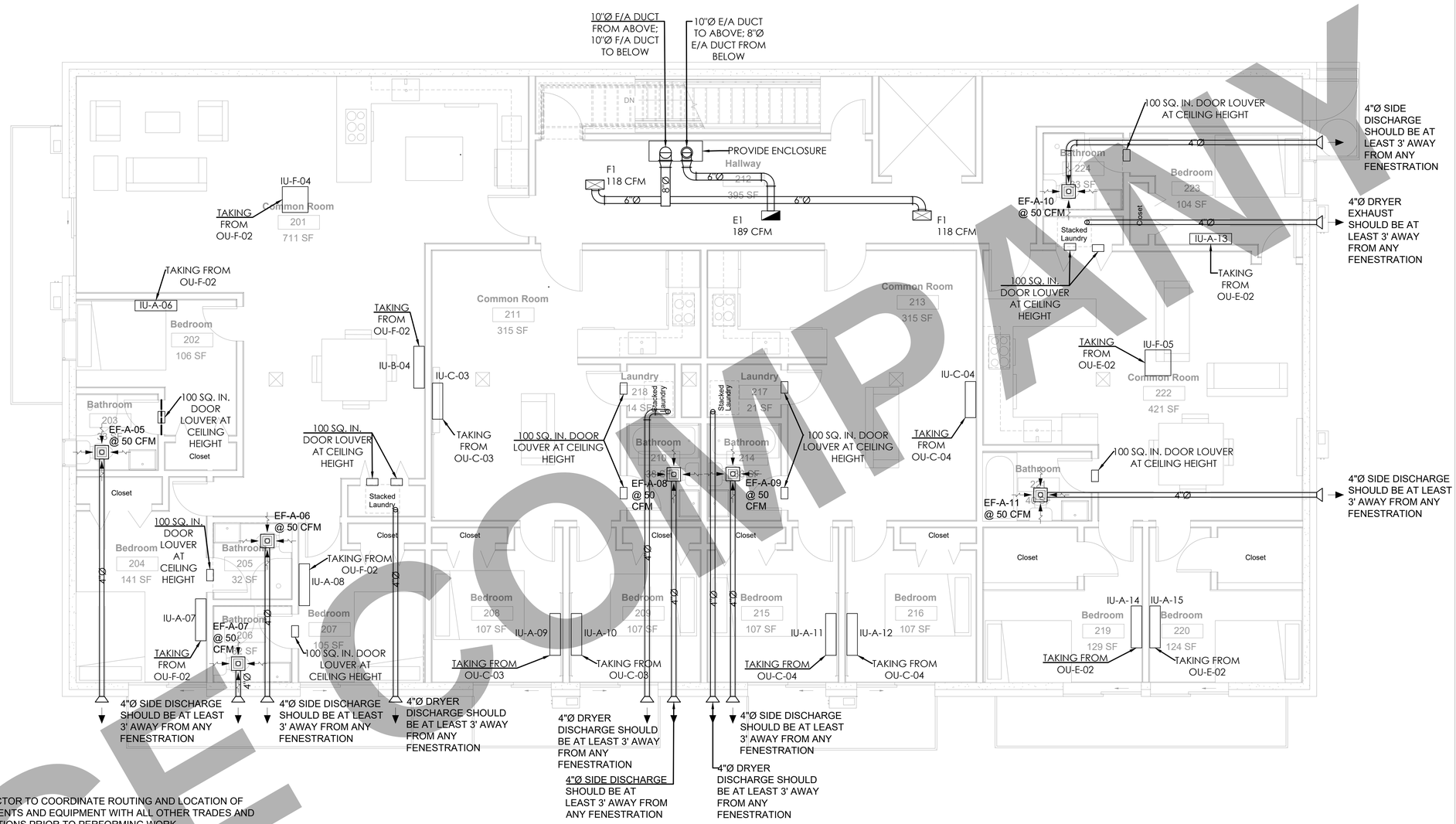
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
FIRST FLOOR - MECHANICAL LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.
M 1 . 0 2

REV.



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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

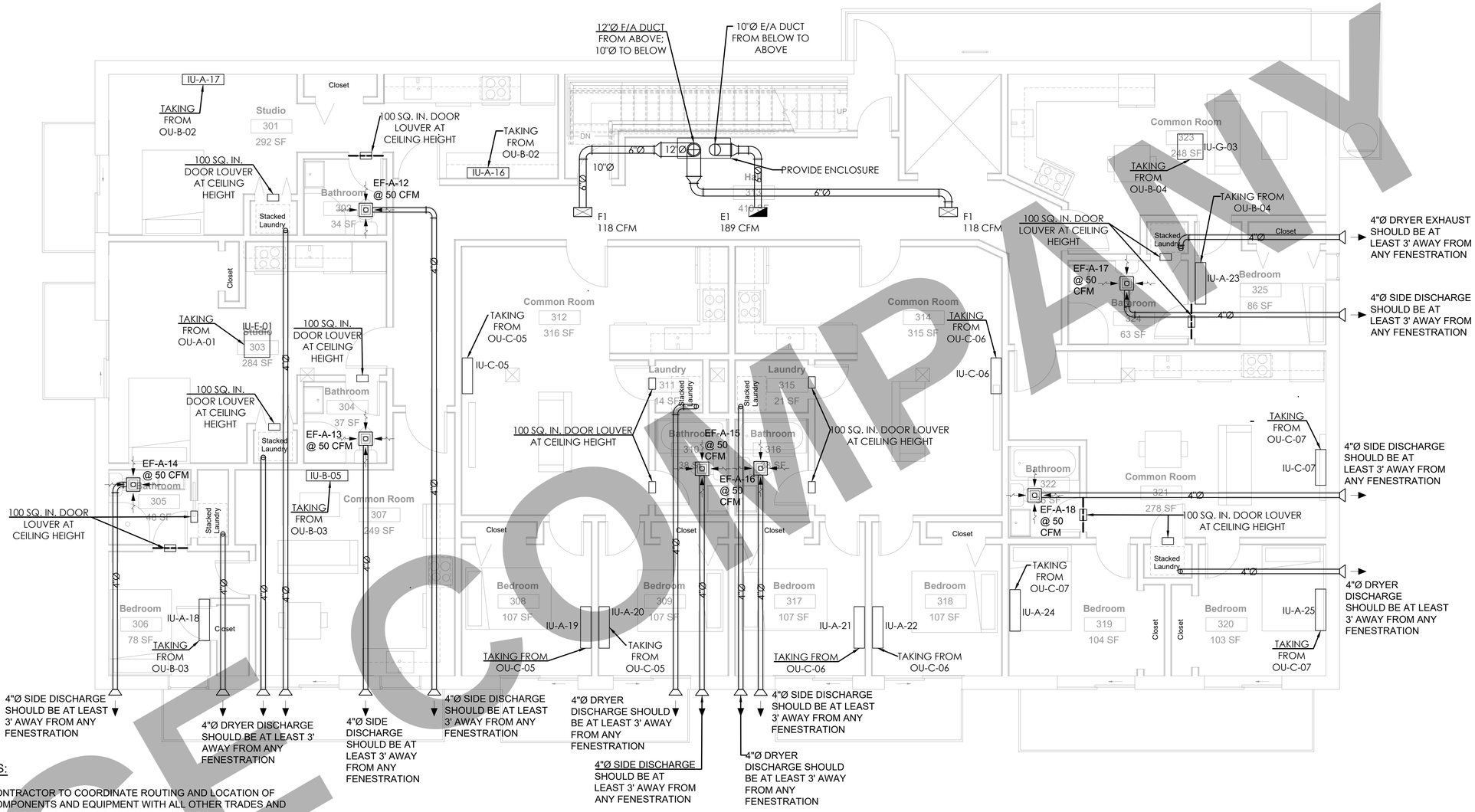
TITLE:

SECOND FLOOR - MECHANICAL LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.: **M 1 . 0 3**

REV.:



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REV. NO.	DESCRIPTION	DATE	BY

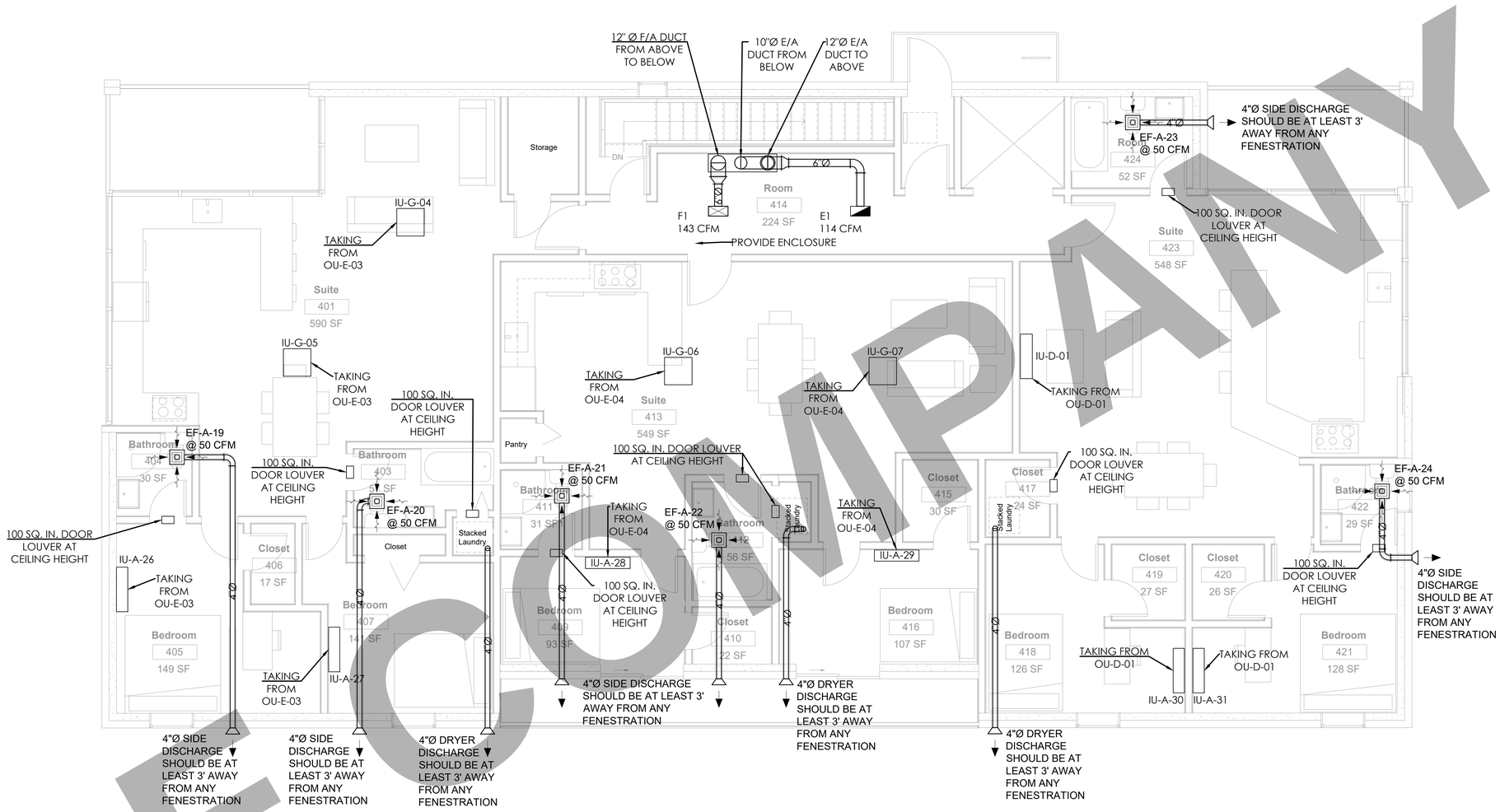
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
THIRD FLOOR - MECHANICAL LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.
M1.04

REV.



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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

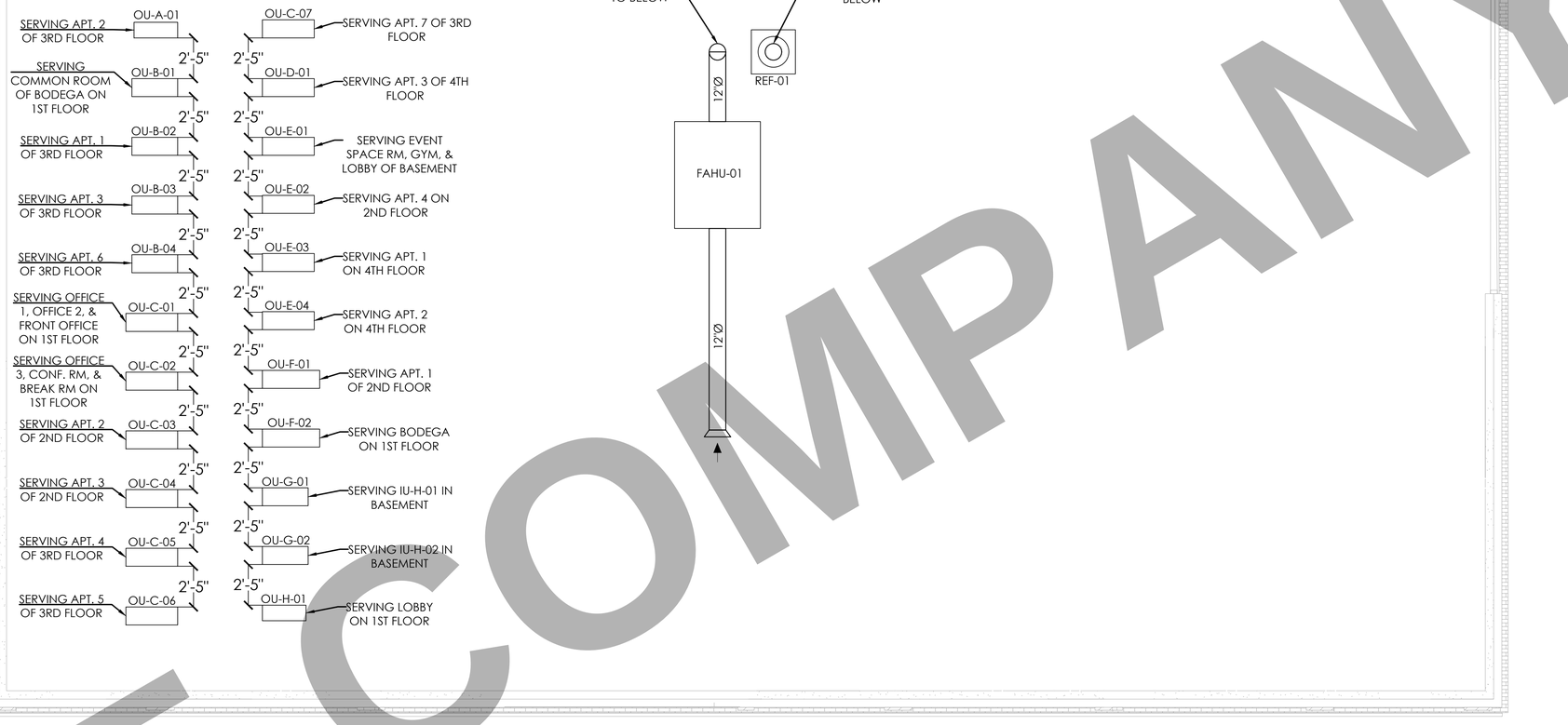
FOURTH FLOOR - MECHANICAL LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.

M1.05

REV.



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CLIENT:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

ROOF PLAN - MECHANICAL LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.

M1.06

REV.

SCHEDULE No. 1

OUTDOOR UNITS

TAG	OU-A-01	OU-B-01 TO OU-B-04	OU-C-01 TO OU-C-07	OU-D-01	OU-E-01 TO OU-E-04	OU-F-01,02	OU-G-01,02	OU-H-01
SERVING	APRTMNT 2 - 3RD FLOOR	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS	IU-H-01,02	BUILDING ENTRANCE
MANUFACTURER	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL	SUZ-KA12NA2	MXZ-2C20NA2	MXZ-3C24NA2	MXZ-3C30NA2	MXZ-4C36NA2	MXZ-8C48NA2	MUZ-D36NA	MUZ-FS06NAH
POWER SUPPLY (V / PH / HZ)	208-230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60
MOCP (A) / MCA (A) / MAX FUSE OR BREAKER SIZE (A)	16 / 9 / 15	- / 17.2 / 20	- / 22.1 / 25	- / 22.1 / 25	- / 22.1 / 25	- / 35 / 40	25 / 21 / 25	15 / 10 / 15
RATED COOLING CAPACITY (BTU/HR)	12,000	18,000	22,000	28,400	35,400	48,000	33,200	6,000
RATED HEATING CAPACITY AT 47°F / 17°F / 5°F (BTU/HR)	13,000 / 8,900 / 6,100	22,000 / 12,500 / 11,100	25,000 / 19,600 / 18,200	28,600 / 21,000 / 18,200	36,000 / 26,600 / 24,000	54,000 / 36,600 / 32,400	35,200 / 21,800 / -	8,700 / 5,900 / 10,500
AIR FLOW (CFM) COOLING / HEATING	1,228 / 1,172	1,342 / 1,458	2,287 / 2,382	2,287 / 2,382	2,287 / 2,382	3,885 / 3,885	1,941 / 1,941	1,141 / 1,183
WIDTH (IN) X DEPTH (IN) X HEIGHT (IN)	31-1/2" X 11-1/4" X 21-5/8"	33-1/16" X 13" X 27-15/16"	37-13/32" X 13" X 31-11/32"	37-13/32" X 13" X 31-11/32"	37-13/32" X 13" X 31-11/32"	41-11/32" X 13" X 52-11/16"	33-1/16" X 13" X 33-7/16"	31-1/2" X 11-1/4" X 21-5/8"
WEIGHT (LBS)	81	126	137	137	139	271	126	83

NOTES
1. RATED HEATING AND COOLING CAPACITIES ARE BASED ON AHRI RATED CONDITIONS.

SCHEDULE No. 2

INDOOR UNITS

TAG	IU-A-01 TO IU-A-31	IU-B-01 TO IU-B-05	IU-C-01 TO IU-C-07	IU-D-01	IU-E-01	IU-F-01 TO IU-F-05	IU-G-01 TO IU-G-07	IU-G-H-01,02
SERVING	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS	CHECK PLANS
MANUFACTURER	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL	MSZ-FS06NA	MSZ-GL09NA	MSZ-GL12NA	MSZ-GL18NA	SLZ-KF12NA	SLZ-KF15NA	SLZ-KF09NA	MSZ-D36NA
RATED COOLING CAPACITY (BTU/HR)	6,000	9,000	12,000	18,000	12,000	14,100	9,000	33,200
RATED HEATING CAPACITY (BTU/HR) AT 47°F / 17°F / 5°F	8,700 / 5,900 / 10,500	10,900 / 6,700 / 8,170	14,400 / 9,200 / 9,790	21,600 / 13,800 / 14,900	13,000 / 8,900 / 6,100	18,000 / 11,900 / 8,900	11,000 / 6,900 / 5,600	35,200 / 21,800 / -
VOLTAGE (V / PH/ HZ)	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60	208/230 / 1 / 60
MEDIUM AIR FLOW RATE (CFM) - COOLING / HEATING	205 / 225	219 / 237	219 / 237	395 / 469	258 / 265	299 / 315	252 / 265	607 / 639
ETERNAL STATIC PRESSURE (IN. W.G)	-	-	-	-	-	-	-	-
WIDTH (IN) X DEPTH (IN) X HEIGHT (IN)	36-7/16" X 9-3/16" X 12"	31-7/16" X 9-1/8" X 11-5/8"	31-7/16" X 9-1/8" X 11-5/8"	36-5/16" X 9-13/16" X 12"	22-7/16" X 22-7/16" X 9-21/32"	22-7/16" X 22-7/16" X 9-21/32"	22-7/16" X 22-7/16" X 9-21/32"	46-1/16" X 11-5/8" X 14-3/8"
WEIGHT (LBS)	29	22	22	28	31	31	31	40

NOTES
1. RATED HEATING AND COOLING CAPACITIES ARE BASED ON AHRI RATED CONDITIONS.

SCHEDULE No. 3

AIR OUTLETS

TAG	DESCRIPTION	MANUFACTURER	MODEL	MOUNTING
F1/E1	FRESH AIR / EXT. AIR DIFFUSER	TITUS	14in. x 6in.	Duct Mounted

NOTES:

1. COORDINATE FINISH, COLOR, BORDER AND EXACT LOCATION WITH OWNER PRIOR TO ORDERING.
2. PROVIDE OPPOSED BLADE DAMPER ACCESSIBLE THROUGH DIFFUSER FACE FOR GYP BD. CEILING INSTALLATIONS.
3. PROVIDE DUCT TRANSITIONS AS REQUIRED.
4. RETURNS R1 ARE PROVIDED WITH PROPER FILTERS.

SCHEDULE No. 4

FAN SCHEDULE

TAG	EF-A-01 TO EF-A-24	EF-B-01,02
LOCATION	CHECK PLANS	LAUNDRY ROOMS
AIR FLOW (CFM)	50	190
STATIC PRESSURE (IN. W.G)	0.1"	0.1"
ELECTRICAL (V / PH / HZ)	120 / 1 / 60	120 / 1 / 60
POWER (W) / CURRENT (A)	3.1 / 0.04	42 / 0.35
IMPELLER SPEED (RPM)	722	696
FAN TYPE	CEILING FAN	CEILING FAN
MANUFACTURER	PANASONIC	PANASONIC
MODEL	FV-0511VK2	FV-20VQ3

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

SCHEDULE No. 5

FRESH AIR HANDLING UNIT

TAG	FAHU-01
LOCATION	ROOF
SUPPLY FLOW RATE (CFM)	400 T0 2,000
NOMINAL TONNAGE	5
IEER	17.9
ELECTRIC COIL CAPACITY (KW)	10 TO 60
COMPRESSOR POWER (KW)	6
APPROXIMATE WEIGHT (LBS)	1,000
WIDTH X DEPTH X HEIGHT (IN.)	62" X 77.25" X 47.5"
MANUFACTURER	FLOAIRE
MODEL	DOAS

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

SCHEDULE No. 6

ROOF-MOUNTED EXHAUST FAN

TAG	REF-01
LOCATION	ROOF
SELECTED FLOW RATE (CFM)	2,000
SELECTED STATIC PRESSURE (IN. W.G.)	1"
FAN SPEED (RPM)	1,400
FAN MOTOR POWER (HP) / FLA (A)	1 / 6.9
VOLTAGE (V / PH / HZ)	208 / 1 / 60
MANUFACTURER	FLOAIRE
MODEL	DU85H
FAN TYPE	CENTRIF. - UP BLAST

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

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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:

B SQUARE TOWER PROJECT

TITLE:

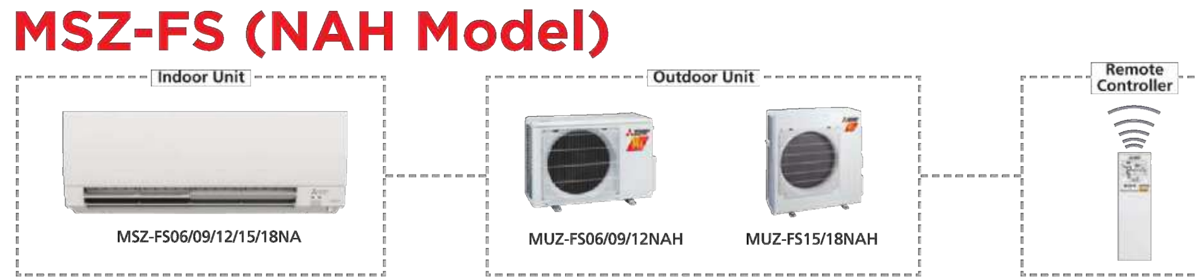
MECHANICAL EQUIPMENT SCHEDULES.

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

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

REV.:

MSZ-FS (NAH Model)

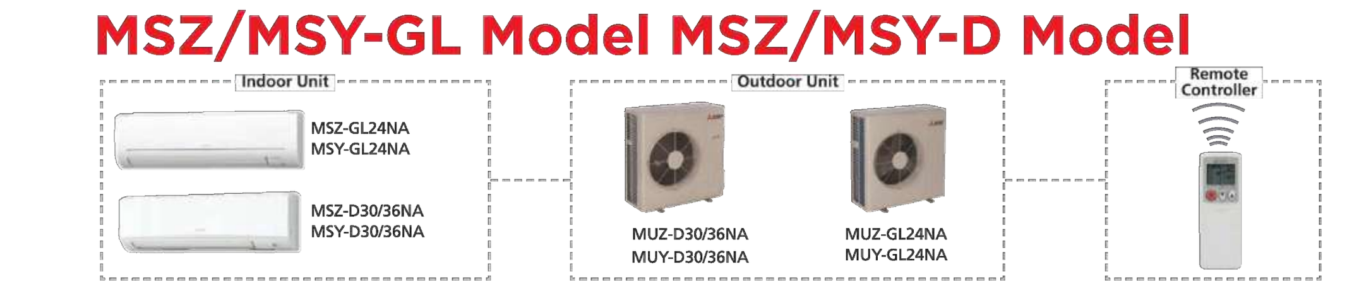


* To confirm compatibility with the MXZ Model multi-zone system, refer to MXZ Model page.

Indoor Unit				MSZ-FS06NA	MSZ-FS09NA	MSZ-FS12NA	MSZ-FS15NA	MSZ-FS18NA
Outdoor Unit				MUZ-FS06NAH	MUZ-FS09NAH	MUZ-FS12NAH	MUZ-FS15NAH	MUZ-FS18NAH
Cooling	Capacity	Rated ¹	BTU/H	6,000	9,000	12,000	14,000	17,200
	Capacity Range	Min-Max	BTU/H	1,700–9,000	1,700–12,000	2,500–13,600	6,450–19,000	6,450–21,000
	Power Input	Rated ¹	W	315	560	870	1,000	1,375
	Moisture Removal	Pints/h		0.2	0.6	1.9	4.0	4.8
	Sensible Heat Factor			0.960	0.920	0.830	0.700	0.690
Heating	Capacity at 47°F	Rated ²	BTU/H	8,700	9,600	12,300	16,000	19,000
	Capacity Range	Min-Max	BTU/H	1,600–14,000	1,600–18,000	3,700–21,000	5,150–24,000	5,150–30,000
	Power Input at 47°F	Rated ²	W	545	620	850	1,155	1,610
	Capacity at 17°F	Rated ³	BTU/H	5,900	5,900	8,400	10,000	12,800
		Max	BTU/H	12,840	14,170	17,410	22,730	27,000
	Capacity at 5°F	Max ⁴	BTU/H	10,500	11,590	14,690	19,360	23,000
	Capacity at -5°F	Max ⁵	BTU/H	8,700	9,600	12,300	16,000	19,000
Efficiency	SEER			33.1	30.5	26.1	22.2	21.0
	EER			19.05	16.05	13.8	14.0	12.5
	HSPF			12.5	12.5	12.0	12.0	12.0
	COP			4.68	4.54	4.24	4.06	3.46
	ENERGY STAR® Certified			Yes	Yes	Yes	Yes	Yes
Indoor Unit	Air Flow Rate - Cooling (Quiet-Lo-Med-Hi-SHi)	Dry	CFM	137–167–221–304–381	137–167–221–304–381	137–167–221–304–424	225–262–304–355–437	225–262–304–355–437
	Air Flow Rate - Cooling (Quiet-Lo-Med-Hi-SHi)	Wet	CFM	117–143–190–261–328	117–143–190–261–328	117–143–190–261–364	194–225–261–305–376	194–225–261–305–376
	Air Flow Rate - Heating (Quiet-Lo-Med-Hi-SHi)	Dry	CFM	140–167–225–325–437	140–167–225–325–437	155–226–282–367–454	201–272–350–410–514	201–272–350–410–514
	Sound Pressure Level (Quiet-Lo-Med-Hi-SHi)	Cooling	dB(A)	20–23–29–36–40	20–23–29–36–40	21–24–29–36–44	27–31–35–39–44	27–31–35–39–44
	Sound Pressure Level (Quiet-Lo-Med-Hi-SHi)	Heating	dB(A)	20–24–29–39–42	20–24–29–39–42	21–28–32–38–43	25–31–37–40–46	25–31–37–40–46
	External Static Pressure		In. W.G.	—	—	—	—	—
	Condensate Lift Mechanism	Max Distance	In. [mm]	—	—	—	—	—
	Dimensions	H	In. [mm]	12 (+11/16) [305 (+17)]	12 (+11/16) [305 (+17)]	12 (+11/16) [305 (+17)]	12 (+11/16) [305 (+17)]	12 (+11/16) [305 (+17)]
		W	In. [mm]	36-7/16 [925]	36-7/16 [925]	36-7/16 [925]	36-7/16 [925]	36-7/16 [925]
		D	In. [mm]	9-3/16 [234]	9-3/16 [234]	9-3/16 [234]	9-3/16 [234]	9-3/16 [234]
	Weight	lbs [kg]		29 [13.5]	29 [13.5]	29 [13.5]	29 [13.5]	29 [13.5]
Outdoor Unit	MCA	A		10.0	10.0	10.0	18.0	18.0
	MOCP	A		15	15	15	20	20
	Dimensions	H	In. [mm]	21-5/8 [550]	21-5/8 [550]	21-5/8 [550]	34-5/8 [880]	34-5/8 [880]
		W	In. [mm]	31-1/2 [800]	31-1/2 [800]	31-1/2 [800]	33-1/16 [840]	33-1/16 [840]
		D	In. [mm]	11-1/4 [285]	11-1/4 [285]	11-1/4 [285]	13 [330]	13 [330]
	Weight	lbs [kg]		83 [37.5]	83 [37.5]	84 [38]	118 [53.5]	118 [53.5]
	Air Flow Rate (Cooling/Heating)	CFM		1141/1183	1141/1183	1215/1201	1801/1949	1801/1949
	Sound Pressure Level	Cooling	dB(A)	47	48	49	51	52
		Heating	dB(A)	49	49	51	55	55
Piping	Diameter	Gas (O.D.)	In. [mm]	3/8 [9.52]	3/8 [9.52]	3/8 [9.52]	1/2 [12.7]	1/2 [12.7]
		Liquid (O.D)	In. [mm]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]
		Indoor Drain	In. [mm]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]
	Max. Length	ft [m]		65 [20]	65 [20]	65 [20]	100 [30]	100 [30]
	Max. Height	ft [m]		40 [12]	40 [12]	40 [12]	50 [15]	50 [15]
Electrical	Outdoor-Indoor ⁶	V, ph, Hz		208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60
	Recommended Breaker Size	A		15	15	15	20	20
Refrigerant Type				R410A	R410A	R410A	R410A	R410A
Guaranteed Temperature Operation Range	Cooling ⁷	°F DB [°C DB]		14 to 115	14 to 115	14 to 115	14 to 115	14 to 115
	Heating	°F DB [°C DB]		-13 to 75	-13 to 75	-13 to 75	-13 to 75	-13 to 75

Notes:
AHRI Rated Conditions (Rated data is determined at a fixed compressor speed)
¹Cooling (Indoor // Outdoor) °F 80 DB, 67 WB // 95 DB, 75 WB
²Heating at 47°F (Indoor // Outdoor) °F 70 DB, 60 WB // 47 DB, 43 WB
³Heating at 17°F (Indoor // Outdoor) °F 70 DB, 60 WB // 17 DB, 15 WB
⁴Heating at 5°F (Indoor // Outdoor) °F 70 DB, 60 WB // 5 DB, 4 WB
⁵Heating at -5°F (Indoor // Outdoor) °F 70 DB, 60 WB // -5 DB, -6 WB
Conditions
⁶Indoor units receive power from outdoor units through field-supplied interconnected wiring.
⁷Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

MSZ/MSY-GL Model MSZ/MSY-D Model



Indoor Unit				MSZ-GL06NA	MSZ-GL09NA	MSZ-GL12NA	MSZ-GL15NA	MSZ-GL18NA	MSZ-GL24NA	MSZ-D30NA	MSZ-D36NA
Outdoor Unit					MUZ-GL09NA	MUZ-GL12NA	MUZ-GL15NA	MUZ-GL18NA	MUZ-GL24NA	MUZ-D30NA	MUZ-D36NA
Cooling	Capacity	Rated ¹	BTU/H	—	9,000	12,000	14,000	18,000	22,400	30,600	33,200
	Capacity Range	Min-Max	BTU/H	—	3,600–12,200	1,500–13,600	3,100–18,200	5,800–22,000	8,200–31,400	9,800–30,700	9,800–33,200
	Power Input	Rated ¹	W	—	585	920	1,080	1,340	1,800	3,850	4,360
	Moisture Removal	Pints/h		—	1.5	2.5	2.7	2.1	5.1	9.9	11.3
	Sensible Heat Factor			—	0.820	0.740	0.800	0.870	0.750	0.640	0.620
Heating	Capacity at 47°F	Rated ²	BTU/H	—	10,900	14,400	18,000	21,600	27,600	32,600	35,200
	Capacity Range	Min-Max	BTU/H	—	4,500–15,900	2,000–18,100	4,800–20,900	5,400–25,000	7,500–36,900	8,700–34,000	8,700–36,000
	Power Input at 47°F	Rated ²	W	—	720	1,100	1,600	1,680	2,340	3,360	3,840
	Capacity at 17°F	Rated ³	BTU/H	—	6,700	9,200	12,200	13,800	16,000	19,500	21,800
		Max	BTU/H	—	10,200	12,000	16,400	18,200	24,600	20,800	22,800
	Capacity at 5°F	Max ⁴	BTU/H	—	8,170	9,790	13,680	14,900	19,320	—	—
	Capacity at -5°F	Max ⁵	BTU/H	—	—	—	—	—	—	—	—
Efficiency	SEER			—	24.6	23.1	21.6	20.5	20.5	14.5	14.5
	EER			—	15.4	13.0	13.0	13.4	12.5	8.0	7.6
	HSPF			—	12.8	12.5	11.7	11.2	10.0	8.2	8.2
	COP			—	4.44	3.84	3.3	3.77	3.46	2.84	2.69
	ENERGY STAR® Certified			—	Yes	Yes	Yes	Yes	Yes	No	No
Indoor Unit	Air Flow Rate - Cooling (Quiet-Lo-Med-Hi-SHi)	Dry	CFM	145–170–237–321–399	145–170–237–321–399	145–170–237–321–399	205–272–335–420–533	258–332–417–522–646	388–469–544–628–738	389–639–848–887	389–639–848–887
	Air Flow Rate - Cooling (Quiet-Lo-Med-Hi-SHi)	Wet	CFM	109–134–201–286–364	109–134–201–286–364	109–134–201–286–364	170–237–300–385–498	232–299–375–470–581	347–420–487–562–661	350–576–763–798	350–576–763–798
	Air Flow Rate - Heating (Quiet-Lo-Med-Hi-SHi)	Dry	CFM	145–170–237–321–406	145–170–237–321–406	145–170–237–321–406	205–247–304–367–463	297–385–469–565–646	388–469–544–628–738	445–639–848–887	445–639–686–887
	Sound Pressure Level (Quiet-Lo-Med-Hi-SHi)	Cooling	dB(A)	19–22–30–37–43	19–22–30–37–43	19–22–30–37–45	26–32–38–44–49	28–33–38–44–49	34–41–45–49–53	32–42–49–51	32–42–49–51
	Sound Pressure Level (Quiet-Lo-Med-Hi-SHi)	Heating	dB(A)	19–22–30–37–43	19–22–30–37–43	19–22–30–37–43	26–30–35–40–46	28–33–38–43–48	32–41–45–49–52	34–42–49–50	34–42–49–50
	External Static Pressure		In. W.G.	—	—	—	—	—	—	—	—
	Condensate Lift Mechanism	Max Distance	In. [mm]	—	—	—	—	—	—	—	—
	Dimensions	H	In. [mm]	11-5/8 [295]	11-5/8 [295]	11-5/8 [295]	11-5/8 [295]	12 [305]	12-13/16 [325]	14-3/8 [365]	14-3/8 [365]
		W	In. [mm]	31-7/16 [798]	31-7/16 [798]	31-7/16 [798]	31-7/16 [798]	36-5/16 [923]	43-5/16 [1100]	46-1/16 [1170]	46-1/16 [1170]
		D	In. [mm]	9-1/8 [232]	9-1/8 [232]	9-1/8 [232]	9-1/8 [232]	9-13/16 [250]	9-3/8 [238]	11-5/8 [295]	11-5/8 [295]
	Weight	lbs [kg]		22 [10.0]	22 [10.0]	22 [10.0]	22 [10.0]	28 [13.0]	37 [17.0]	40 [18.0]	40 [18.0]
Outdoor Unit	MCA	A		—	9.0	9.0	0.0	14.0	7.0	21.0	21.0
	MOCP	A		—	15	15	15	15	20	25	25
	Dimensions	H	In. [mm]	—	21-5/8 [550]	21-5/9 [550]	21-5/10 [550]	34-5/8 [880]	34-5/8 [880]	33-7/16 [850]	33-7/16 [850]
		W	In. [mm]	—	31-1/2 [800]	31-1/2 [800]	31-1/4 [800]	33-1/16 [840]	33-1/16 [840]	33-1/16 [840]	33-1/16 [840]
		D	In. [mm]	—	11-1/4 [285]	11-1/5 [285]	11-1/6 [285]	13 [330]	13 [330]	13 [330]	13 [330]
	Weight	lbs [kg]		—	81 [37]	81 [37]	81 [37]	121 [55]	119 [54]	126 [57]	126 [57]
	Air Flow Rate (Cooling/Heating)	CFM		—	1229/1172	1229/1172	1243/1129	1691/1691	1769/1701	1941/1941	1941/1941
	Sound Pressure Level	Cooling	dB(A)	—	48	49	49	54	55	55	56
		Heating	dB(A)	—	50	51	51	55	55	57	56
Piping	Diameter	Gas (O.D.)	In. [mm]	—	3/8 [9.52]	3/8 [9.52]	1/2 [12.7]	1/2 [12.7]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]
		Liquid (O.D)	In. [mm]	—	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	3/8 [9.52]	3/8 [9.52]	3/8 [9.52]
		Indoor Drain	In. [mm]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]	5/8 [15.88]
	Max. Length	ft [m]		—	65 [20]	65 [20]	65 [20]	100 [30]	100 [30]	100 [30]	100 [30]
	Max. Height	ft [m]		—	40 [12]	40 [12]	40 [12]	50 [15]	50 [15]	50 [15]	50 [15]
Electrical	Outdoor-Indoor ⁶	V, ph, Hz		—	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60
	Recommended Breaker Size	A		—	15	15	15	15	20	25	25
Refrigerant Type				—	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Guaranteed Temperature Operation Range	Cooling ⁷	°F DB [°C DB]		—	14 to 115 [-10.0 to 46.0]	14 to 115 [-10.0 to 46.0]	14 to 115 [-10.0 to 46.0]	14 to 115 [-10.0 to 46.0]	14 to 115 [-10.0 to 46.0]	14 to 115 [-10.0 to 46.0]	14 to 115 [-10.0 to 46.0]
	Heating	°F DB [°C DB]		—	-4 to 75 [-20.0 to 24.0]	-4 to 75 [-20.0 to 24.0]	-4 to 75 [-20.0 to 24.0]	-4 to 75 [-20.0 to 24.0]	-4 to 75 [-20.0 to 24.0]	14 to 75 [-10.0 to 24.0]	14 to 75 [-10.0 to 24.0]

Notes:
AHRI Rated Conditions (Rated data is determined at a fixed compressor speed)
¹Cooling (Indoor // Outdoor) °F 80 DB, 67 WB // 95 DB, 75 WB
²Heating at 47°F (Indoor // Outdoor) °F 70 DB, 60 WB // 47 DB, 43 WB
³Heating at 17°F (Indoor // Outdoor) °F 70 DB, 60 WB // 17 DB, 15 WB
⁴Heating at 5°F (Indoor // Outdoor) °F 70 DB, 60 WB // 5 DB, 4 WB
⁵Heating at -5°F (Indoor // Outdoor) °F 70 DB, 60 WB // -5 DB, -6 WB
Conditions
⁶Indoor units receive power from outdoor units through field-supplied interconnected wiring.
⁷Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

SLZ-KF Model

SLP-18FAU (standard grille) SLP-18FAEU (3D i-see Sensor® grille)

Indoor Unit				SLZ-KF09NA	SLZ-KF12NA	SLZ-KF15NA	SLZ-KF18NA
Outdoor Unit				SUZ-KA09NA2	SUZ-KA12NA2	SUZ-KA15NA2	SUZ-KA18NA2
Cooling	Capacity	Rated ¹	BTU/H	9,000	12,000	14,100	17,700
	Capacity Range	Min-Max	BTU/H	3,600–9,000	3,900–12,000	5,100–14,100	6,100–17,700
	Power Input	Rated ¹	W	670	900	1,150	1,410
	Moisture Removal	Pints/h		1.0	2.8	3.2	4.7
	Sensible Heat Factor			0.870	0.740	0.750	0.710
Heating	Capacity at 47°F	Rated ²	BTU/H	11,000	13,000	18,000	19,700
	Capacity Range	Min-Max	BTU/H	4,010–12,000	4,800–13,000	5,100–19,100	8,400–20,900
	Power Input at 47°F	Rated ²	W	4,010	4,800	5,100	8,400
	Capacity at 17°F	Rated ³	BTU/H	6,900	8,900	11,900	12,900
		Max	BTU/H	6,900	8,900	11,900	12,900
	Capacity at 5°F	Max ⁴	BTU/H	5,600	6,100	8,900	9,800
	Capacity at -5°F	Max ⁵	BTU/H	—	—	—	—
Efficiency	SEER			22.4	22.0	19.8	20.7
	EER			13.4	13.3	12.2	12.5
	HSPF			12.2	11.4	11.2	11.6
	COP			3.9	2.9	3.0	3.1
	ENERGY STAR® Certified			Yes	Yes	No	Yes
Indoor Unit	Air Flow Rate - Cooling (Quiet-Lo-Med-Hi-SHi)	Dry	CFM	230–265–300	230–265–335	245–315–405	300–420–475
	Air Flow Rate - Cooling (Quiet-Lo-Med-Hi-SHi)	Wet	CFM	207–239–270	207–252–302	221–284–365	270–378–429
	Air Flow Rate - Heating (Quiet-Lo-Med-Hi-SHi)	Dry	CFM	230–265–335	230–265–335	245–315–405	300–420–475
	Sound Pressure Level (Quiet-Lo-Med-Hi-SHi)	Cooling	dB(A)	25–28–31	25–30–34	27–34–39	32–40–43
	Sound Pressure Level (Quiet-Lo-Med-Hi-SHi)	Heating	dB(A)	25–28–31	25–30–34	27–34–39	32–40–43
	External Static Pressure		In. W.G.	—	—	—	—
	Condensate Lift Mechanism	Max Distance	In. [mm]	33 [850]	33 [850]	33 [850]	33 [850]
	Dimensions	H	In. [mm]	9-21/32 [245]	9-21/32 [245]	9-21/32 [245]	9-21/32 [245]
		W	In. [mm]	22-7/16 [570]	22-7/16 [570]	22-7/16 [570]	22-7/16 [570]
		D	In. [mm]	22-7/16 [570]	22-7/16 [570]	22-7/16 [570]	22-7/16 [570]
	Weight	lbs [kg]		31 [13.9]	31 [13.9]	31 [13.9]	31 [13.9]
Outdoor Unit	MCA	A		9.0	9.0	10.0	14.0
	MOCP	A		15	16	18	24
	Dimensions	H	In. [mm]	21-5/8 [550]	21-5/8 [550]	21-5/8 [550]	34-5/8 [880]
		W	In. [mm]	31-1/2 [800]	31-1/2 [800]	31-1/2 [800]	33-1/16 [840]
		D	In. [mm]	11-1/4 [285]	11-1/4 [285]	11-1/4 [285]	13 [330]
	Weight	lbs [kg]		81 [37]	81 [37]	81 [37]	127 [58]
	Air Flow Rate (Cooling/Heating)	CFM		1228/1172	1228/1172	1243/1229	1691/1691
	Sound Pressure Level	Cooling	dB(A)	48	49	49	54
		Heating	dB(A)	50	51	51	55
Piping	Diameter	Gas (O.D.)	In. [mm]	3/8 [9.52]	3/8 [9.52]	1/2 [12.7]	1/2 [12.7]
		Liquid (O.D)	In. [mm]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]
		Indoor Drain	In. [mm]	1-1/4 [32]	1-1/4 [32]	1-1/4 [32]	1-1/4 [32]
	Max. Length	ft [m]		65 [20]	65 [20]	65 [20]	100 [30]
	Max. Height	ft [m]		40 [12]	40 [12]	40 [12]	50 [15]
Electrical	Outdoor-Indoor ⁶	V, ph, Hz		208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60
	Recommended Breaker Size	A		15	15	15	15
Refrigerant Type				R410A	R410A	R410A	R410A
Guaranteed Temperature Operation Range	Cooling ⁷	°F DB [°C DB]		14 to 115 [-10 to 46]	14 to 115 [-10 to 46]	14 to 115 [-10 to 46]	14 to 115 [-10 to 46]
	Heating	°F DB [°C DB]		-4 to -75 [-20 to 24]	-4 to -75 [-20 to 24]	-4 to -75 [-20 to 24]	-4 to -75 [-20 to 24]

Notes:
AHRI Rated Conditions (Rated data is determined at a fixed compressor speed)
¹Cooling (Indoor // Outdoor) °F 80 DB, 67 WB // 95 DB, 75 WB
²Heating at 47°F (Indoor // Outdoor) °F 70 DB, 60 WB // 47 DB, 43 WB
³Heating at 17°F (Indoor // Outdoor) °F 70 DB, 60 WB // 17 DB, 15 WB
⁴Heating at 5°F (Indoor // Outdoor) °F 70 DB, 60 WB // 5 DB, 4 WB
⁵Heating at -5°F (Indoor // Outdoor) °F 70 DB, 60 WB // -5 DB, -6 WB
Conditions
⁶Indoor units receive power from outdoor units through field-supplied interconnected wiring.
⁷Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

MXZ-C Model

INVERTER-driven Multi-zone Heat Pump

Type					Up to 2 indoor units	Up to 3 indoor units		Up to 4 indoor units	Up to 5 indoor units	Up to 8 indoor units	
Outdoor Unit					MXZ-2C20NA2	MXZ-3C24NA2	MXZ-3C30NA2	MXZ-4C36NA2	MXZ-5C42NA2	MXZ-8C48NA2	MXZ-8C60NA2
Branch Box Required					No	No	No	No	No	Yes	Yes
Power Supply	Source				R410A	R410A	R410A	R410A	R410A	R410A	R410A
	Outdoor (Phase, Hz, V)				1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V
Cooling	Capacity	Rated *1		BTU/H	18,000	22,000	28,400	35,400	40,500	48,000	60,000
	SEER				Refer to page 148						
	EER										
Heating	Capacity	Rated *1		BTU/H	22,000	25,000	28,600	36,000	45,000	54,000	66,000
		Max at 17F *2		BTU/H	12,500	19,600	21,000	26,600	30,500	36,600	65,000
		Max at 5F *3		BTU/H	11,100	18,200	18,200	24,000	26,000	32,400	57,000
	HSPF				Refer to page 148						
Outdoor Unit	MCA			A	17.2	22.1	22.1	22.1	32.5	35.0	46.0
	Recommended Fuse/Breaker Size			A	20	25	25	25	40	40	50
	Dimensions	W		In. [mm]	33-1/16 [840]	37-13/32 [950]	37-13/32 [950]	37-13/32 [950]	37-13/32 [950]	41-11/32 [1,050]	41-11/32 [1,050]
		D		In. [mm]	13 [330]	13 [330]	13 [330]	13 [330]	13 [330]	13+1 [330+25]	13+1 [330+25]
		H		In. [mm]	27-15/16 [710]	31-11/32 [796]	31-11/32 [796]	31-11/32 [796]	41-17/64 [1,048]	52-11/16 [1,338]	52-11/16 [1,338]
	Weight			lbs [kg]	126 [57]	137 [62]	137 [62]	139 [63]	189 [86]	271 [123]	302 [137]
	Air volume (Cooling/Heating)			CFM	1,342/1,458	2,287/2,382	2,287/2,382	2,287/2,382	2,118/2,542	3,885	4,879
	Sound Level	Cooling		dB [A]	50	51	52	54	56	51	58
		Heating		dB [A]	54	55	56	56	58	54	59
Piping	Diameter	Gas		In. [mm]	3/8 [9.52]	A: 1/2 [12.7] B,C: 3/8 [9.52]	A: 1/2 [12.7] B,C: 3/8 [9.52]	A: 1/2 [12.7] B,C,D: 3/8 [9.52]	A: 1/2 [12.7] B,C,D,E: 3/8 [9.52]	5/8 [15.88]	3/4 [19.05]
		Liquid		In. [mm]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	1/4 [6.35]	3/8 [9.52]	3/8 [9.52]
	Max. Length			ft [m]	164 [50]	230 [70]	230 [70]	230 [70]	262 [80]	492 [150]	492 [150]
	Height			ft [m]	49 [15]	49 [15]	49 [15]	49 [15]	49 [15]	164 [50]	164 [50]
Guaranteed Operation Range		Cooling		F [C]	14 ~ 115°FDB [-10 ~ 46°CDB]	14 ~ 115°FDB [-10 ~ 46°CDB]	14 ~ 115°FDB [-10 ~ 46°CDB]	14 ~ 115°FDB [-10 ~ 46°CDB]	14 ~ 115°FDB [-10 ~ 46°CDB]	23 ~ 115°FDB [-5 ~ 46°CDB] *5	23 ~ 115°FDB [-5 ~ 46°CDB] *5
		Heating		F [C]	5 ~ 75°FDB [-15 ~ 24°CDB]	5 ~ 75°FDB [-15 ~ 24°CDB]	5 ~ 75°FDB [-15 ~ 24°CDB]	5 ~ 75°FDB [-15 ~ 24°CDB]	5 ~ 75°FDB [-15 ~ 24°CDB]	-4 ~ 70°FDB [-20 ~ 21°CDB]	-4 ~ 70°FDB [-20 ~ 21°CDB]

NOTE:
Test conditions are based on AHRI 210/240.
*1 Rating Conditions (Cooling) - Indoor: 80° FDB, 67° FWB, Outdoor: 95° FDB, (75° FWB)
(Heating) - Indoor: 70° FDB, 60° FWB, Outdoor: 47° FDB, 43° FWB
*2 Rating Conditions (Heating) - Indoor: 70° FDB, 60° FWB, Outdoor: 17° FDB, 15° FWB
*3 Rating Conditions (Heating) - Indoor: 70° FDB, 60° FWB, Outdoor: 5° FDB, 5° FWB
*5 °F DB ~ 115°F DB when optional wind baffles are installed

Branch Box

Type				Branch Box	
Model Name				PAC-MKA32BC	PAC-MKA52BC
Connectible Number of Indoor Units				Maximum 3	Maximum 5
Power Supply				1-phase, 60Hz, 208/230V	1-phase, 60Hz, 208/230V
Input			kW	0.003	0.003
Running Current			A	0.05	0.05
Dimensions		W	In. [mm]	17-23/32 [450]	17-23/32 [450]
		D	In. [mm]	11-1/32 [280]	11-1/32 [280]
		H	In. [mm]	6-11/16 [170]	6-11/16 [170]
Weight			lbs [kg]	15 [6.7]	16 [7.4]
Piping Connection (Flare)	Branch (indoor side)*	Gas	In. [mm]	3/8 [9.52] × 3	3/8 [9.52] × 4, 1/2 [12.7] × 1
		Liquid	In. [mm]	1/4 [6.35] × 3	1/4 [6.35] × 5
	Main (outdoor side)*	Gas	In. [mm]	5/8 [15.88]	5/8 [15.88]
		Liquid	In. [mm]	3/8 [9.52]	3/8 [9.52]

*The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size for indoor and branch box. If the piping connection size of branch box does not match the piping connection size of indoor units, use optional different-diameter (deformed) joints to the branch box side. (Connect deformed joint directly to the branch box side.)

WhisperGreen Select™ VENTILATION FAN

Built-In Self Adjusting Airflow Capability

FV-0511VK2

Specification Submittal Data / Panasonic Ventilation Fan

Description

Customizable ceiling mount ventilating fan, low sone and rated for continuous operation. ENERGY STAR® rated and certified by the Home Ventilating Institute (HVI). Evaluated by the Underwriters Laboratories and conforms to both UL and cUL standards.

Motor/Blower:
- Enclosed brushless ECM smart motor technology rated for continuous operation
- Adjustable ventilation rates at 50 – 80 – 110 CFM
- Power rating of 120 volts and 60 Hz
- UL and cUL listed for tub/shower enclosure when GFCI protected
- Motor equipped with thermal cutoff fuse
- Removable permanently lubricated plug-in motor

Housing:
- Environmentally friendly 26 gauge Zinc-Aluminum-Magnesium (ZAM) housing
- Integrated dual 4" or 6" diameter duct adapter
- Built-in damper reduces back draft and helps with blower door testing
- Built-in metal flange provides blocking for penetrations through drywall as an Air Barrier, and assists with the decrease in leakage in the Building Envelope during blower door testing
- Suitable for installation in ceilings insulated up to R60
- Articulating and expandable installation bracket up to 24"

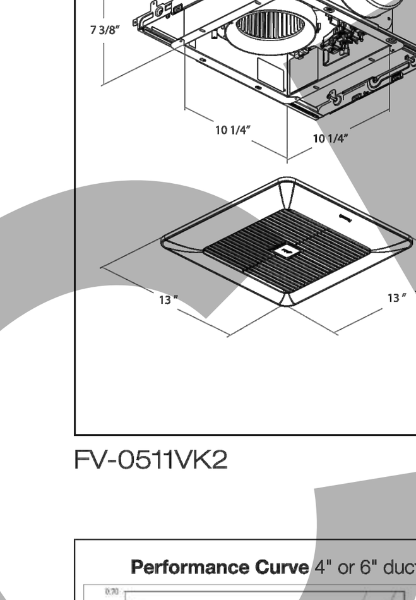
Grille:
- Attractive design using Poly Pro material
- Attaches directly to housing with torsion springs
- Includes a motion sensor cap for use as a cover when motion sensor Plug 'n Play™ module has not been selected

Warranty:
- ECM Motor: 6 Years from original purchase date
- ALL Parts: 3 Years from original purchase date

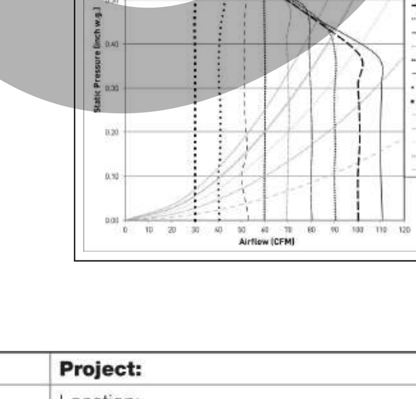
Architectural Specifications:

Customizable ceiling mount ventilation fan, ENERGY STAR® rated with built-in speed selector. Select from 50/80/110 CFM with <0.3 sone as certified by the Home Ventilating Institute (HVI) at 0.1 w.g. with 51/80/110 CFM and no more than 0.4/0.5/0.8 sones at 0.25 w.g. and 51/79/108 CFM at 0.375 w.g. Power Consumption shall be no greater than 9.9/7.9/6.5 watts at 0.1 w.g. and 15.4/13.1/11.2 watts at 0.25 w.g. and 9.6/13.4/20.0 watts at 0.375 w.g. ENERGY STAR® rated with efficiency of no less than 16.2/15.7/11.1 CFM/watt at 0.1 w.g. and 8.3/8.3/7.1 CFM/watt at 0.25 w.g. and 5.3/5.9/5.4 CFM/watt at 0.375 w.g. The motor shall be enclosed with brushless ECM motor engineered to run continuously. ECM motor speed shall automatically increase when the fan senses static pressure to maintain selected CFM. Power rating shall be 120v/60Hz. Duct diameter shall be no less than 4", inclusive of an integrated dual 4" or 6" duct adapter. **Plug 'N Play™ modules** provide up to three additional features. Select from Multi-Speed with Time Delay, Condensation Sensor, and Motion Sensor. Fan shall be RoHS Compliant and UL and cUL listed for tub/shower enclosure when GFCI protected. Also suitable for installation in ceilings insulated up to R60. Fan can be used to comply with ASHRAE 62.2, LEED, ENERGY STAR® IAP, EarthCraft, California Title-24 and WA Ventilation Code.

ECM Motor Technology:
When fan senses static pressure, its speed is automatically increased to ensure that the desired CFM is not compromised, which allows the fan to perform as rated.



FV-0511VK2



Model	Quantity	Comments	Project:
			Location:
			Architect:
			Engineer:
			Contractor:
			Submitted by:
			Date:

For complete Installation Instructions visit **us.panasonic.com/ventfans**

Ceiling Radiation Damper: WhisperGreen Select™ is UL listed for use with the Panasonic Ceiling Radiation Damper (Model #: PC-RD05C5, sold separately).

WhisperGreen Select™ VENTILATION FAN

Built-In Self Adjusting Airflow Capability

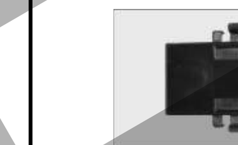
FV-0511VK2

Plug 'N Play™ Modules

Plug 'N Play™ modules provide up to three additional features. Select from Multi-Speed with Time Delay, Motion Sensor, and Condensation Sensor.

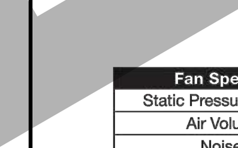
FV-VS15VK1: Multi-Speed with Time Delay

Allows you to select the proper CFM settings to satisfy ASHRAE 62.2 continuous ventilation requirements. The fan runs continuously at a pre-set lower level (0, 30-100 CFM, in 10 CFM increments), then elevates to a maximum level of operation (50-80-110 CFM) when the wall switch is turned on, or when the motion sensor or Condensation Sensor module is activated. A High/Low delay timer returns the fan to the pre-set CFM level after a period of time set by the user.



FV-MSVK1: Motion Sensor

Automatically activates when someone enters the room. Once the settings have been applied, the fan becomes truly automatic. This module also activates a 20 minute delay off timer for the fan.



FV-CSVK1: Condensation Sensor

Helps control bathroom condensation to prevent mold and mildew. Sensor technology detects relative humidity and temperature to anticipate dew point, automatically turning the fan on to control humidity. Built-in Relative Humidity (RH) sensitivity adjustment enables fine tuning for moist conditions and for satisfying CalGreen requirements. When the condensation sensor is used in conjunction with multi-speed functionality, the fan will kick up to high speed when the condensation sensor detects moisture in the room. This module also activates a 20 minute delay off timer for the fan.

Fan Specifications	WhisperGreen Select™ FV-0511VK2								
Static Pressure in inches w.g.	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375
Air Volume (CFM)	110	110	108	80	80	79	50	51	51
Noise (sones)	<0.3	0.8	-	<0.3	0.5	-	<0.3	0.4	-
Power Consumption (watts)	9.9	15.4	20.0	5.1	9.6	13.4	3.1	6.2	9.6
Energy Efficiency (CFM/Watt)	11.1	7.1	5.4	15.7	8.3	5.9	16.2	8.3	5.3
Speed (RPM)	920	1182	1356	795	1113	1315	722	1054	1266
Current (amps)	0.10	0.16	0.20	0.06	0.10	0.14	0.04	0.07	0.10
MAX. Current(amps)	0.20								
Power Rating (V/Hz)	120/60								
ENERGY STAR rated	Yes								

0.375=Installed Performance

Fan Specifications	WhisperGreen Select™: FV-0511VK2 + FV-VS15VK1 (Multi Speed Plug 'N Play™ Module)																										
Static Pressure in inches w.g.	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375	0.1	0.25	0.375
Air Volume (CFM)	110	110	108	100	101	101	90	90	90	80	80	79	70	71	70	60	60	60	50	51	51	40	41	40	30	30	30
Noise (sones)	<0.3	0.8	-	<0.3	0.7	-	<0.3	0.6	-	<0.3	0.5	-	<0.3	0.5	-	<0.3	0.4	-	<0.3	0.4	-	<0.3	0.3	-	<0.3	0.3	-
Power Consumption (watts)	9.9	15.4	20.0	7.9	13.1	17.8	6.5	11.2	16.0	5.1	9.6	13.4	4.3	8.5	12.1	3.7	6.9	10.5	3.1	6.2	9.6	2.7	5.5	7.8	2.4	4.6	6.8
Energy Efficiency (CFM/Watt)	11.1	7.1	5.4	12.7	7.7	5.7	13.9	8.0	5.6	15.7	8.3	5.9	16.7	8.5	5.9	16.3	8.7	5.7	16.2	8.3	5.3	14.8	7.4	5.1	12.6	6.6	4.4
Speed (RPM)	920	1182	1356	889	1164	1356	839	1135	1351	795	1113	1315	760	1112	1309	751	1061	1287	722	1054	1266	707	1057	1251	711	1039	1259
Current (amps)	0.10	0.16	0.20	0.09	0.14	0.18	0.07	0.12	0.16	0.06	0.10	0.14	0.05	0.09	0.13	0.05	0.08	0.11	0.04	0.07	0.10	0.04	0.07	0.09	0.04	0.06	0.08
MAX. Current(amps)	0.20																										
Power Rating (V/Hz)	120/60																										
ENERGY STAR rated	Yes																										

0.375=Installed Performance

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Panasonic

VF18972SS-FV-0511VK2

WhisperCeiling™ VENTILATION FAN

FV-20VQ3

Specification Submittal Data / Panasonic Ventilation Fan

Description

Ventilating fan shall be Low Noise ceiling mount type rated for continuous run. Fan shall be ENERGY STAR® rated and certified by the Home Ventilating Institute (HVI). Evaluated by Underwriters Laboratories and conform to both UL and cUL safety standards.

Motor/Blower:
- Four–pole totally enclosed condenser motor rated for continuous operation.
- Power Rating shall be 120 volts and 60 Hz.
- Fan shall be UL listed for tub/shower enclosure when used with a GFCI branch circuit wiring.
- Motor equipped with thermal–cutoff fuse.
- Removable with permanently lubricated plug–in motor.

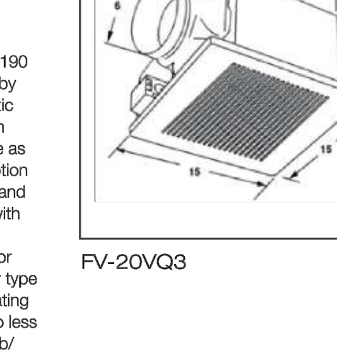
Housing:
- Rust proof paint, galvanized steel body.
- 6" diameter duct adaptor.
- Built in backdraft damper.
- Expandable extension bracket up to 26".

Grille:
- Attractive design using PP material.
- Attaches directly to housing with torsion springs.

Warranty:
- ALL Parts: For period of 3 years from the date of the original purchase.

Architectural Specifications:

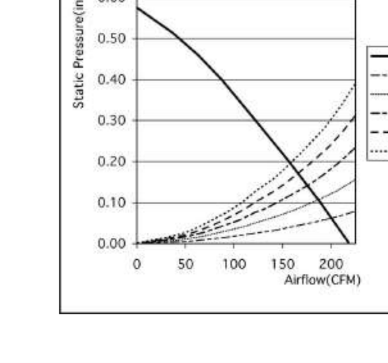
Ventilating fan shall be of the ceiling mount, ENERGY STAR rated type, with no less than 190 CFM and no more than 0.8 sone as certified by the Home Ventilating Institute (HVI) at 0.1 static pressure in inches water gauge(w.g.) and with no less than 144 CFM no more than 1.4 sone as certified by HVI at 0.25 w.g. Power Consumption shall be no greater than 42 watts at 0.1 w.g. and 42 watts at 0.25 w.g. ENERGY STAR rated with efficiency of no less than 4.5 CFM/watt at 0.1 w.g. and 3.4 CFM/watt at 0.25 w.g. The motor shall be totally enclosed, four pole condenser type engineered to operate continuously. Power rating shall be120v/60Hz. Duct diameter shall be no less than 6". Fan shall be UL and cUL listed for tub/shower enclosure when used with GFCI branch circuit wiring. Fan shall be ASHRAE 62.2, LEED, ENERGY STAR IAP, EarthCraft, California Title-24, and WA Ventilation Code compliant.



FV-20VQ3

Specifications: **WhisperCeiling** FV-20VQ3	6" Duct	
Static Pressure in inches w.g.	0.1	0.25
Air Volume (CFM)	190	144
Noise (sones)	0.8	1.4
Power Consumption (watts)	42	42
Energy Efficiency (CFM/Watt)	4.5	3.4
Speed (RPM)	696	871
Current (amps)	0.35	0.35
ENERGY STAR rated	YES	
Washington State VIAQ Code	YES	

As of date 4/11



For complete Installation Instructions visit **www.panasonic.com/building**

Model	Quantity	Comments	Project:
			Location:
			Architect:
			Engineer:
			Contractor:
			Submitted by:
			Date:

Panasonic Home and Environment Company
Division of Panasonic Corporation of North America
One Panasonic Way
Secaucus, NJ 07094
www.panasonic.com/building

Panasonic ideas for life

VF11076SS-20

CLIENT:

ADDRESS:
420 SOUTH AVE, SPRINGFIELD, MO 65806

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: **B SQUARE TOWER PROJECT**

TITLE: **MECHANICAL EQUIPMENT DATASHEETS.**

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

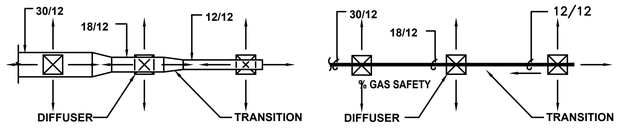
DRAWING NO.	REV.
M 4 . 0 1	

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
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 2018 INTERNATIONAL MECHANICAL CODE AND THE 2018 INTERNATIONAL BUILDINGCODE AND THE 2018 INTERNATIONAL 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 (IMC 314 3) . .
18. PROVIDE 120 VOLT ELECTRICAL OUTLETS WITHIN 25 FT OF ALL MECH EQUIPT .(IMC 309)
19. HEATING,VENTILATING,ANDAIR CONDITIONING SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH ONE OF THE FOLLOWING METHODS IN ACCORDANCE WITH IMC 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 .

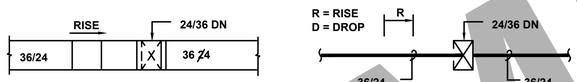
DUCTWORK SYMBOLS LEGEND

TRANSITIONS



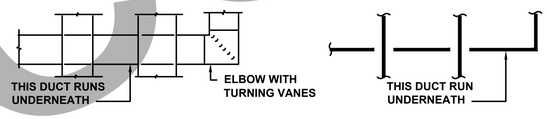
MAIN BRANCH TAKE-OFFS

RISERS

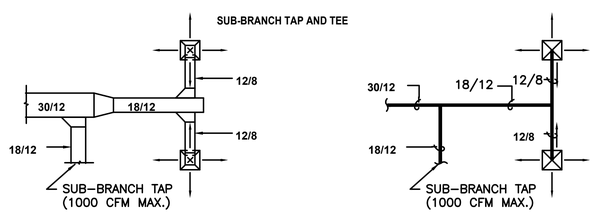


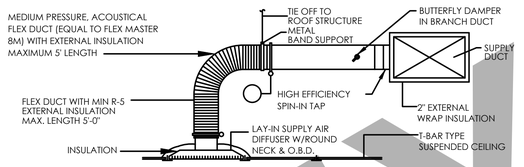
SIDEWALL REGISTERS

DUCT CROSSOVERS

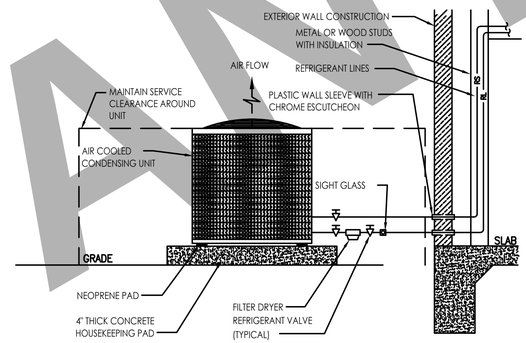


SUB-BRANCH TAP AND TEE

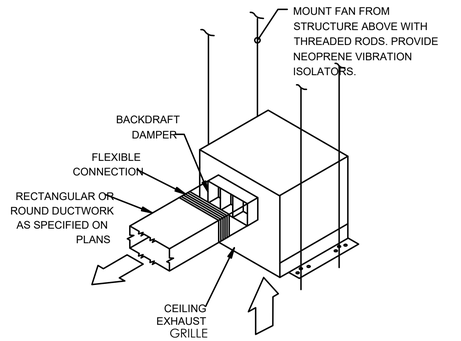




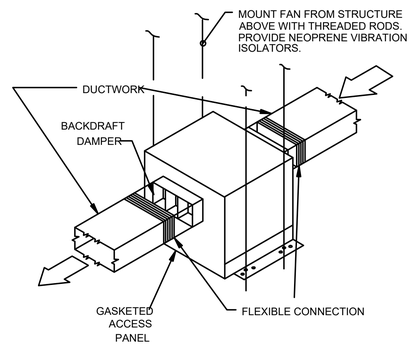
SUPPLY AIR DIFFUSER CONNECTION



OUTSIDE AIR CONDITIONER



CEILING EXHAUST FAN DETAIL



IN-LINE FAN DETAIL

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

MECHANICAL GENERAL DETAILS.

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

DRAWING NO.	REV.
M5.01	

ELECTRICAL SPECIFICATIONS

1.ELECTRICAL GENERAL NOTES

A. GC SHALL VERIFY ANY THIRD PARTY INSPECTIONS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION PRIOR TO BIDDING THIS PROJECT.
B. ALL LOW VOLTAGE WIRING TO BE IN CONDUIT UNLESS APPROVED OTHERWISE BY AUTHORITY HAVING JURISDICTION.
C. ALL EMERGENCY LIGHTS & EXIT SIGNS ARE TO BE CONNECTED TO THE UNSWITCHED PORTION OF THE ADJACENT LIGHTING CIRCUIT. ALL EMERGENCY FIXTURES TO REMAIN ACTIVE FOR 90 MINUTE MINIMUM.
D. ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE LABELED AND LISTED BY A CERTIFIED TESTING LABORATORY OR AGENCY.
E. ALL LIGHTING, DUCTWORK, SOFFITS, AND CEILING COMPONENT HEIGHTS ARE TO BE COORDINATED WITH THE ARCHITECT.
F. ATTENTION LIGHTING SUPPLIER AND CONTRACTOR: ENSURE ALL LIGHTING EXPOSED TO PLENUM IS PLENUM RATED.
G. COORDINATE THE MOUNTING OF ALL HIGH-BAY FIXTURES AND CEILING FANS WITH ARCHITECT PRIOR TO INSTALLATION.
H. . VERIFY MOUNTING HEIGHTS OF ALL FIXTURES WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.
I. FIRE ALARM CONTRACTOR SHALL VERIFY ALL BUILDING AND FIRE DEPARTMENT REQUIREMENTS REGARDING SHUT OFF OF ANY NECESSARY COMPONENTS UPON ACTIVATION OF THE FIRE ALARM. THIS INCLUDES, BUT IS NOT LIMITED TO:
a. AUDIO/MUSIC SYSTEM(S)
b. ROOFTOP UNITS
c. TANNING EQUIPMENT
d. EXERCISE FANS
J. PROVIDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR (SIZE PER NEC) IN PVC TYPE CONDUIT, POWER CIRCUITS, ISOLATED GROUND CIRCUITS, OR AS SHOWN ON PLANS. CONDUIT SHALL BE SIZED PER NEC BASED ON THIN 600 VOLT COPPER SINGLE CONDUCTORS, PLUS THE EQUIPMENT GROUNDING CONDUCTOR.
K. WIRING SHALL INCLUDE FINAL CONNECTION TO ALL EQUIPMENT IN CONFORMANCE WITH EQUIPMENT SUPPLIER WIRING DIAGRAMS.
L. CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPLETE PANELBOARD IDENTIFICATION SCHEDULES.
M. BRANCH CIRCUIT CONDUCTORS SHALL BE MINIMUM #12 AWG UNLESS NOTED OTHERWISE IN SCHEDULES. WHERE 20A BRANCH CIRCUITS HAVE #8 AND LARGER WIRE SPECIFIED, #10 AWG WIRE SHALL BE USED FOR THE FINAL CONNECTION (15 FOOT MAXIMUM).
N. WHERE BRANCH CIRCUITS ARE GROUPED, SIZE CONDUIT AND DERATE CURRENT CARRYING CONDUCTORS PER NEC.
O. PROVIDE HANDLE TIES ON ALL MULTIWIRE BRANCH CIRCUITS TO MEET NEC REQUIREMENTS.
P. SUPPORT FROM STRUCTURE: NO ATTACHMENT OF ANY TYPE SHALL BE MADE TO BRIDGING OR JOIST WEB MEMBERS. UTILIZE ONLY THE TOP AND BOTTOM CHORDS FOR SUPPORTING THE ELECTRICAL SYSTEM INSTALLATIONS. REFER TO STRUCTURAL PLANS.
Q. WHERE GROUPED CONDUITS ARE INSTALLED WITHIN THE JOIST SPACE, COORDINATE WITH SPRINKLER CONTRACTOR PRIOR TO INSTALLATION IN ORDER TO MAINTAIN REQUIRED CLEARANCES FROM SPRINKLERS.
R. SEAL PENETRATIONS IN FIRE RATED WALLS PER NEC 300.21.
S. ELECTRICAL EQUIPMENT, FIXTURES, DEVICES, AND OTHER ITEMS SHOWN IN THESE PLANS IN GREY HALFTONE ARE EITHER EXISTING TO REMAIN OR PART OF LANDLORD SHELL PACKAGE.
T. PROVIDE ARC-FLASH COORDINATION STUDY PER NEC.
U. PROVIDE (1) 1/2" CONDUIT AND (1) 4" SQUARE BOX WITH SINGLE GANG DEVICE RING FOR ALL THERMOSTAT LOCATIONS INDICATED ON MECHANICAL DRAWINGS. ROUTE CONDUIT FROM BOX TO ACCESSIBLE CEILING CAVITY. PROVIDE PLASTIC BUSHING ON EXPOSED CONDUIT ENDS. PROVIDE PULL STRING IN ALL EMPTY CONDUIT SYSTEMS. COORDINATE EXACT LOCATIONS AND MOUNTING HEIGHTS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
V. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE LOW VOLTAGE CONTRACTOR TO CLARIFY SCOPE OF WORK BEFORE BID OR INSTALLATION
W. WIRING DEVICES: DEVICE MOUNTING HEIGHTS ARE FROM FINISHED FLOOR TO CENTER OF OUTLET BOX UNLESS NOTED OTHERWISE ON PLANS. COORDINATE THE STANDARD MOUNTING HEIGHTS WITH MASONRY:
a. SWITCHES 48" AFF
b. RECEPTACLES 18" AFF
c. VOICE/DATA 18" AFF

2. ELECTRICAL POWER NOTES

A. ALL REQUIRED DOCUMENTATION REGARDING THE DESIGN OF FIRE DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS AND THE PROCEDURES FOR MAINTENANCE, INSPECTION, AND TESTING OF FIRE DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS SHALL BE MAINTAINED AT AN APPROVED, SECURED LOCATION FOR THE LIFE OF THE SYSTEM PER IFC 901.6.2.1.
B. THE FIRE ALARM CONTROL PANEL DISCONNECTING MEANS SHALL HAVE A RED MARKING, SHALL ONLY BE ACCESSIBLE TO AUTHORIZED PERSONNEL, AND SHALL BE IDENTIFIED AS "FIRE ALARM CIRCUIT". THE LOCATION OF THE CIRCUIT DISCONNECTING MEANS SHALL BE IDENTIFIED AT THE FIRE ALARM CONTROL UNIT PER NFPA 72 4.4.1.4.2.2 AND 4.4.1.4.2.3.
C. ROUTE ALL CONDUIT TIGHT TO DECK IN ACCORDANCE TO NEC 300.4(E)
D. FIRE ALARM SYSTEM SHALL BE INSTALLED PER CURRENT NFPA STANDARDS.
E. ALL ELECTRICAL THAT MAY NEED TO BE MAINTAINED WHILE ENERGIZED SHALL BE FIELD MARKED WITH ARC FLASH LABELING AND BE FULLY VISIBLE TO QUALIFIED PERSONNEL PRIOR TO EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF EQUIPMENT.
F. SERVICE EQUIPMENT SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT. THE FIELD MARKINGS SHALL INCLUDE THE DATE THE FAULT CURRENT CALCULATIONS WERE PERFORMED AND BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
G. FIRE ALARM DEVICE LOCATIONS ARE SHOWN FOR REFERENCE ONLY. THE ELECTRICAL CONTRACTOR SHALL INCLUDE A PRICE IN THE ELECTRICAL BID FOR A LANDLORD APPROVED FIRE ALARM SYSTEM, INCLUDING PLANS AND ALL ASSOCIATED DOCUMENTATION REQUIRED. THESE PLANS SHALL BE SUBMITTED TO THE LOCAL AUTHORITIES HAVING JURISDICTION BY A QUALIFIED AND LICENSED DESIGN-BUILD FIRE ALARM CONTRACTOR FOR A COMPLETE AND APPROVED FIRE ALARM SYSTEM. THE PLANS SHALL BE SIGNED AND SEALED BY THEIR LOCAL DESIGN ENGINEER AND SUBMITTED FOR PLAN REVIEW PRIOR TO RECEIVING SPECIFIC PERMITS FOR THIS WORK. THE FIRE ALARM CONTRACTOR SHALL ALSO SUBMIT ALL SHOP DRAWINGS, BATTERY CALCULATIONS, SPECIFICATION SHEETS, ETC. AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION TO THEIR LOCAL DESIGN ENGINEER FOR REVIEW AND APPROVAL.
H. COORDINATE WITH MECHANICAL INSTALLER TO PROVIDE AND INSTALL CONDUIT AND JUNCTION BOXES FOR MECHANICAL THERMOSTATS.

3. NETWORK CABLING REQUIREMENTS

A. EACH CAT 5 CABLE RUN MUST BE KEPT TO A MAXIMUM OF 295 FEET (90 METERS). INCLUDING PATCH CORDS, ENTIRE CHANNEL MAXIMUM LENGTH NOT TO EXCEED 328 FEET (100 METERS).
B. MAINTAIN PAIR TWISTING AS CLOSE AS POSSIBLE TO FINAL TERMINATION POINTS WITH MAXIMUM UNTWISTED SEGMENT OF 1/2".
C. WHERE NECESSARY, GRADUALLY BEND CABLE TO MAINTAIN THE MINIMUM BEND RADIUS OF 4 TIMES THE CABLE DIAMETER (APPROX. 1").
D. USE LOW TO MODERATE PRESSURE TO DRESS CABLES NEATLY WITH CABLE TIES.
E. USE LOW TO MODERATE FORCE WHEN PULLING CABLE. DO NOT EXCEED MAXIMUM OF 25 POUNDS OF FORCE.
F. USE CABLE PULLING LUBRICANT FOR CABLE RUNS THAT MAY EXCEED 25 POUNDS OF FORCE WHEN PULLING.
G. MAINTAIN 12" OF SEPARATION FROM POWER CABLES THAT MAY BE SOURCES OF EMI (ELECTRICAL CABLES, TRANSFORMERS, LIGHT FIXTURES, ETC.)
H. INSTALL PROPER CABLE SUPPORTS WITH MAXIMUM OF 5 FEET OF SEPARATION.
I. LEAVE EXCESS WIRE COILED IN THE CEILING OR NEAREST CONCEALED SPACE. MAINTAIN 5 FEET OF SLACK AT WORK OUTLET AND 10 FEET OF SLACK AT PATCH PANEL END.
J. FURNISH AND INSTALL GROMMETS WHEN PASSING THROUGH METAL STUDS AND OTHER POTENTIAL HAZARDS.
K. CONTRACTOR IS RESPONSIBLE FOR MEETING BOTH NATIONAL FIRE AND BUILDING CODES AND ANY LOCAL AMENDMENTS BY THE AUTHORITIES HAVING JURISDICTION AND MAINTAIN FIRESTOPS AT ALL CABLES THAT PENETRATE FIREWALLS. PLENUM RATED CABLES SHALL BE INSTALLED WHERE REQUIRED.
L. DO NOT SPLICE OR BRIDGE CABLE AT ANY POINT.
M. DO NOT INSTALL CABLE SUPPORTED FROM CEILING TILES.
N. DO NOT OVER TIGHTEN (25 POUNDS PER SQUARE INCH MAXIMUM) WITH USING CABLE OR PLASTIC TIES.
O. DO NOT USE OIL OR OTHER LUBRICANT NOT SPECIFICALLY DESIGNED FOR NETWORK CABLE PULLING.
P. DO NOT SUPPORT CABLES DIRECTLY FROM ELECTRICAL CONDUITS OR FIXTURES

4. GENERAL FIRE ALARM NOTES

A. THE INTENT OF THE FIRE ALARM SYSTEM DEVICES INDICATED ON THIS DRAWING ARE FOR PERFORMANCE SPECIFICATIONS AND LOCATIONS ONLY. THE SUCCESSFUL FIRE ALARM SYSTEM CONTRACTOR SHALL PROVIDE COMPLETE PERMIT DRAWINGS, INCLUDING WIRING MEANS AND METHODS, BATTERY CALCULATIONS, DEVICE CUT SHEETS, ETC. FOR THE EQUIPMENT THEY SHALL PROVIDE. PROVIDE 15% SPARE CAPACITY FOR NEW SYSTEMS. COORDINATE FINAL REQUIREMENTS WITH ALL AUTHORITIES HAVING JURISDICTION.
B. THE FIRE ALARM SYSTEM SHALL BE MONITORED BY A UL LISTED CENTRAL STATION.
C. FIRE ALARM CONTRACTOR SHALL SUBMIT FIRE ALARM SUBMITTALS TO THE OWNER'S REPRESENTATIVE WITHIN 30 DAYS AFTER CONTRACT IS AWARDED.
D. WALL MOUNTED DEVICES SHALL BE 80" AFF TO BOTTOM OF DEVICE UNLESS NOTED OTHERWISE.
E. SURFACE MOUNTING OF FIRE ALARM CONDUIT IS NOT PERMITTED IN FINISHED AREAS.
F. BUILDING IS EQUIPPED WITH A FULLY AUTOMATIC SPRINKLER SYSTEM.
G. REMOVE ALL EXISTING FIRE ALARM SYSTEMS FROM PREVIOUS TENANTS PRIOR TO INSTALLING NEW EQUIPMENT.
H. ALL REQUIRED DOCUMENTATION REGARDING THE DESIGN OF FIRE DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS AND THE PROCEDURES FOR MAINTENANCE, INSPECTION, AND TESTING OF FIRE DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS SHALL BE MAINTAINED AT AN APPROVED, SECURED LOCATION FOR THE LIFE OF THE SYSTEM PER IFC 901.6.2.1.
I. THE FIRE ALARM CONTROL PANEL DISCONNECTING MEANS SHALL HAVE A RED MARKING, SHALL ONLY BE ACCESSIBLE TO AUTHORIZED PERSONNEL, AND SHALL BE IDENTIFIED AS "FIRE ALARM CIRCUIT". THE LOCATION OF THE CIRCUIT DISCONNECTING MEANS SHALL BE IDENTIFIED AT THE FIRE ALARM CONTROL UNIT PER NFPA 72 4.4.1.4.2.2 AND 4.4.1.4.2.3.
J. ROUTE ALL CONDUIT TIGHT TO DECK IN ACCORDANCE WITH NEC 300.4(E).
K. FIRE ALARM SYSTEMS SHALL BE INSTALLED PER CURRENT NFPA STANDARDS.FIRE ALARM DEVICE LOCATIONS ARE SHOWN FOR REFERENCE ONLY. THE ELECTRICAL CONTRACTOR SHALL INCLUDE A PRICE IN THE ELECTRICAL BID FOR A LANDLORD APPROVED FIRE ALARM SYSTEM, INCLUDING PLANS AND ALL ASSOCIATED DOCUMENTATION REQUIRED. THESE PLANS SHALL BE SUBMITTED TO THE LOCAL AUTHORITIES HAVING JURISDICTION BY A QUALIFIED AND LICENSED DESIGN-BUILD FIRE ALARM CONTRACTOR FOR A COMPLETE AND APPROVED FIRE ALARM SYSTEM. THE PLANS SHALL BE SIGNED AND SEALED BY THEIR LOCAL DESIGN ENGINEER AND SUBMITTED FOR PLAN REVIEW PRIOR TO RECEIVING SPECIFIC PERMITS FOR THIS WORK. THE FIRE ALARM CONTRACTOR SHALL ALSO SUBMIT ALL SHOP DRAWINGS, BATTERY CALCULATIONS, SPECIFICATION SHEETS, ETC. AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION TO THEIR LOCAL DESIGN ENGINEER FOR REVIEW AND APPROVAL.

5.ELECTRICAL ABBREVIATIONS:

ABC ABOVE COUNTER
AFF ABOVE FINISHED FLOOR
CF CEILING FAN
CP CIRCULATING PUMP
EC ELECTRICAL CONTRACTOR
ECB ENCLOSED CIRCUIT BREAKER
EDF ELECTRIC DRINKING FOUNTAIN
EF EXHAUST FAN
GC GENERAL CONTRACTOR
GFCI GROUND FAULT CIRCUIT INTERRUPT
GR GROUND
HC HVAC CONTRACTOR
JB JUNCTION BOX
PC PLUMBING CONTRACTOR
TTB TELEPHONE TERMINATION BOARD
UC UNDERCOUNTER
UH UNIT HEATER
UNO UNLESS NOTED OTHERWISE
VIF VERIFY IN FIELD
WH WATER HEATER
WP WEATHER PROOF DEVICE
WR WEATHER RESISTANT DEVICE
GFCI GROUND FAULT CIRCUIT INTERRUPTER

ELECTRICAL LEGEND

HB — High bay Lighting similar to Corvus UFO High Bay Light 100 Watt from RuggedGrade
Lithonia Lighting 4-ft x 2-ft Cool White LED Panel Light, 38W
120W LED Wall Pack Light similar to wall pack light (WPG Series) from superbrightleds (WPG-50K120W-S-Photocell)
RECESSED MOUNTED ROUND LED LIGHTING FIXTURE SIMILAR TO PHILIPS DN130B D165 1xLED10S/840.
CHANDILIER (ADDITIONAL SUPPORT STUDS WITH 5/8" PLYWOOD
RECESSED MOUNTED SPOT SIMILAR TO DN140B PSED-E IP54 D162 1 xLED10S/840 C WITH POWER 11.5 WATT
EMERGENCY ILLUMINATION FIXTURE, SHALL BE ON ALL TIME WITH 90 BACK UP MINUTES BATTERY BUILT IN
LIGHTING OUTLET FOR WALL ,20W
HEAVY DUTY JUNCTION BOX, FLUSH IN CEILING FOR EXHAUST FANS
EXIT — EXIT SIGN WITH EMERGENCY LIGHT SHALL BE ON ALL TIME WITH 90 BACK UP MINUTES BATTERY BUILT IN
S — ONE WAY LIGHTING SWITCH
S_3 — TWO WAYS LIGHTING SWITCH
S_M — SWITCH WITH OCCUPANCY SENSOR
S_T — SWITCH WITH TIMER
S_T — SWITCH WITH OCCUPANCY SENSOR
HEAVY DUTY JUNCTION BOX, WALL MOUNTED
C — SELF CONTAINED SMOKE/CARBON MONOXIDE (120 W/BATTERY BACKUP) - CEILING MOUNTED
S — SELF CONTAINED SMOKE DETECTOR/ANNUNCIATOR (120 W/BATTERY BACKUP) - CEILING MOUNTED
DUPLEX RECEPTACLE - WALL MOUNTED @ +18" AFF UNLESS NOTED GFCI DENOTES: GROUD FAULT PROTECTION
DUPLEX RECEPTACLE - FLOOR MOUNTED GFCI DENOTES: GROUD FAULT PROTECTION
YxXA — NON-FUSED DISCONNECT SWITCH - SIZE AS INDICATED
D — DATA OUTLET - WALL MOUNTED WITH 4PAIRS CAT5A CABLE
CAM — DATA OUTLET - CEILING MOUNTED WITH 4PAIRS CAT5A CABLE FOR CCTV
DOME TYPE CAMERA 8MP WITH INFRARED
BULLET TYPE CAMERA 8MP WITH INFRARED. VANDAL PROOF
KF — KEY FOB
BG — EMERGENCY BREAK GLASS
PB — RELEASE PUSH BUTTON
Design Hardware ALK-2000 Exit Alarm Kit for 2000 Series Devices
DC — DOOR CONTROLLER
MAGNETIC LOCK
EXTERIOR WALL SCONE WITH PHOTOCELL SIMILAR TO Lithonia Lighting TWS LED P1 50K MVOLT PE DDB M4 Outdoor TWS LED Photocell Wall Pack Light, 5000K , 120-277V, Dark Bronze, Daylight
EXTERIOR WALL VANDAL PROOF FLOOD LIGHT WITH PHOTOCELL SIMILAR TO RAB Lighting WP2F42MSW WP2 180 Deg View Smartpack Adjustable Mini Sensor CFL Wallpack, Triple Type, Aluminum, 42W Power, 3200 Lumens, 277V, White

CLIENT:

ADDRESS:
420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
ELECTRICAL SPECIFICATIONS AND SYMBOLS

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

DRAWING NO.
E 0 . 0 0

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 75°c 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 R314.3 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

ID	SYMBOL	DESCRIPTION	MANUF.	MODEL	LUMIN. TYPE	COLOR / FINISH	REMARKS
L1	○	4" RECESSED LED CAN LIGHT	Klus	LOTOS	LED	WHITE	RATED IC / AT FOR FLAT CEILING;
L2	○	4" RECESSED LED CAN LIGHT	Klus		LED	WHITE	RATED IC / AT FOR FLAT CEILING; WET LOCATION LISTED
L3	⊕	PENDANT / CHANDELIER	WAC LIGHTINGS	PARALAX PD-73129-CH	LED	CHROME	
L4	▭	LINEAR LED GARAGE LIGHT	WAC LIGHTINGS	TBD	LED	WHITE	RATED IC / AT FOR FLAT CEILING; WET LOCATION LISTED
L5	LED	UNDER COUNTER STRIP LIGHT	KLUS	VALENT	LED	TBD	PROVIDE ALUM. EXTURSION CHANNEL HOUSING
L6	LED	CLOSET LED STRIP LIGHT	KLUS	VALENT	LED	TBD	CEILING MOUNTED; PROVIDE ALUM. EXTURSION CHANNEL TO BE SWITCHED BY CLOSET DOORS & TIME CONTROL
L7	◎	PENDANT OVER ISLAND	WAC LIGHTINGS	INGO QUICK ADJUST MP913LED	LED	CHROME	

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.
2. 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.

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO	DESCRIPTION	DATE	BY

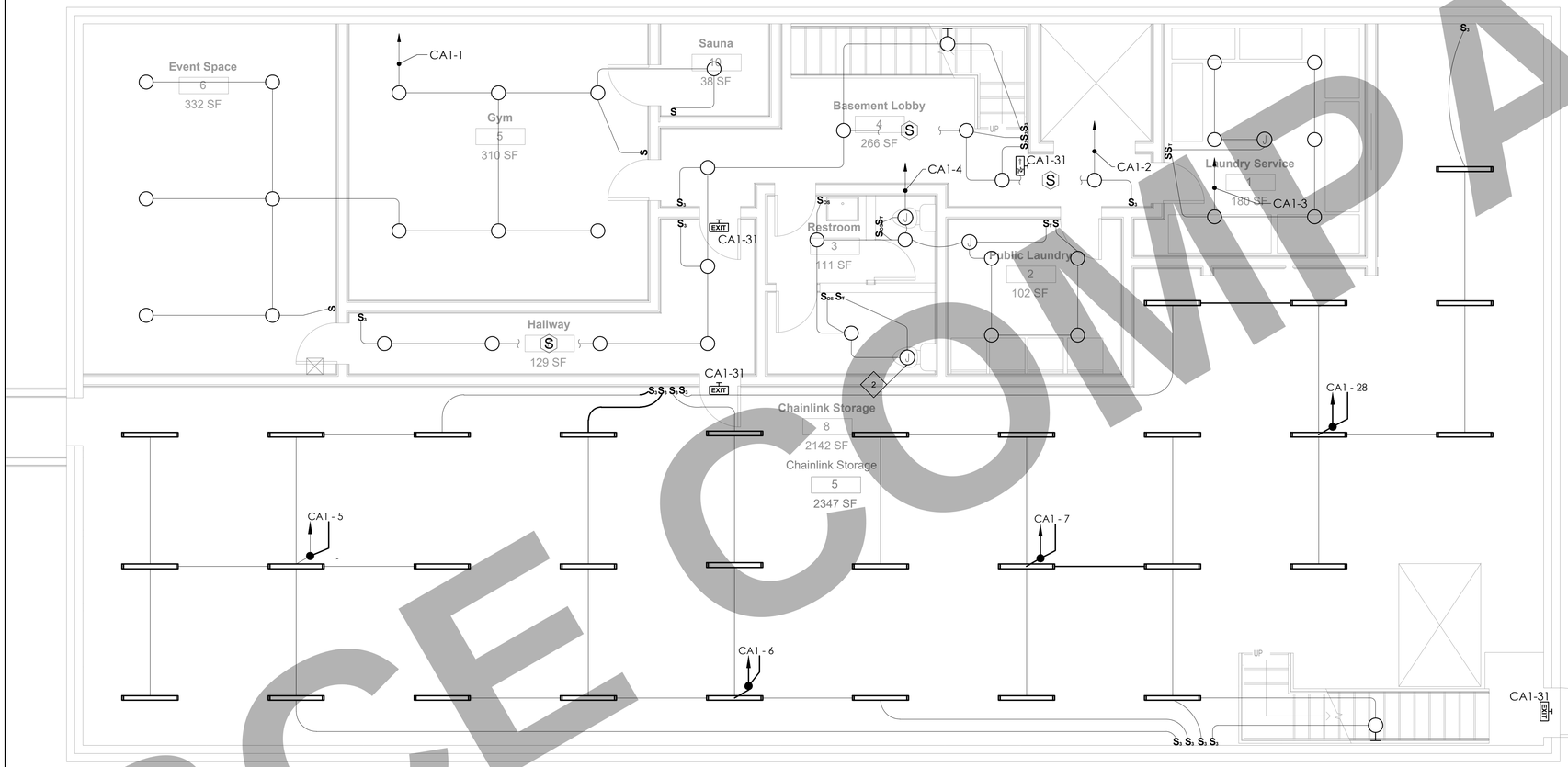
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
ELECTRICAL SPECIFICATIONS AND LIGHTING FIXTURES SCHEDULES

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

DRAWING NO.
E 0 . 0 1

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

1. JUNCTION BOX FOR KLUS STRIP LIGHT
2. JUNCTION BOX FOR EXHAUST FAN (3.1 W) SWITCHED INDEPENDENTLY WITH 5 MIN OFF TIMER
3. JUNCTION BOX FOR EXHAUST FAN (40 W) SWITCHED INDEPENDENTLY WITH 5 MIN OFF TIMER
4. SELF CONTAINED SMOKE DETECTOR/ANNUNCIATOR (120 W/BATTERY BACKUP) - CEILING MOUNTED
5. JUNCTION BOX FOR BEDROOM CEILING FAN (100 W)
6. JUNCTION BOX FOR LIVING ROOM CEILING FAN (150 W)

GENERAL NOTES

1. ALL JUNCTION BOXES, CONDUITS, AND AIRES SHALL BE SIZED PER NEC.
2. CONNECT ALL EXIT LIGHTS AHEAD OF ANY LOCAL OR AUTOMATIC SWITCHING DEVICE.
3. PROVIDE A CONSTANT HOT FROM PANEL BOARD DIRECTLY TO ALL EMERGENCY BATTERY PACKS/BALLASTS IN EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS. EMERGENCY LIGHTING FIXTURES SHALL TURN ON TO FULL BRIGHTNESS IN CASE OF POWER LOSS.
4. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION & MOONING HEIGHTS OF ALL LIGHTING FIXTURES SHOWN ON THIS DRAWING.
5. REFER TO DETAIL SHEET FOR SYMBOLS, SPECIFICATIONS, ABBREVIATIONS, AND LIGHTING FIXTURE SCHEDULE.
6. ALL DEVICES AND EQUIPMENT OUTSIDE THE SCOPE OF WORK ARE EXISTING TO REMAIN U.O.N.
7. CONTRACTOR SHALL PROVIDE AN ACCURATELY TYPED PANEL BOARD SCHEDULE FOR EACH PANEL BOARD.
8. ELECTRICAL CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY PROBLEMS PERTAINING TO CIRCUIT AVAILABILITY OR LOAD CAPACITY PRIOR TO INSTALLATION.
9. ALL EXTERIOR LUMINARIES AND ELECTRICAL DEVICES SHALL BE USED AS WEATHERPROOF TYPE.
10. ALL NEW CEILING OCCUPANCY SENSORS SHALL BE DUAL-TECHNOLOGY WITH 1000 SQFT COVERAGE AT 360 DEGREES U.O.N. ON THE DRAWING. COORDINATE EXACT LOCATION AND REQUIREMENTS OF ALL OCCUPANCY SENSORS SHOWN ON THIS DRAWING WITH MANUFACTURER REPRESENTATIVE PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR TO PROVIDE POWER PACKS AS REQUIRED.
11. CONTRACTOR SHALL CONFIRM COMPATIBILITY OF ALL LIGHTING CONTROL DEVICES/SWITCHES/DIMMERS WITH LIGHTING FIXTURES AND BALLASTS/DRIVERS PRIOR TO SUBMITTAL.
12. FIXTURE MARKED WITH SUBSCRIPT "(E)" IS EXISTING TO REMAIN, CONTRACTOR TO MAINTAIN CONTINUITY OF BRANCH CIRCUITS.
13. ALL CONDUIT RUNS IN OPEN PLENUM SPACE SHALL BE INSTALLED IN A NEAT MANNER PERPENDICULAR OR PARALLEL TO WALLS AND PAINTED AS DIRECTED BY OWNER.

CLIENT:

ADDRESS:

420 SOUTH AVE,
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NOTES:

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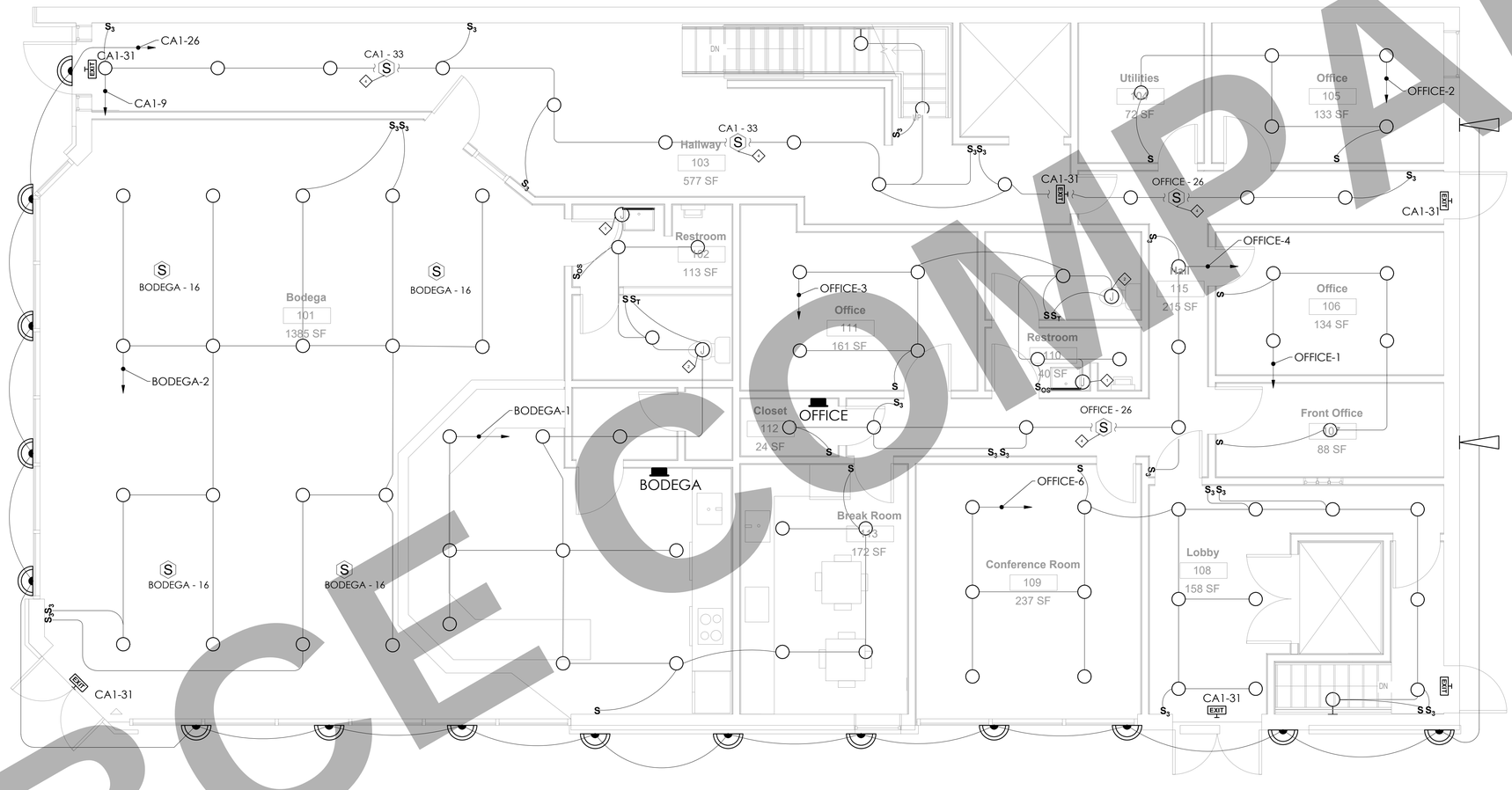
REV. NO	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Lighting Basement

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.	REV.
E1.01	



APPLICABLE CODE: NEC 2017

SHEET NOTES:

1. JUNCTION BOX FOR KLUS STRIP LIGHT
2. JUNCTION BOX FOR EXHAUST FAN (3.1 W) SWITCHED INDEPENDENTLY WITH 5 MIN OFF TIMER
3. JUNCTION BOX FOR EXHAUST FAN (40 W) SWITCHED INDEPENDENTLY WITH 5 MIN OFF TIMER
4. SELF CONTAINED SMOKE DETECTOR/ANNUNCIATOR (120 W/BATTERY BACKUP) - CEILING MOUNTED
5. JUNCTION BOX FOR BEDROOM CEILING FAN (100 W)
6. JUNCTION BOX FOR LIVING ROOM CEILING FAN (150 W)
7. WALL MOUNTED OUTLET FOR FACADE LIGHTING

GENERAL NOTES

1. ALL JUNCTION BOXES, CONDUITS, AND AIRES SHALL BE SIZED PER NEC.
2. CONNECT ALL EXIT LIGHTS AHEAD OF ANY LOCAL OR AUTOMATIC SWITCHING DEVICE.
3. PROVIDE A CONSTANT HOT FROM PANEL BOARD DIRECTLY TO ALL EMERGENCY BATTERY PACKS/BALLASTS IN EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS. EMERGENCY LIGHTING FIXTURES SHALL TURN ON TO FULL BRIGHTNESS IN CASE OF POWER LOSS.
4. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION & MOONING HEIGHTS OF ALL LIGHTING FIXTURES SHOWN ON THIS DRAWING.
5. REFER TO DETAIL SHEET FOR SYMBOLS, SPECIFICATIONS, ABBREVIATIONS, AND LIGHTING FIXTURE SCHEDULE.
6. ALL DEVICES AND EQUIPMENT OUTSIDE THE SCOPE OF WORK ARE EXISTING TO REMAIN U.O.N.
7. CONTRACTOR SHALL PROVIDE AN ACCURATELY TYPED PANEL BOARD SCHEDULE FOR EACH PANEL BOARD.
8. ELECTRICAL CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY PROBLEMS PERTAINING TO CIRCUIT AVAILABILITY OR LOAD CAPACITY PRIOR TO INSTALLATION.
9. ALL EXTERIOR LUMINARIES AND ELECTRICAL DEVICES SHALL BE USED AS WEATHERPROOF TYPE.
10. ALL NEW CEILING OCCUPANCY SENSORS SHALL BE DUAL-TECHNOLOGY WITH 1000 SQFT COVERAGE AT 360 DEGREES U.O.N. ON THE DRAWING. COORDINATE EXACT LOCATION AND REQUIREMENTS OF ALL OCCUPANCY SENSORS SHOWN ON THIS DRAWING WITH MANUFACTURER REPRESENTATIVE PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR TO PROVIDE POWER PACKS AS REQUIRED.
11. CONTRACTOR SHALL CONFIRM COMPATIBILITY OF ALL LIGHTING CONTROL DEVICES/SWITCHES/DIMMERS WITH LIGHTING FIXTURES AND BALLASTS/DRIVERS PRIOR TO SUBMITTAL.
12. FIXTURE MARKED WITH SUBSCRIPT "(E)" IS EXISTING TO REMAIN. CONTRACTOR TO MAINTAIN CONTINUITY OF BRANCH CIRCUITS.
13. ALL CONDUIT RUNS IN OPEN PLENUM SPACE SHALL BE INSTALLED IN A NEAT MANNER PERPENDICULAR OR PARALLEL TO WALLS AND PAINTED AS DIRECTED BY OWNER.

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REV. NO	DESCRIPTION	DATE	BY

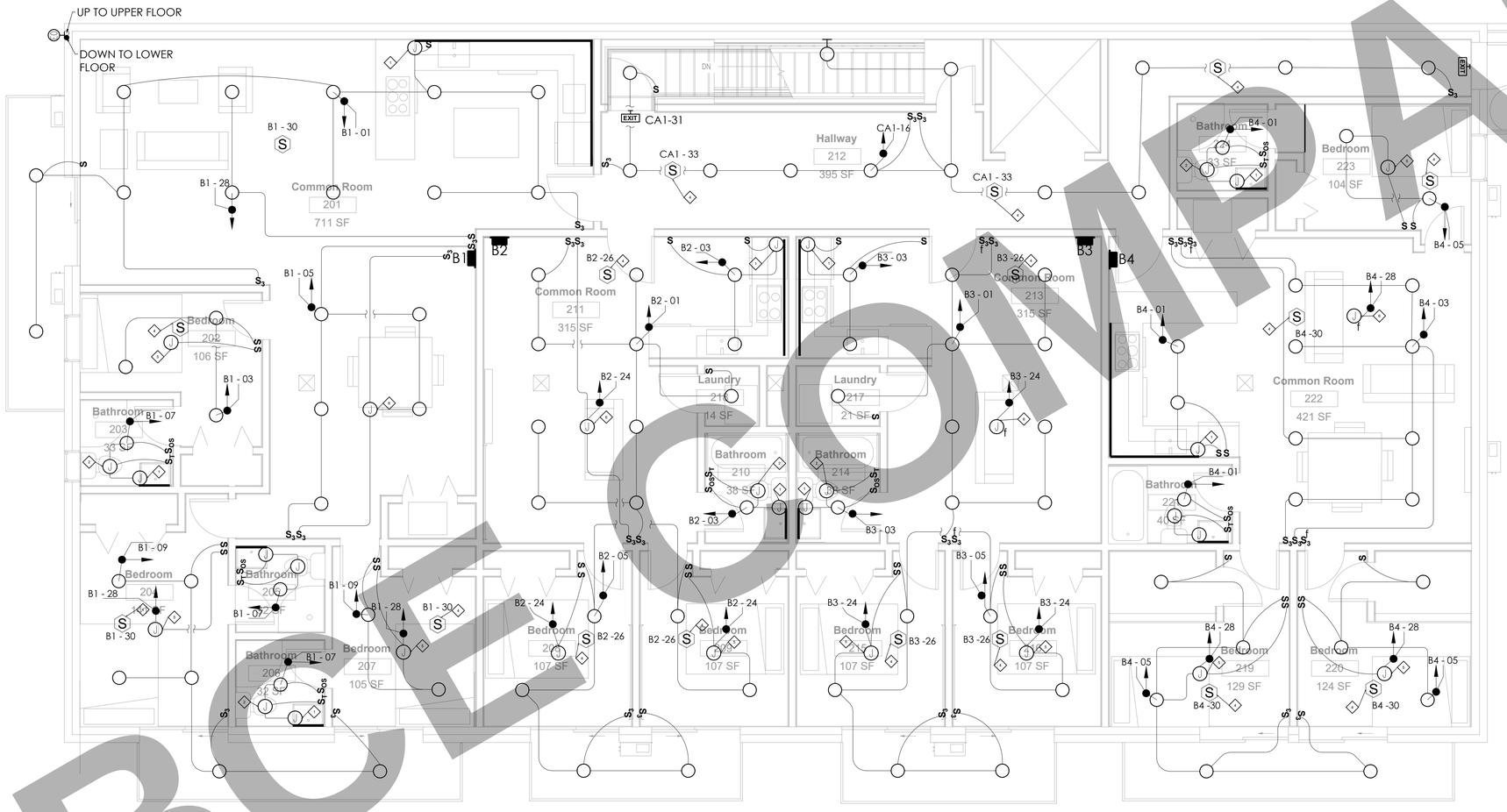
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Lighting First Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 1 . 0 2

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

1. JUNCTION BOX FOR KLUS STRIP LIGHT
2. JUNCTION BOX FOR EXHAUST FAN (3.1 W) SWITCHED INDEPENDENTLY WITH 5 MIN OFF TIMER
3. JUNCTION BOX FOR EXHAUST FAN (40 W) SWITCHED INDEPENDENTLY WITH 5 MIN OFF TIMER
4. SELF CONTAINED SMOKE DETECTOR/ANNUNCIATOR (120 W/BATTERY BACKUP) - CEILING MOUNTED
5. JUNCTION BOX FOR BEDROOM CEILING FAN (100 W)
6. JUNCTION BOX FOR LIVING ROOM CEILING FAN (150 W)

GENERAL NOTES

1. ALL JUNCTION BOXES, CONDUITS, AND AIRES SHALL BE SIZED PER NEC.
2. CONNECT ALL EXIT LIGHTS AHEAD OF ANY LOCAL OR AUTOMATIC SWITCHING DEVICE.
3. PROVIDE A CONSTANT HOT FROM PANEL BOARD DIRECTLY TO ALL EMERGENCY BATTERY PACKS/BALLASTS IN EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS. EMERGENCY LIGHTING FIXTURES SHALL TURN ON TO FULL BRIGHTNESS IN CASE OF POWER LOSS.
4. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION & MOONING HEIGHTS OF ALL LIGHTING FIXTURES SHOWN ON THIS DRAWING.
5. REFER TO DETAIL SHEET FOR SYMBOLS, SPECIFICATIONS, ABBREVIATIONS, AND LIGHTING FIXTURE SCHEDULE.
6. ALL DEVICES AND EQUIPMENT OUTSIDE THE SCOPE OF WORK ARE EXISTING TO REMAIN U.O.N.
7. CONTRACTOR SHALL PROVIDE AN ACCURATELY TYPED PANEL BOARD SCHEDULE FOR EACH PANEL BOARD.
8. ELECTRICAL CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY PROBLEMS PERTAINING TO CIRCUIT AVAILABILITY OR LOAD CAPACITY PRIOR TO INSTALLATION.
9. ALL EXTERIOR LUMINARIES AND ELECTRICAL DEVICES SHALL BE USED AS WEATHERPROOF TYPE.
10. ALL NEW CEILING OCCUPANCY SENSORS SHALL BE DUAL-TECHNOLOGY WITH 1000 SQFT COVERAGE AT 360 DEGREES U.O.N. ON THE DRAWING. COORDINATE EXACT LOCATION AND REQUIREMENTS OF ALL OCCUPANCY SENSORS SHOWN ON THIS DRAWING WITH MANUFACTURER REPRESENTATIVE PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR TO PROVIDE POWER PACKS AS REQUIRED.
11. CONTRACTOR SHALL CONFIRM COMPATIBILITY OF ALL LIGHTING CONTROL DEVICES/SWITCHES/DIMMERS WITH LIGHTING FIXTURES AND BALLASTS/DRIVERS PRIOR TO SUBMITTAL.
12. FIXTURE MARKED WITH SUBSCRIPT "(E)" IS EXISTING TO REMAIN, CONTRACTOR TO MAINTAIN CONTINUITY OF BRANCH CIRCUITS.
13. ALL CONDUIT RUNS IN OPEN PLENUM SPACE SHALL BE INSTALLED IN A NEAT MANNER PERPENDICULAR OR PARALLEL TO WALLS AND PAINTED AS DIRECTED BY OWNER.

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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REV. NO	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

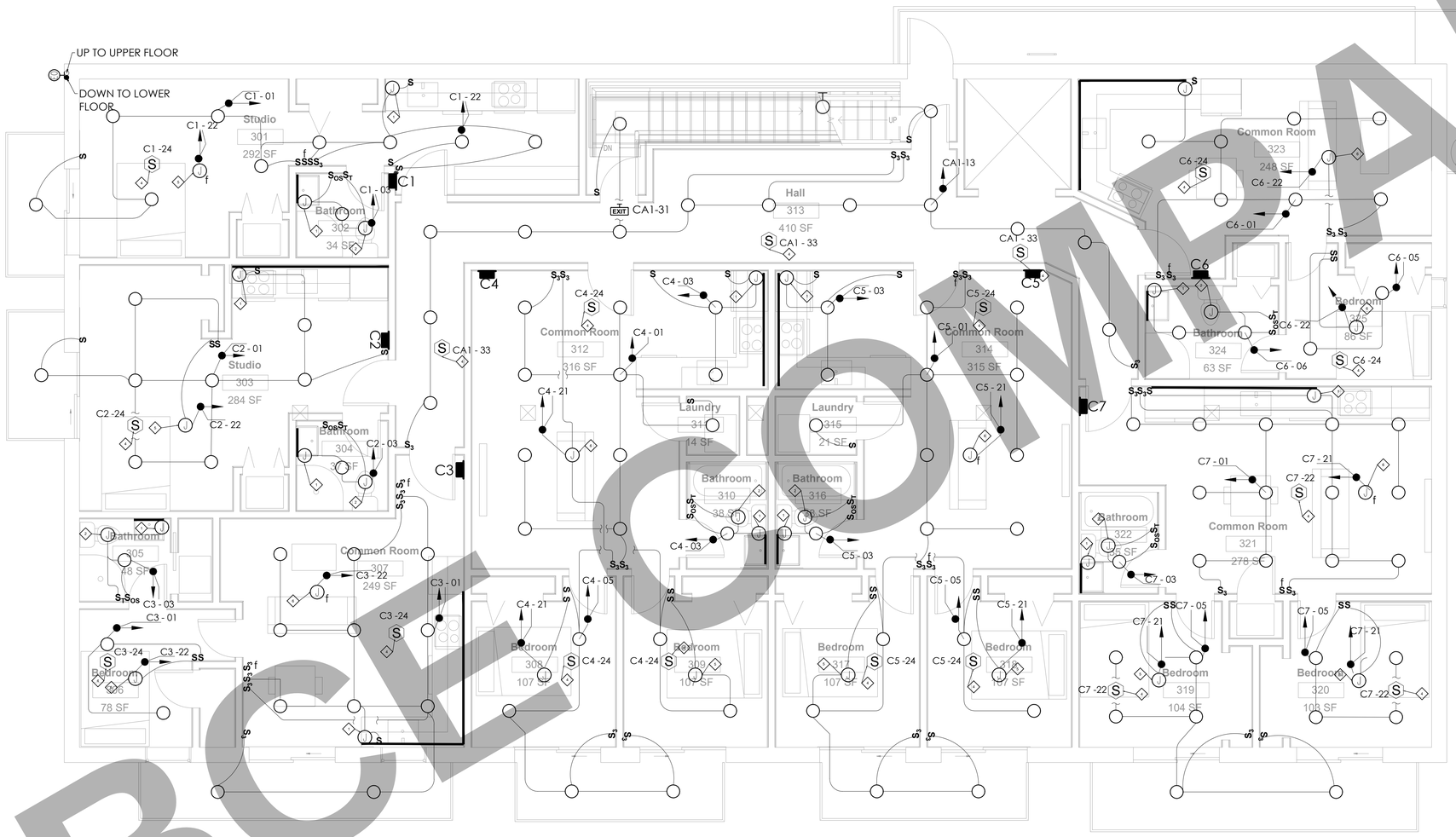
Electrical Lighting Second Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.

E 1 . 0 3

REV.



APPLICABLE CODE: NEC 2017

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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

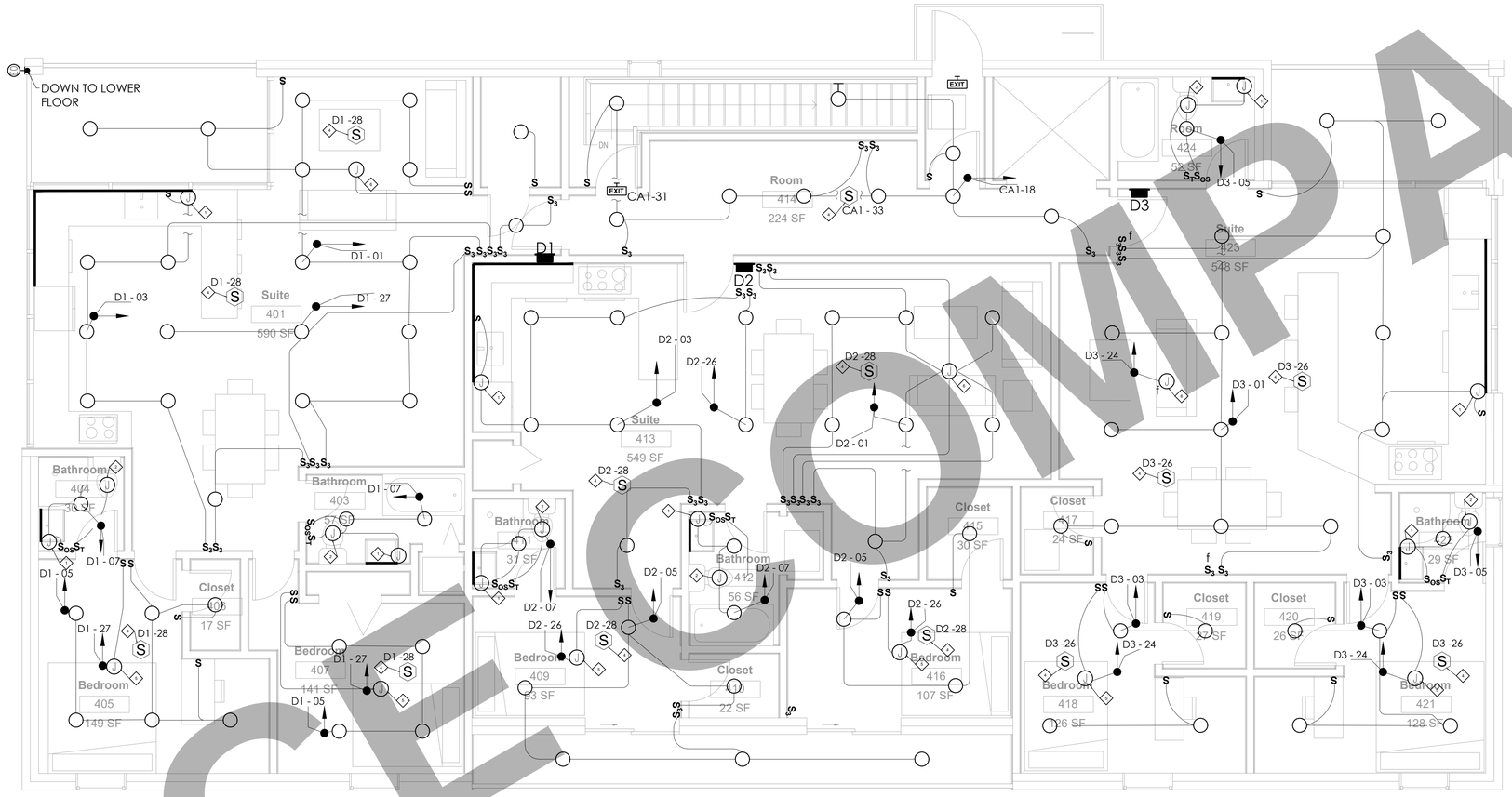
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Lighting Third Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 1 . 0 4

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

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CLIENT:

ADDRESS:

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REV. NO	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

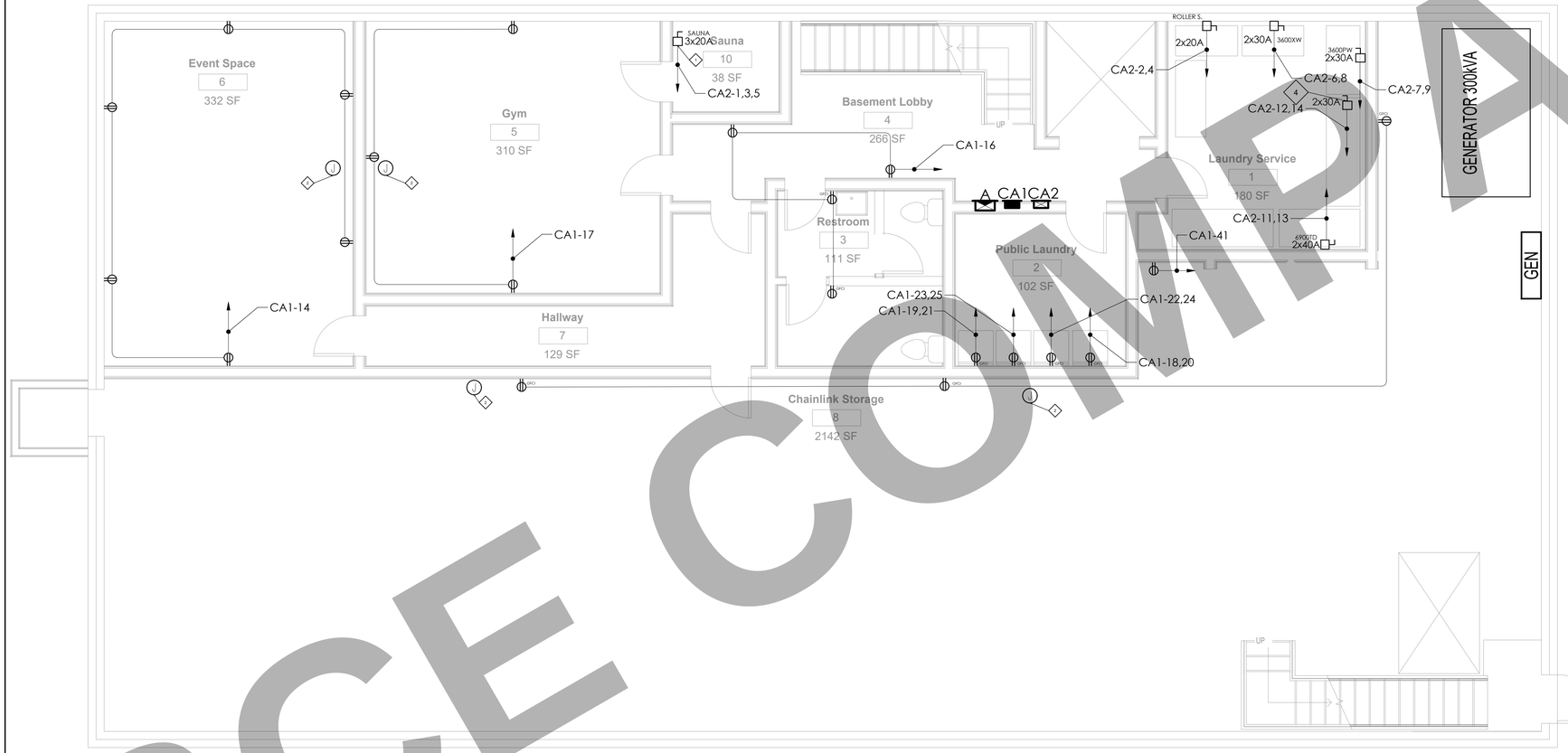
Electrical Lighting Fourth Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.

E 1 . 0 5

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

1. DISCONNECT SWITCH FOR SUBMERSIBLE PUMP
2. JUNCTION BOX FOR HVAC INDOOR UNIT
3. DISCONNECT SWITCH FOR HVAC OUTDOOR UNIT
4. DISCONNECT SWITCH FOR EWH UNIT
5. DISCONNECT SWITCH FOR FAHU UNIT

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.

a. NEC ARTICLE 210.52(A) (1) SPACING. RECEPTACLES SHALL BE INSTALLED THAT NO POINT ALONG THE FLOOR LINE OF THE WALL IS MORE THAN 6-FEET FROM A RECEPTACLE.

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.

3. IN EVERY KITCHEN, FAMILY ROOM, DINING ROOM, LIVING ROOM, PARLOR, LIBRARY, DEN, SUNROOM, BEDROOM, RECREATION ROOM OR SIMILAR ROOM OR AREA OF DWELLING UNITS, ALL 125 VOLT 15 AND 20 AMP RECEPTACLES SHALL BE LISTED TAMPER-RESISTANT RECEPTACLES
NEC 406.12)

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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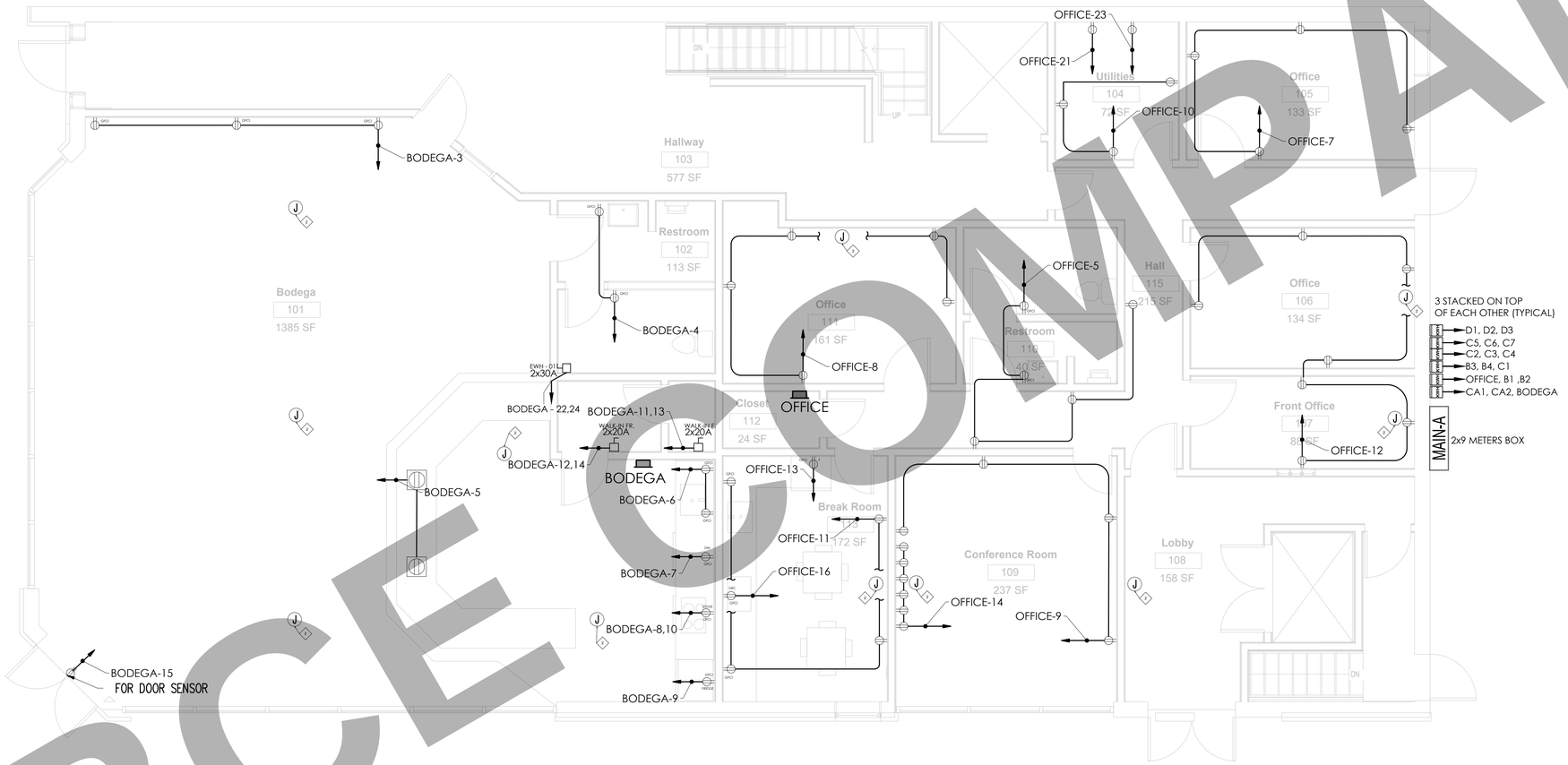
REV. NO	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Power Basement

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.	REV.
E 2 . 0 1	



SHEET NOTES:

1. PROVIDE NON-FUSED NEMA 3R DISCONNECT SWITCH FOR SAUNA
2. PROVIDE HEAVY DUTY JUNCTION BOX FOR INDOOR UNITS TAKING POWER FROM OUTDOOR UNITS

APPLICABLE CODE: NEC 2017

SHEET NOTES:

1. DISCONNECT SWITCH FOR SUBMERSIBLE PUMP
2. JUNCTION BOX FOR HVAC INDOOR UNIT
3. DISCONNECT SWITCH FOR HVAC OUTDOOR UNIT
4. DISCONNECT SWITCH FOR EWH UNIT
5. DISCONNECT SWITCH FOR FAHU UNIT

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.
   a. NEC ARTICLE 210.52(A) (1) SPACING. RECEPTACLES SHALL BE INSTALLED THAT NO POINT ALONG THE FLOOR LINE OF THE WALL IS MORE THAN 6-FEET FROM A RECEPTACLE.
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   NEC 406.12)

CLIENT:

ADDRESS:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

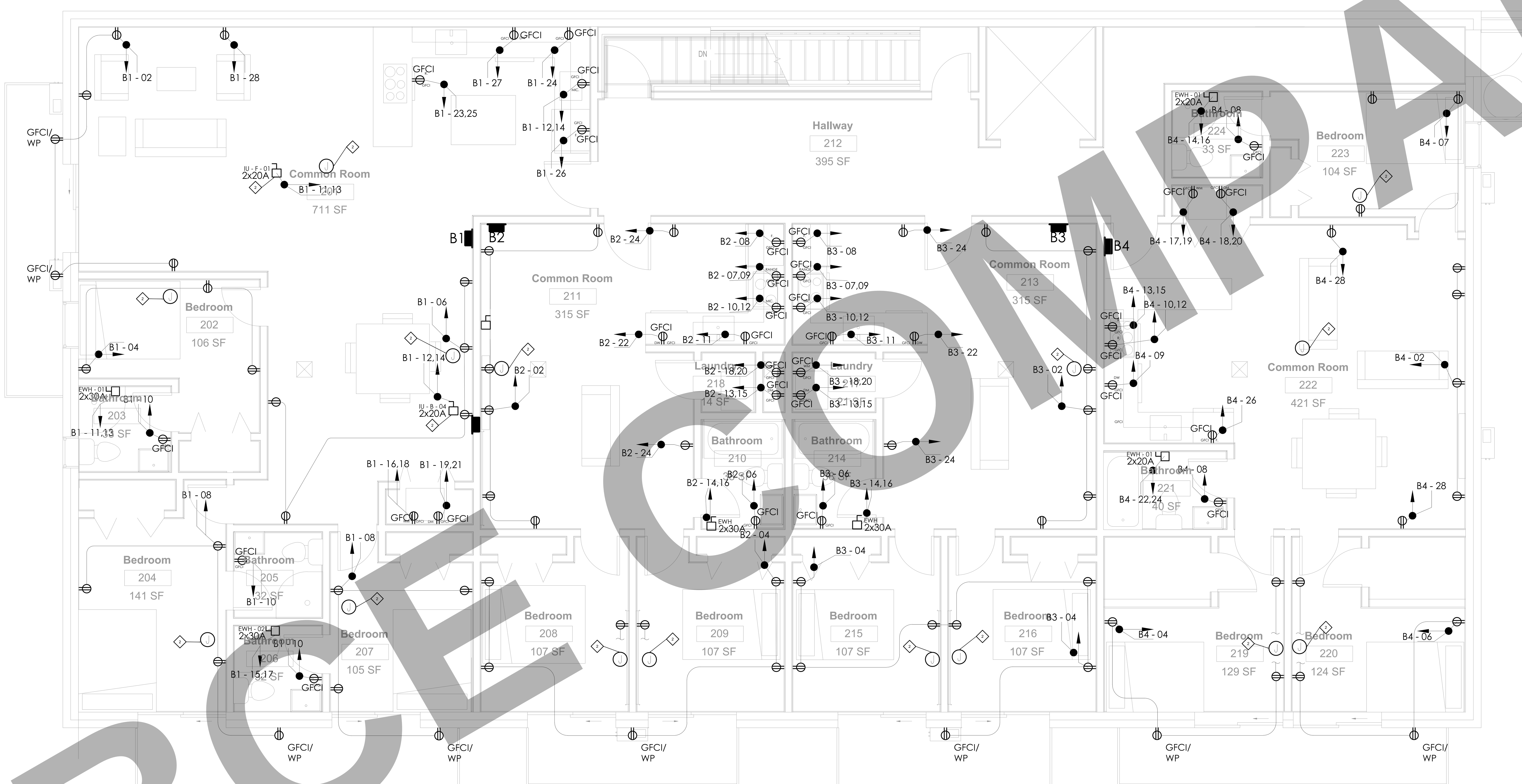
Electrical Power First Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.

E 2 . 0 2

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

1 — DISCONNECT SWITCH FOR SUBMERSIBLE PUMP

2 — JUNCTION BOX FOR HVAC INDOOR UNIT

3 — DISCONNECT SWITCH FOR HVAC OUTDOOR UNIT

4 — DISCONNECT SWITCH FOR EWH UNIT

5 — DISCONNECT SWITCH FOR FAHU UNIT

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))

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REV. NO.	DESCRIPTION	DATE	BY

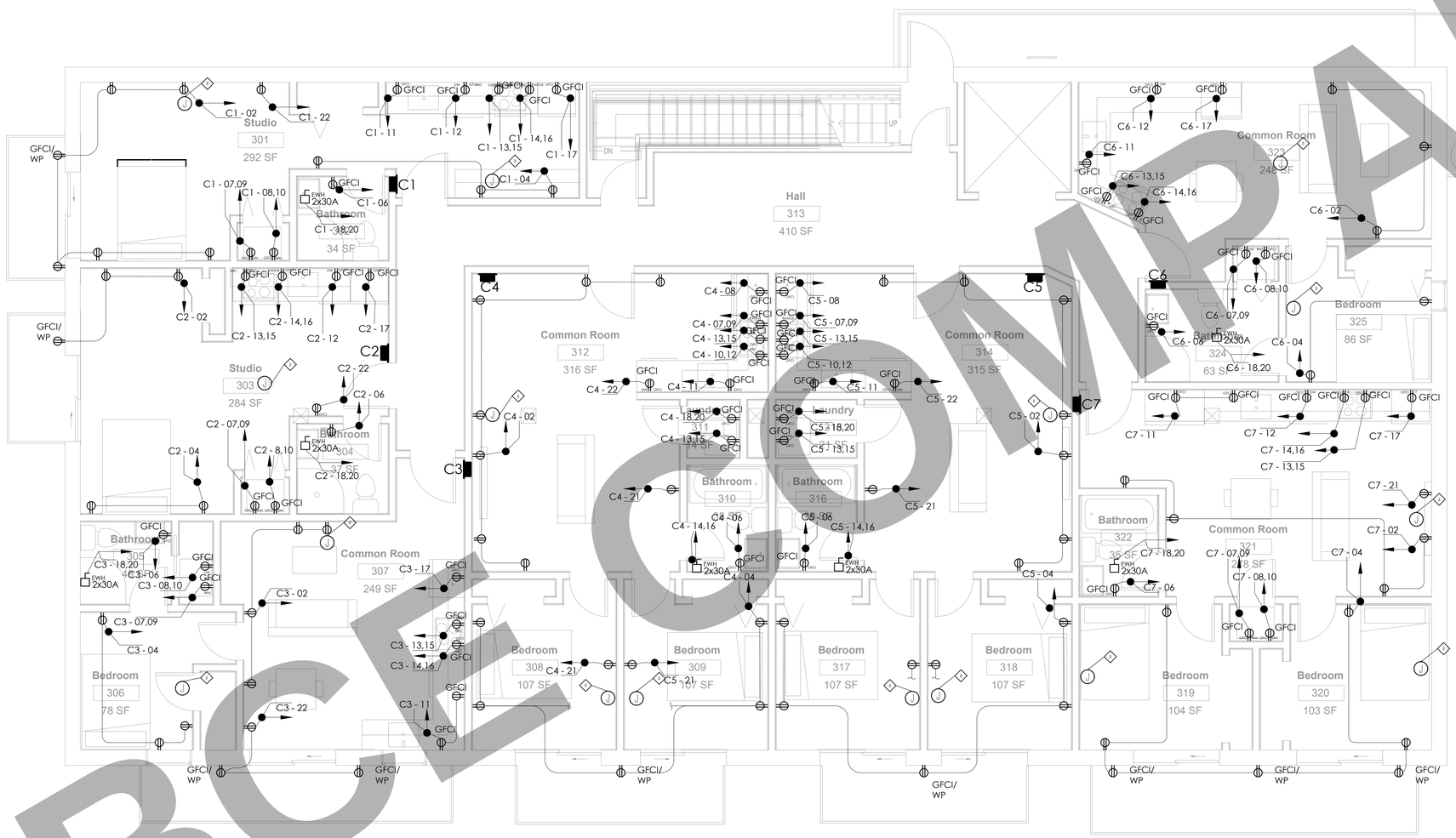
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Power Second Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36: 1/4"=1'-0"

DRAWING NO.
E 2 . 0 3

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

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2. JUNCTION BOX FOR HVAC INDOOR UNIT
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REV. NO	DESCRIPTION	DATE	BY

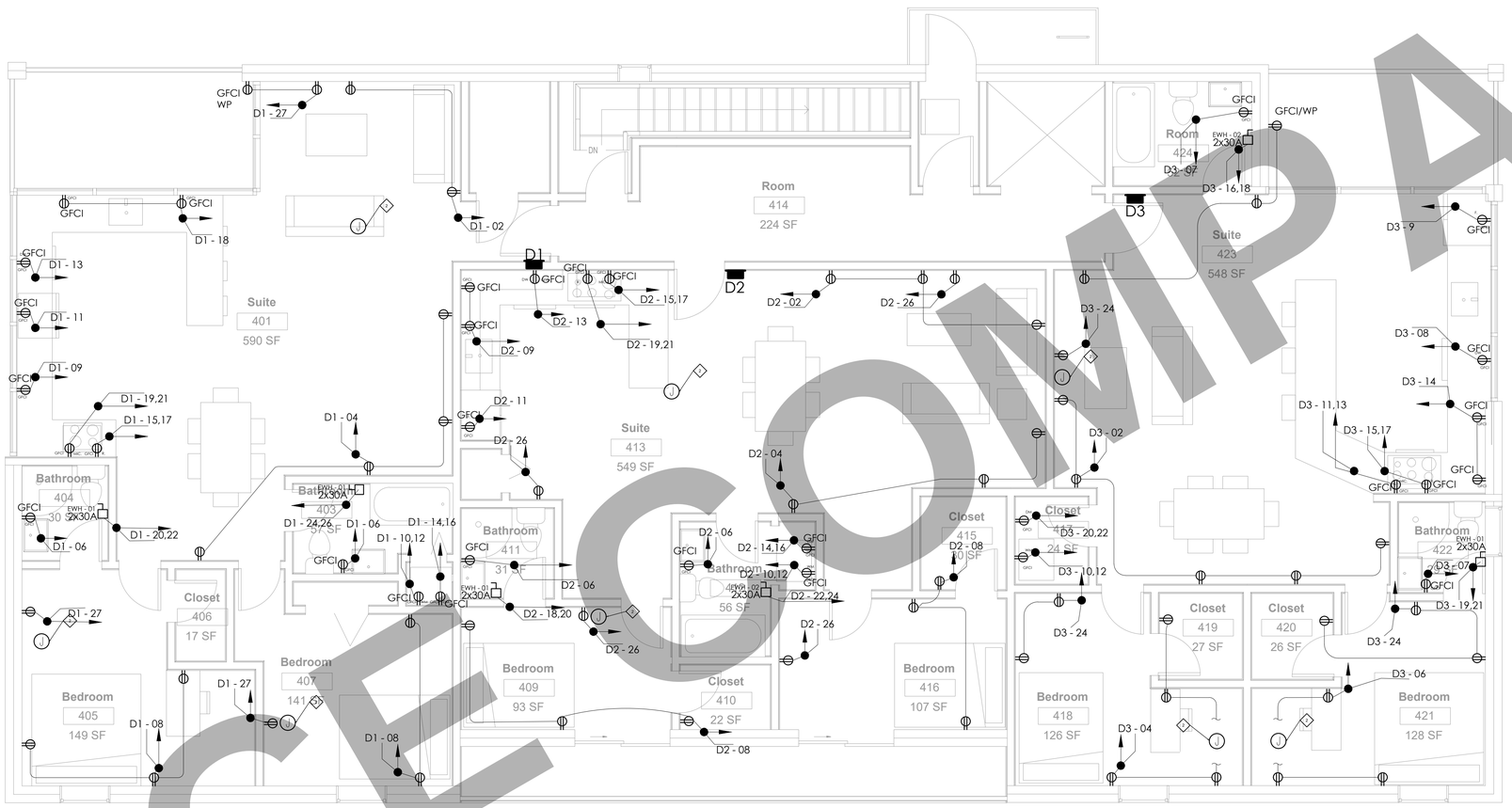
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Power Third Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 2 . 0 4

REV.



APPLICABLE CODE: NEC 2017

SHEET NOTES:

1. DISCONNECT SWITCH FOR SUBMERSIBLE PUMP
2. JUNCTION BOX FOR HVAC INDOOR UNIT
3. DISCONNECT SWITCH FOR HVAC OUTDOOR UNIT
4. DISCONNECT SWITCH FOR EWH UNIT
5. DISCONNECT SWITCH FOR FAHU UNIT

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.

a. NEC ARTICLE 210.52(A) (1) SPACING. RECEPTACLES SHALL BE INSTALLED THAT NO POINT ALONG THE FLOOR LINE OF THE WALL IS MORE THAN 6-FEET FROM A RECEPTACLE.

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.

3. IN EVERY KITCHEN, FAMILY ROOM, DINING ROOM, LIVING ROOM, PARLOR, LIBRARY, DEN, SUNROOM, BEDROOM, RECREATION ROOM OR SIMILAR ROOM OR AREA OF DWELLING UNITS, ALL 125 VOLT 15 AND 20 AMP RECEPTACLES SHALL BE LISTED TAMPER-RESISTANT RECEPTACLES
NEC 406.12)

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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REV. NO	DESCRIPTION	DATE	BY

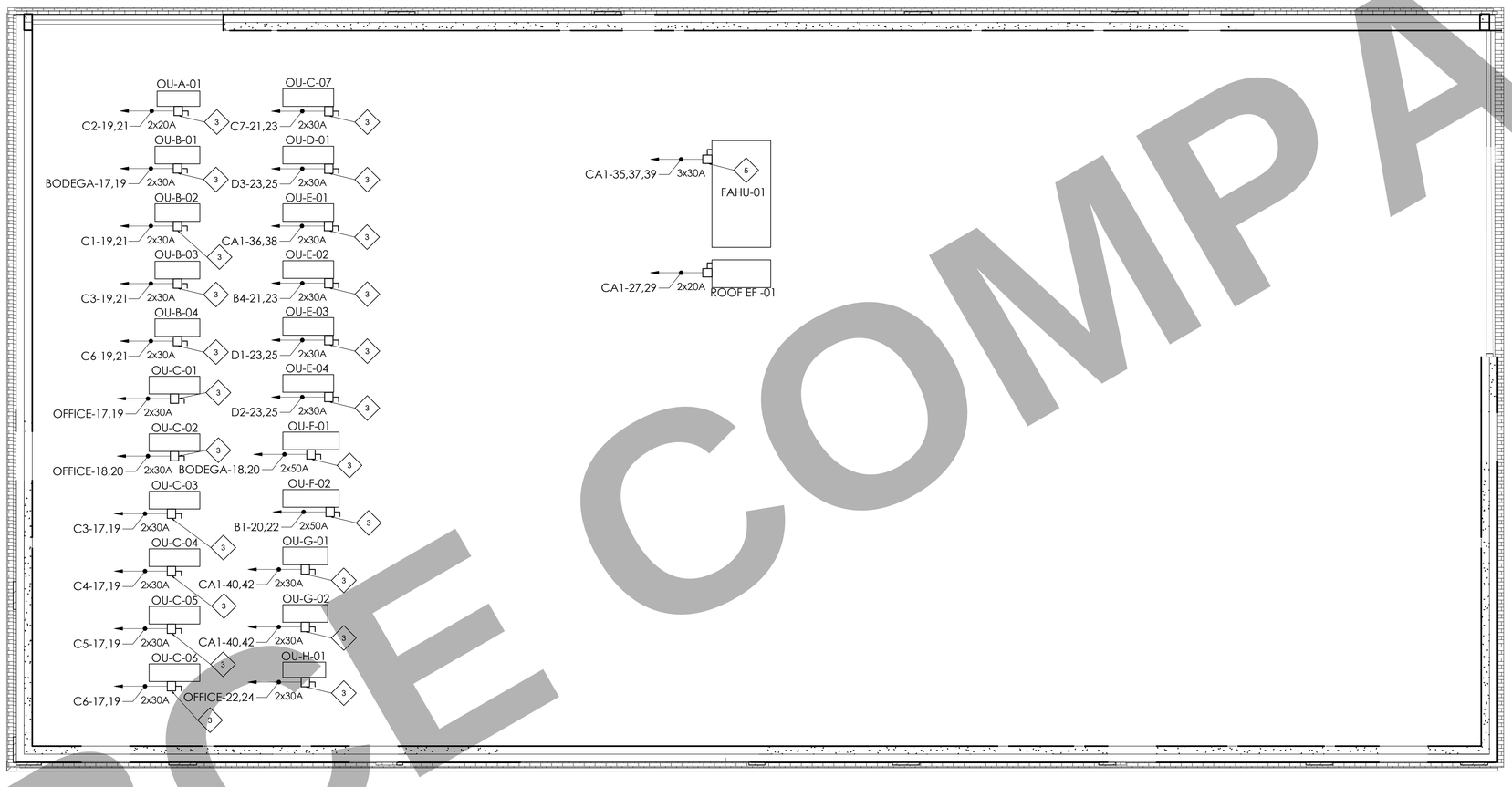
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Power Fourth Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 2 . 0 5

REV.



APPLICABLE CODE: NEC 2017

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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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   NEC 406.12)

CLIENT:

ADDRESS:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
Electrical Power Roof

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

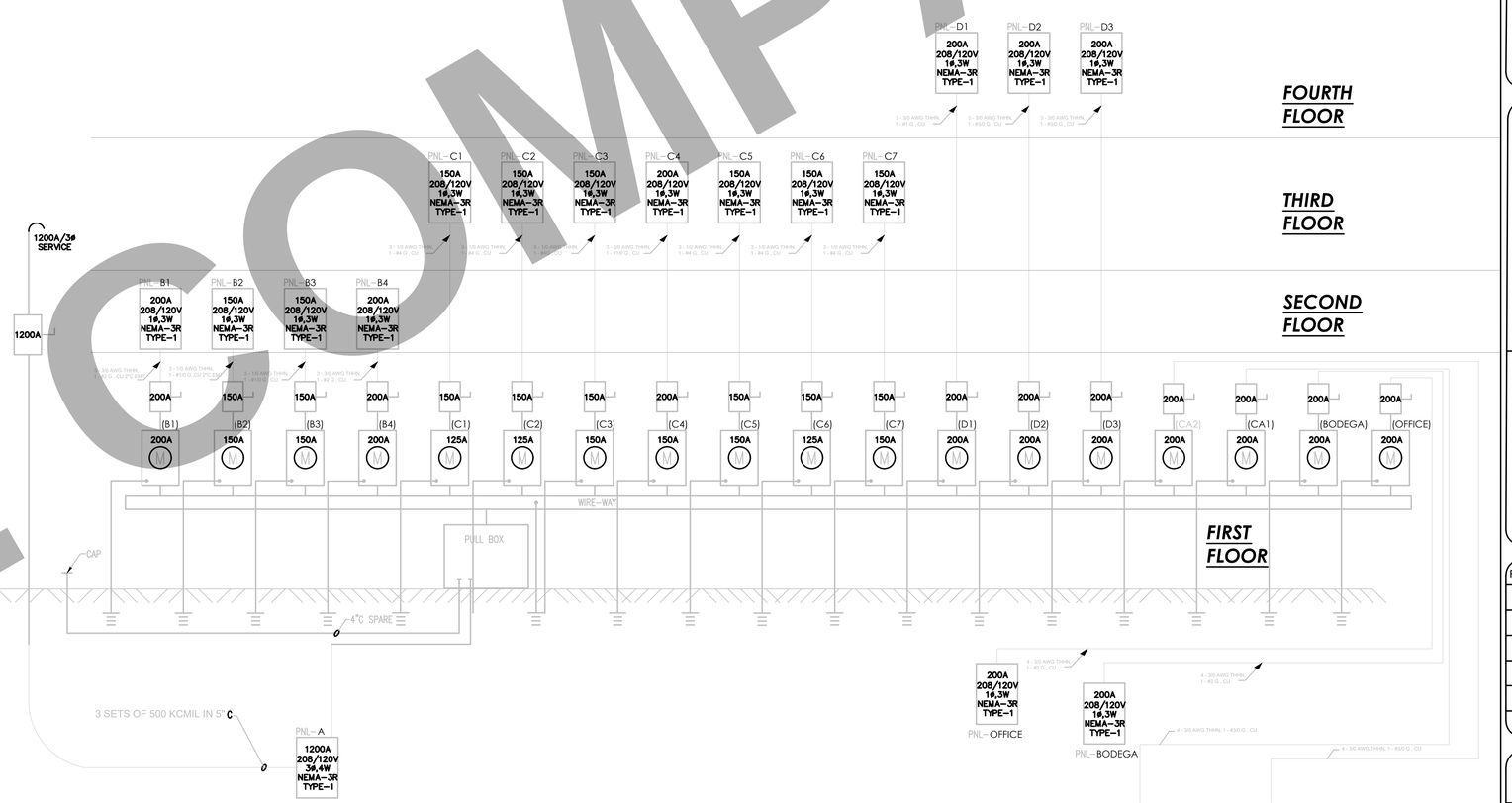
DRAWING NO.
E 2 . 0 6

REV.

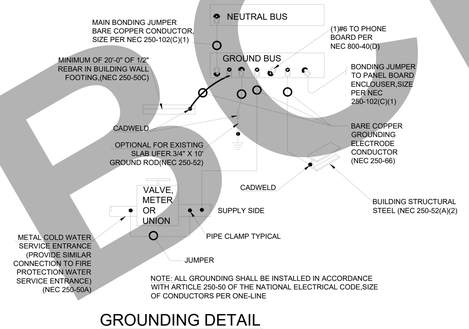
GENERAL NOTES

A. ALL EXISTING COMPONENTS OF THIS ELECTRICAL DIAGRAM ARE TO REMAIN AS INSTALLED AND ARE SHOWN FOR REFERENCE ONLY.
B. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL FIRE PROTECTION
C. ASSOCIATION (NFPA) 70, NATIONAL ELECTRICAL CODE 2017. ALL ITEMS ARE ON AN OR EQUAL BASIS.
D. ALL SINGLE PHASE BRANCH CIRCUITS (RECEPTACLES, LIGHTING, ETC.; ARE 1/2" CONDUIT OR EMT WITH THIN, 90C WIRING, UNLESS NOTED OTHERWISE. ALL OTHER CONDUIT AND WIRING SHALL BE AS INDICATED ON THE PLANS. ACTUAL ROUTING AND HOME RUN GROUPINGS ARE TO BE DETERMINED IN THE FIELD.
E. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC EXCEPT FOR DETAILS AND ELEVATIONS. DO NOT SCALE FROM DIAGRAMMATIC DRAWINGS. EXACT LOCATIONS OF DEVICES AND PANELS ARE TO BE DETERMINED AND ROUGHED-IN DURING CONSTRUCTION TO AVOID INTERFERENCE, TO MEET USER REQUIREMENTS, TO PROVIDE ADEQUATE MOUNTING, AND TO MEET NEC LINEAR ACCESS AND CLEARANCE REQUIREMENTS.
F. BACK TO BACK MOUNTING OF RECEPTACLES IS NOT PERMITTED.
G. IN ADDITION TO THE NEC REQUIREMENTS FOR GFCI PROTECTION FOR RECEPTACLES, THE FOLLOWING RECEPTACLES SHALL ALSO HAVE GFCI PROTECTION: (1)-ALL RECEPTACLES LOCATED WITHIN 8 FEET OF A SINK, (2)-ALL RECEPTACLES WHICH ARE PROVIDED FOR CONVENIENCE IN SERVICING HVAC EQUIPMENT REGARDLESS OF LOCATION.AS REQUIRED TO ACCOMMODATE CONDUCTOR PULLING EASE, FIELD LIFE SAFETY.
H. PROVIDE A LAMICOID NAMEPLATE (WHITE LETTERS ON BLACK BACKGROUND; ON EACH PANELBOARD, MOTOR STARTER,CONTACTOR, TRANSFORMER, ETC. LETTERS SHALL BE 0.75 INCH MAINIMUM.
I. CONTRACTOR SHALL CUT AS REQUIRED TO INSTALL ELECTRICAL EQUIPMENT REPAIR OF FLOOR OR WALLS SHALL BE COORDINATED WITH GENERAL CONTRACTOR CONTRACTOR SHALL ALSO REPAIR ALL OPENINGS LEFT DUE TO EQUIPMENT REMOVAL.
J. CONDUCTORS ARE COPPER UNLESS OTHERWISE SHOWN. ALL CONDUCTORS LARGER THAN #10 SHALL BE STRANDED.
K. PANELBOARDS SHALL CONTAIN A TYPEWRITTEN DIRECTORY WITH A PLASTIC COVER AFFIXED TO THE INSIDE DOOR.

L. ALL FIXTURES, DEVICES, CONDUIT, AND EQUIPMENT SHALL BE SECURED WITH APPROVED HANGERS AND ANCHORS AND IN ACCORDANCE WITH APPROVED STANDARDS OF INSTALLATION.
M. ALL BREAKERS SHOWN IN THE PANELBOARD SCHEDULE SHALL BE RATED AS SHOWN FOR BOTH CIRCUIT CAPACITY AND FAULT CURRENT INTERRUPTING CAPACITY.
N. ALL PANELBOARDS, DISCONNECT SWITCHES, MOTOR STARTERS, AND CONTACTORS SHALL BE NEMA 1, UNLESS OTHERWISE NOTED.
O. ELECTRICAL CONTRACTOR MUST BE AVAILABLE AT TIME OF DBS INSPECTION. COORDINATE WITH GENERAL CONTRACTON.
P. FIELD VERIFY THE AVAILABLE FAULT CURRENT AT THE LANDLORD'S EXISTING PANEL AND PROVIDE A NEW, FULLY RATED, PANEL TO MATCH EXISTING.
Q. CONTRACTOR TO MAKE FINAL CONNECTIONS IN EMS PANEL FOR LANDLORD PROVIDED LIGHTING CIRCUITS. 50% OF THE GENERAL LIGHTING CIRCUITS SHOULD BE ROUTED THROUGH THE CUSTOMER CONTROL ZONE .



1 SERVICE ON-LINE DIAGRAM
Scale: N.T.S



GROUNDING DETAIL

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO	DESCRIPTION	DATE	BY

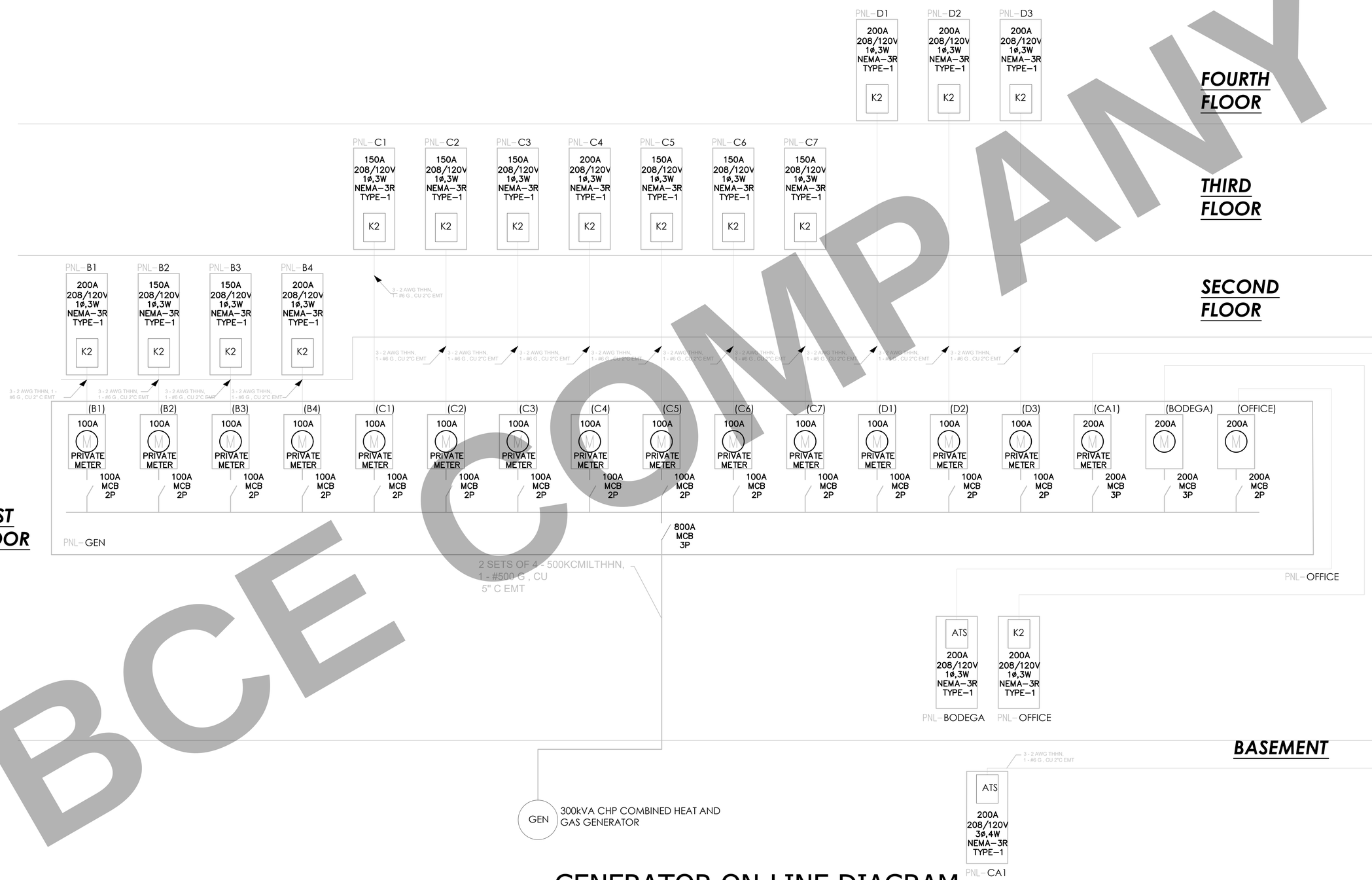
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
UTILITY Single Line Diagram

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

DRAWING NO.
E 3 . 0 1

REV.



GENERATOR ON-LINE DIAGRAM

2 Scale: N.T.S

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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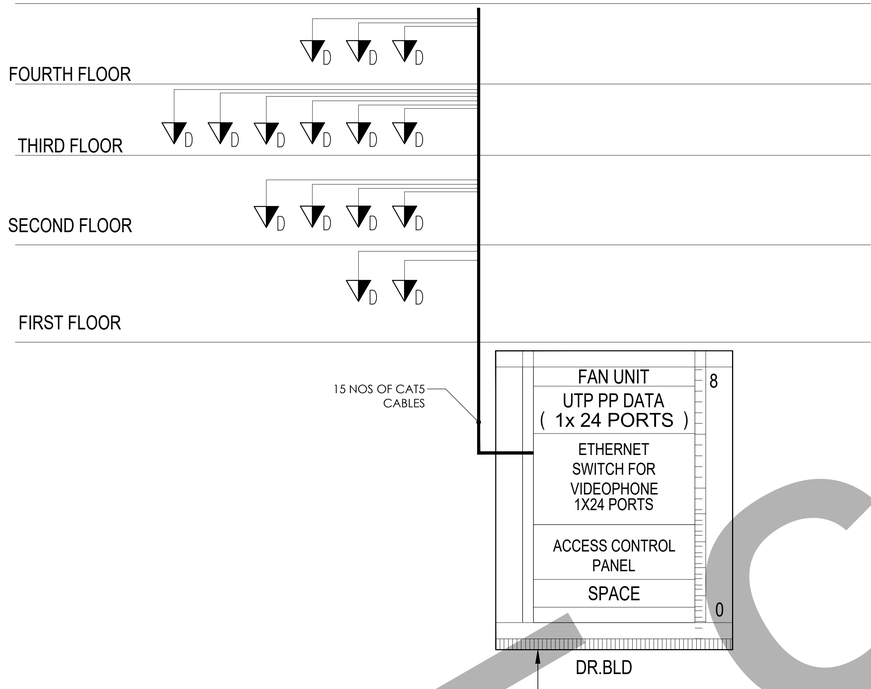
REV. NO	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

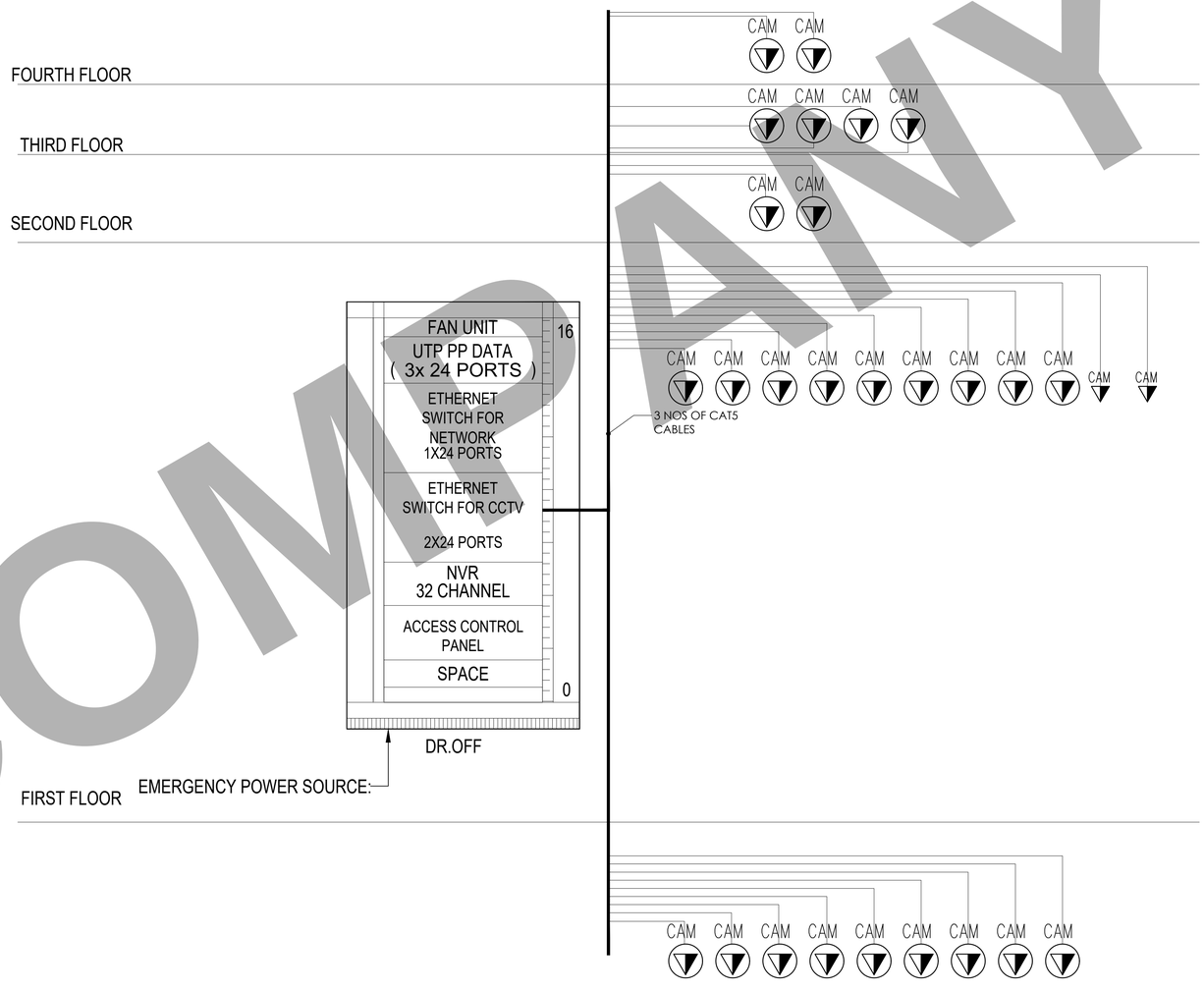
TITLE:
GENERATOR Single Line Diagram

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

DRAWING NO.	REV.
E 3 . 0 2	



1 DR.BLD ONE LINE DIAGRAM
SCALE: NTS



2 DR.OFF RISER DIAGRAM
SCALE: NTS

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO	DESCRIPTION	DATE	BY

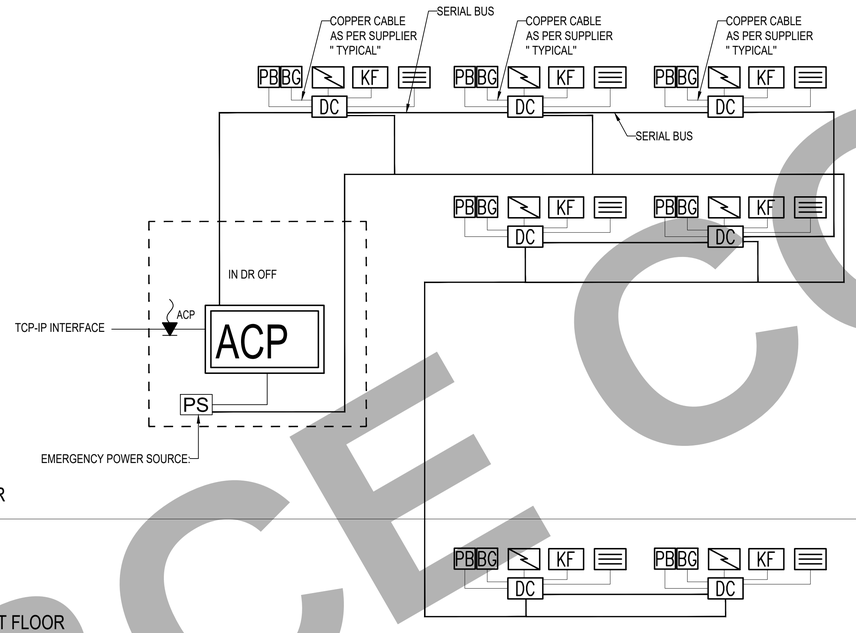
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
TELECOM RISER DIAGRAMS

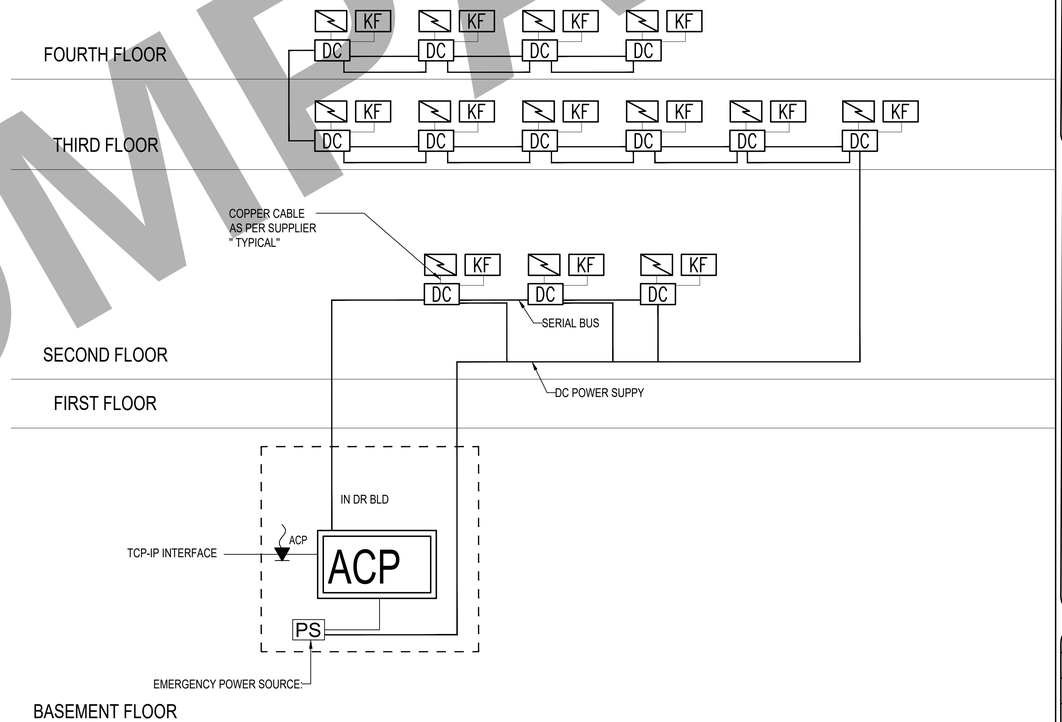
PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		NTS

DRAWING NO.
E 3 . 0 3

REV.



1 OFFICE ACCESS CONTROL SYSTEM
SCALE: NTS



2 APARTMENTS ACCESS CONTROL SYSTEM
SCALE: NTS

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO	DESCRIPTION	DATE	BY

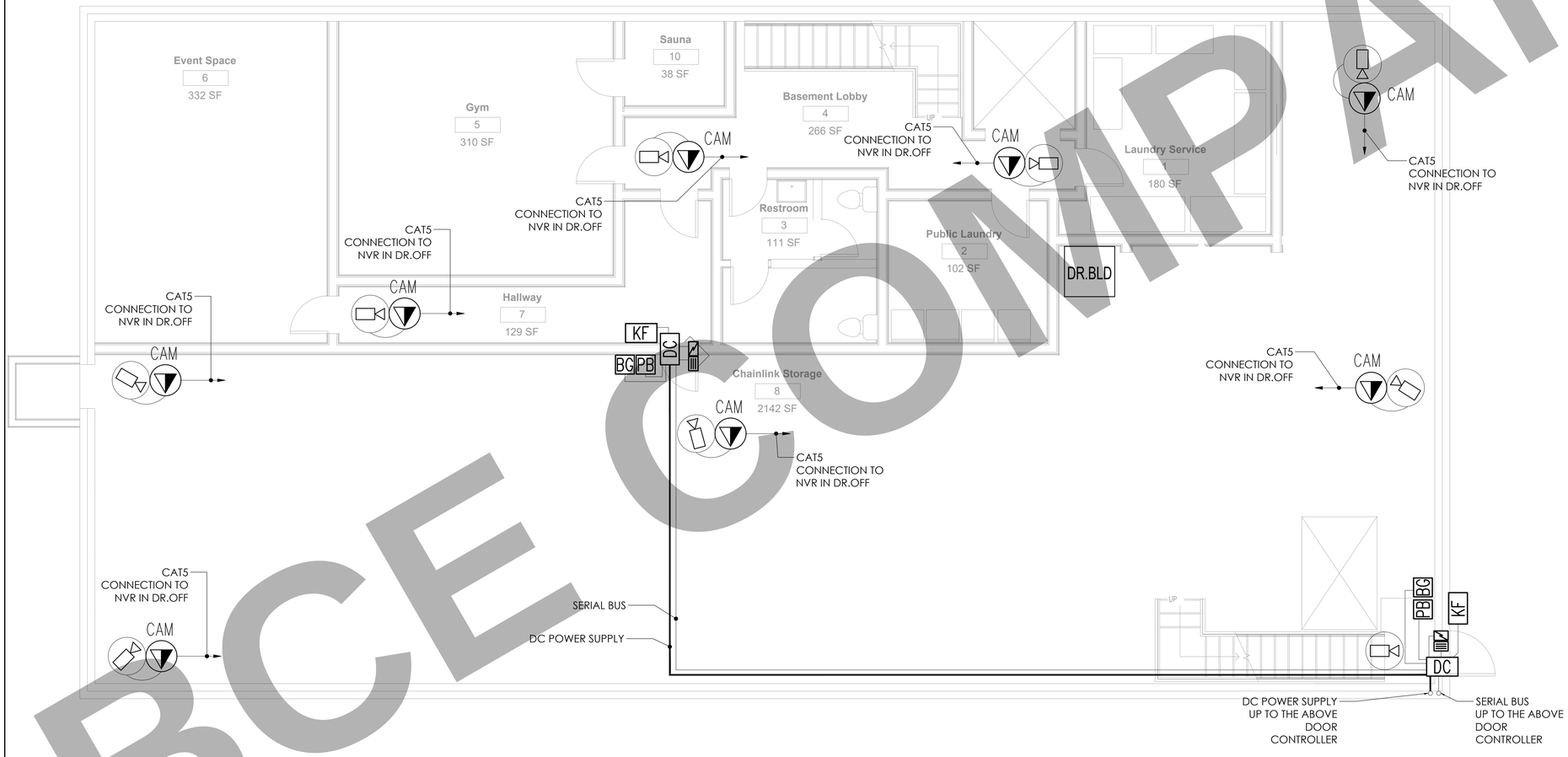
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
ACCESS CONTROL RISER DIAGRAMS

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

DRAWING NO.
E 3 . 0 3

REV.



APPLICABLE CODE: NEC 2017

CLIENT:

ADDRESS:

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REV. NO	DESCRIPTION	DATE	BY

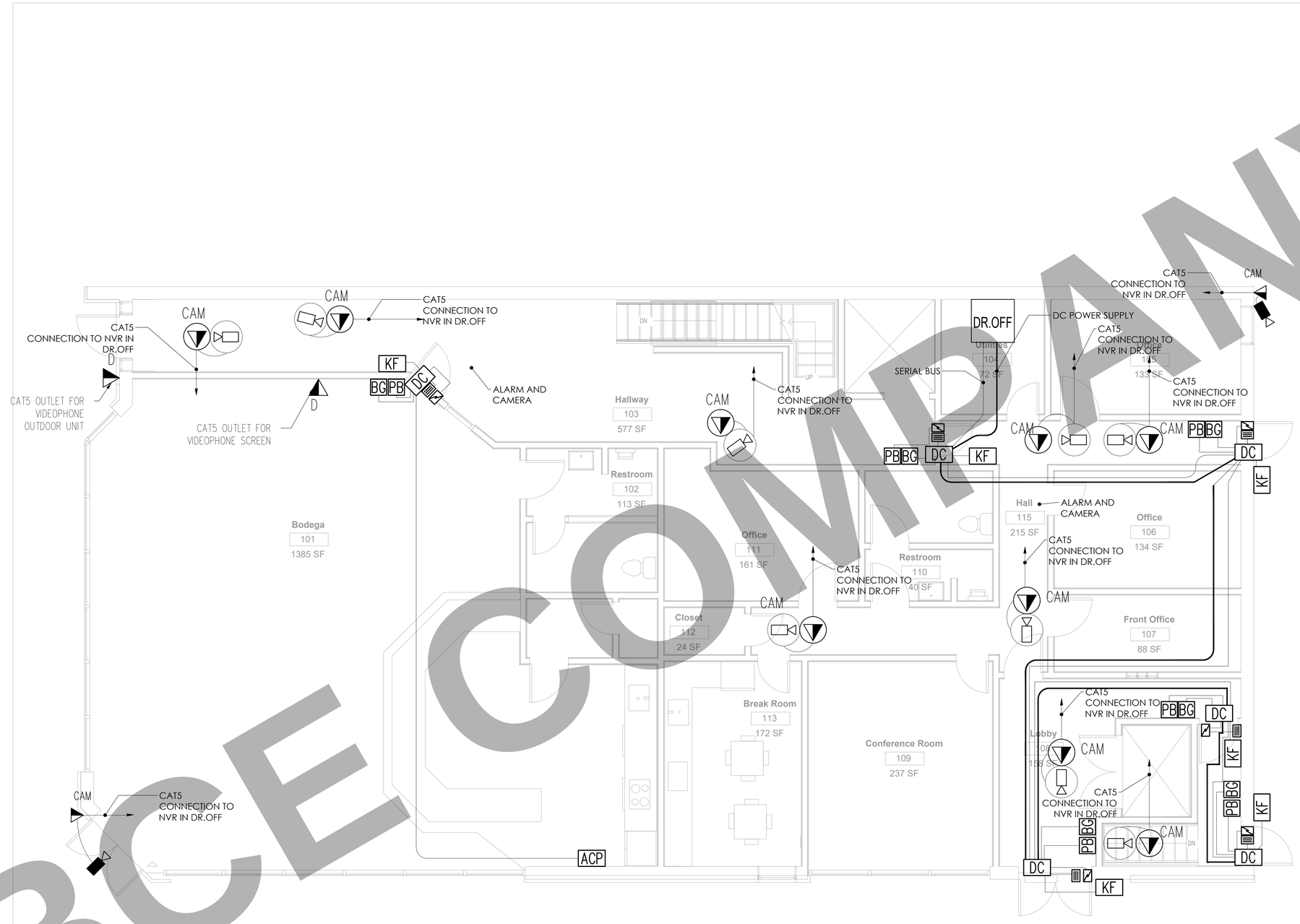
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
TELECOM SYSTEM
Basement

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 4 . 0 1

REV.



APPLICABLE CODE: NEC 2017

CLIENT:

ADDRESS:

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SPRINGFIELD, MO 65806

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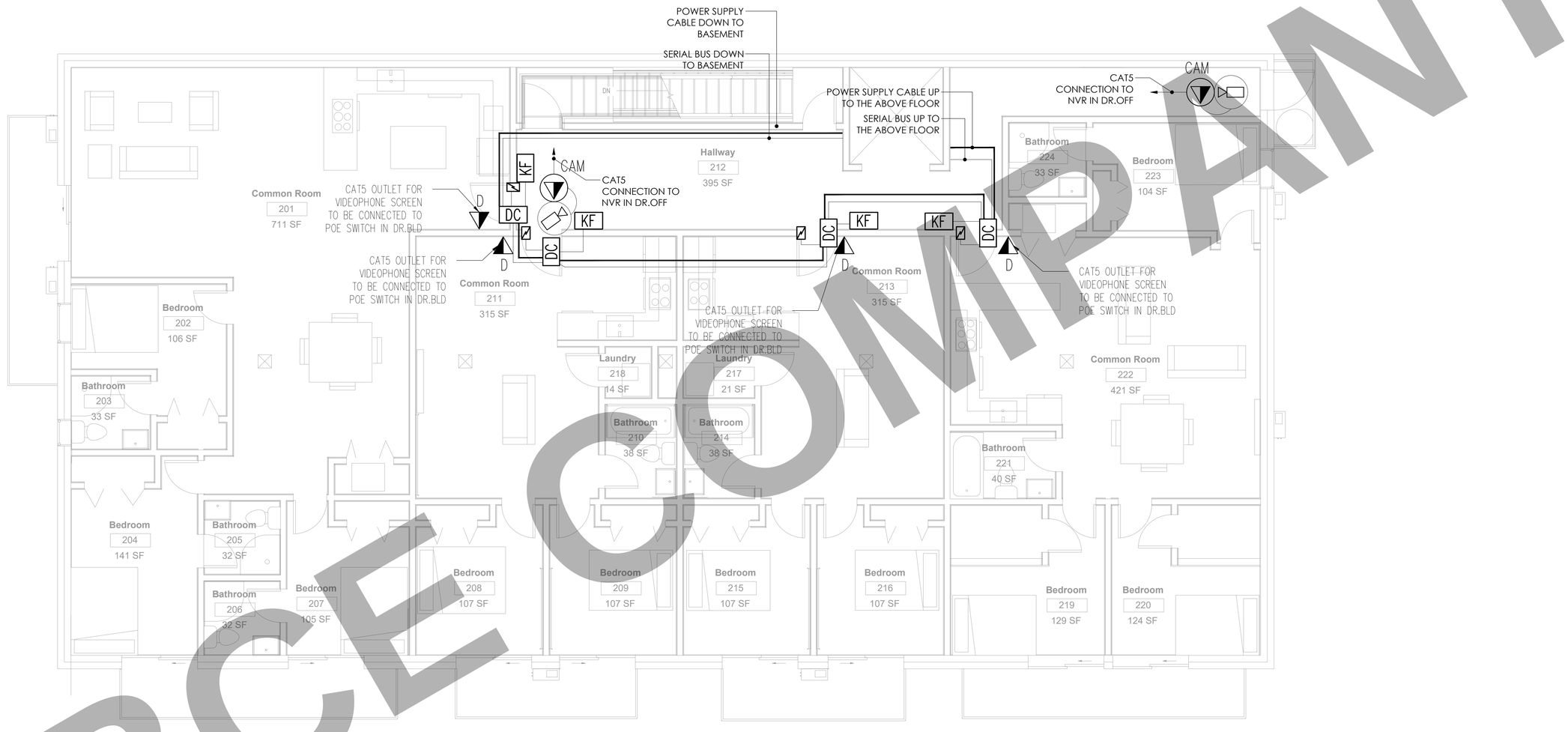
REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
TELECOM SYSTEM First Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.	REV.
E 4 . 0 2	



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REV. NO	DESCRIPTION	DATE	BY

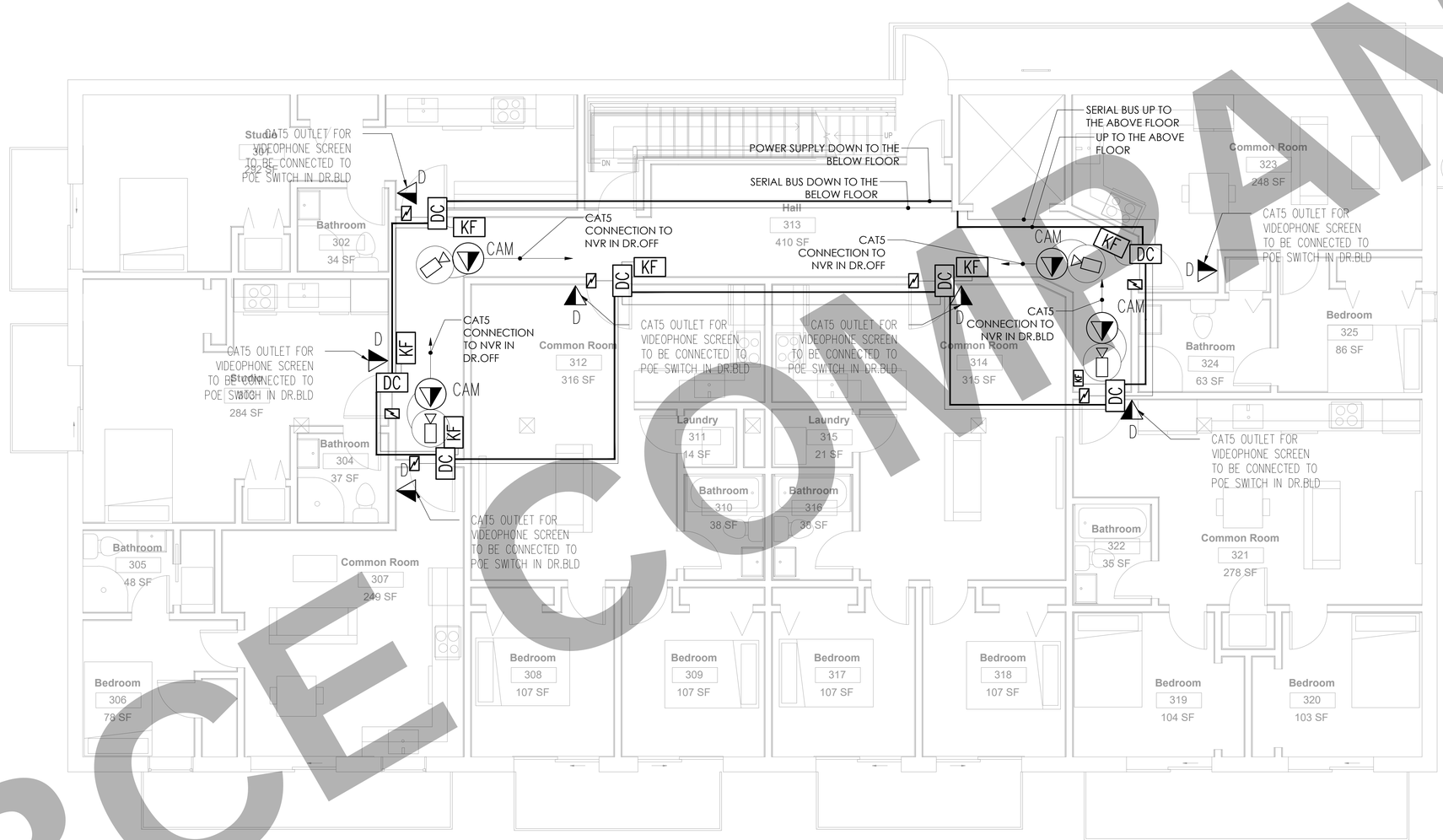
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
TELECOM SYSTEM
Second Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 4 . 0 3

REV.



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REV. NO	DESCRIPTION	DATE	BY

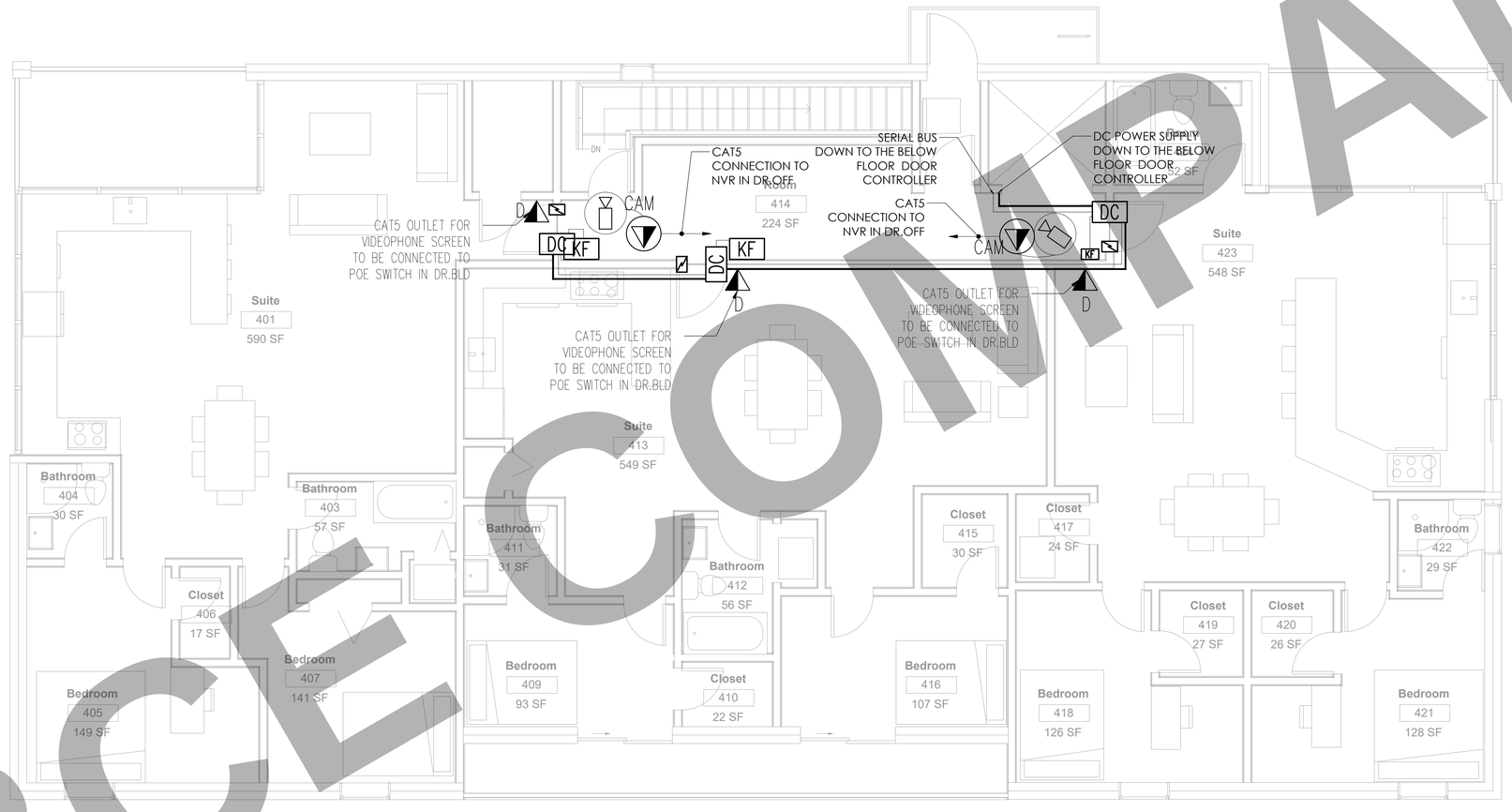
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
TELECOM SYSTEM Third Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 4 . 0 4

REV.



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REV. NO	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
TELECOM SYSTEM Fourth Floor

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36:
		1/4"=1'-0"

DRAWING NO.
E 4 . 0 5

REV.

A

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 3Φ, 4W
BUS SIZE	1200A
SYSTEM TYPE	NORMAL
FEEDER PROT	1200A-3P C/B Bus Plug
CONDUCTOR SIZE	500-kcmil - #500G CU
CONDUCTOR/PHASE	3
MAINS	1200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	50
FEEDER V. DROP (%)	0.430
FAULT CURRENT	
KAIC RATING	10
ENCLOSURE	TYPE 3R

Location: BASEMENT

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	C	DEMAND TOTAL
L	Lighting		1.25				
R	Convenience Recept						
H	Heating (Space)		1.25				
C	RESIDENTIAL/DWELLING UN	462.21	0.40	65.08	60.31	59.49	184.88
A	HVAC		1.00				
P	Process	119.83	1.00	30.66	44.59	44.59	119.83
O	Other Continuous		1.25				
K	Kitchen		0.65				
N	Noncontinuous		1.00				
M	Motor		1.00				
	Total	**582.04**		95.74	104.90	104.07	304.71

Total Demand Load (KVA)	304.71
Total Demand Current (A)	845.80
Min. Feeder Ampacity (A)	1057.25

NB OF DWELLING UNITS 14
DF = 0.4 (NEC 220.84)
(Common areas are not included with the DF)

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	C	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	PANEL BOARD COMMON AREAS 2 (CA2)	P	4X 3/0 AWG	- #2G	200A-3P	12.93	33.29			20.36	200A-2P	3X 3/0 AWG	- #2G	PANEL BOARD B1	C	2
3		P				12.93		32.30		19.37					C	4
5		P				12.93			30.66	17.73					P	6
7	PANEL BOARD B2	C	3x 1/0 AWG	- #4G	150A-2P	12.92	30.65			17.73	200A-2P	4X 3/0 AWG	- #2G	PANEL BOARD COMMON AREAS 1 (CA1)	P	8
9		C				12.43		30.16		17.73					P	10
11	PANEL BOARD C2	C	3x 1/0 AWG	- #4G	150A-2P	13.65			30.67	17.02	150A-2P	3X 1/0 AWG	- #4G	PANEL BOARD B3	C	12
13		C				13.50	29.23			15.73					C	14
15	PANEL BOARD B4	C	3x 3/0 AWG	- #2G	200A-2P	18.05		31.98		13.93	200A-2P	3X 3/0 AWG	- #2G	PANEL BOARD OFFICE	P	12
17		C				17.31			31.24	13.93					P	14
19	PANEL BOARD C7	C	3x 1/0 AWG	- #4G	150A-2P	15.83	15.83							SPACE		20
21		C				14.95		32.07		17.12	200A-2P	3X 3/0 AWG	- #2G	PANEL BOARD C4	C	22
23	PANEL BOARD C3	C	3x 1/0 AWG	- #4G	150A-2P	15.09			30.72	15.63					C	24
25		C				14.66	14.66							SPACE		26
27	PANEL BOARD C5	C	3x 1/0 AWG	- #4G	150A-2P	16.32		35.55		19.23	200A-2P	3X 3/0 AWG	- #2G	PANEL BOARD D2	C	28
29		C				15.63			34.93	19.30					C	30
31	PANEL BOARD D3	C	3x 3/0 AWG	- #2G	200A-2P	20.52	35.33			14.81	150A-2P	3X 1/0 AWG	- #4G	PANEL BOARD C1	C	32
33		C				18.81		33.30		14.48					C	34
35	PANEL BOARD C6	C	3x 1/0 AWG	- #4G	150A-2P	15.19			35.08	19.89	200A-2P	3X 3/0 AWG	- #2G	PANEL BOARD D1	C	36
37		C				14.66	34.37			19.70					C	38
39	SPACE													SPACE		40
41	SPACE													SPACE		42
	(KVA)															
	Total Connected Load					193.37	195.36	193.31								

GEN

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 3Φ, 4W
BUS SIZE	800A
SYSTEM TYPE	NORMAL
FEEDER PROT	800A-3P C/B Bus Plug
CONDUCTOR SIZE	500-kcmil - #500G CU
CONDUCTOR/PHASE	2
MAINS	800A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	50
FEEDER V. DROP (%)	0.430
FAULT CURRENT	
KAIC RATING	10
ENCLOSURE	TYPE 3R

Location: BASEMENT

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	C	DEMAND TOTAL
L	Lighting		1.25				
R	Convenience Recept						
H	Heating (Space)		1.25				
C	RESIDENTIAL/DWELLING UN		0.40				
A	HVAC		1.00				
P	Process	359.56	0.70	121.78	136.19	101.59	251.69
O	Other Continuous		1.25				
K	Kitchen		0.65				
N	Noncontinuous		1.00				
M	Motor		1.00				
	Total	**359.56**		121.78	136.19	101.59	251.69

Total Demand Load (KVA)	251.69
Total Demand Current (A)	698.63
Min. Feeder Ampacity (A)	873.29

GENERATOR SIZE SHALL BE 300kVA

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	C	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	PANEL BOARD COMMON AREAS 1 (CA1)	P	4X 3/0 AWG	- #2G	200A-3P	17.73	23.79			6.06	100A-2P	3x 2 AWG	- #6G	LOAD FROM C3	P	2
3		P				17.73		23.39		5.66					P	4
5		P				17.73			24.38	6.65					P	6
7	LOAD FROM B1	P	3x 2 AWG	- #6G	100A-2P	10.70	16.95			6.25	100A-2P	3x 2 AWG	- #6G	LOAD FROM C4	P	8
9		P				11.10		17.75		6.65					P	10
11	LOAD FROM B2	P	3x 2 AWG	- #6G	100A-2P	6.25			12.50	6.25	100A-2P	3x 2 AWG	- #6G	LOAD FROM C5	P	12
13		P				6.65	12.72			6.06					P	14
15	LOAD FROM B3	P	3x 2 AWG	- #6G	100A-2P	6.25		11.91		5.66	100A-2P	3x 2 AWG	- #6G	LOAD FROM C6	P	12
17		P				6.65			13.30	6.65					P	14
19	LOAD FROM B4	P	3x 2 AWG	- #6G	100A-2P	9.25	15.50			6.25	100A-2P	3x 2 AWG	- #6G	LOAD FROM C7	P	20
21		P				9.65		18.90		9.25					P	22
23	LOAD FROM C1	P	3x 2 AWG	- #6G	100A-2P	6.06			15.72	9.65	100A-2P	3x 2 AWG	- #6G	LOAD FROM D1	P	24
25		P				5.66	15.31			9.65					P	26
27	LOAD FROM C2	P	3x 2 AWG	- #6G	100A-2P	5.08		14.63		9.55	100A-2P	3x 2 AWG	- #6G	LOAD FROM D2	P	28
29		P				4.68			13.93	9.25					P	30
31	LOAD FROM OFFICE	P	3x 2 AWG	- #6G	100A-2P	27.86	37.51			9.65	100A-2P	3x 2 AWG	- #6G	LOAD FROM D3	P	32
33		P				27.86		49.61		21.75					P	34
35	SPACE								21.75	21.75	100A-2P	3x 2 AWG	- #6G	BODEGA	P	36
	(KVA)															
	Total Connected Load					121.78	136.19	101.59								

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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:
B SQUARE TOWER PROJECT

TITLE:
ELECTRICAL PANEL BOARDS

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

DRAWING NO.
E 5 . 0 1

REV.

##	15A-1P	2x 12 - #1	LIGHTING 4TH FLOOR	L

Location: ELEC

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	C	DEMAND TOTAL
L	Lighting	4.78	1.25	2.52	1.70	0.56	5.97
R	Convenience Recept	3.92		1.08	1.80	1.04	3.92
H	Heating (Space)		1.25				
C	Cooling		1.00				
A	HVAC	10.62	1.00	3.08	3.23	4.31	10.62
P	Process		1.00				
O	Other Continuous		1.25				
K	Kitchen	17.00	6.00	6.90	3.90	6.20	11.05
N	Noncontinuous	21.00	1.00	7.00	7.00	7.00	21.00
M	Motor		1.00				
	Total	**57.32**		20.58	17.63	19.11	52.56

Total Demand Load (KVA)	52.56
Total Demand Current (A)	145.89
Min. Feeder Ampacity (A)	182.36

THIS PANEL WILL BE TOTALLY FED FROM GENERATOR SO ATS WILL BE FEEDING ALL THE PANEL

PANEL CA1

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 - #2G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	10
FEEDER V. DROP (%)	0.128
FAULT CURRENT	
KAIC RATING	10
ENCLOSURE	TYPE 3R

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B		KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING GYM - EVENT SPACE - SAUNA	L	2x 12 AWG - #12G		15A-1P	0.33	0.60			0.28	15A-1P	2x 12 AWG - #12G		LIGHTING CORRIDORS	L	2
3	LIGHTING LAUNDRY SERVICE	L	2x 12 AWG - #12G		15A-1P	0.18		0.43		0.25	15A-1P	2x 12 AWG - #12G		LIGHTING RESTROOM - PUBLIC LAUNDRY	L	4
5	LIGHTING STORAGE	L	2x 12 AWG - #12G		15A-1P	0.15			0.36	0.21	15A-1P	2x 12 AWG - #12G		LIGHTING STORAGE	L	6
7	LIGHTING STORAGE	L	2x 12 AWG - #12G		15A-1P	0.24	0.24							SPACE		8
9	LIGHTING CORRIDOR 1ST FLOOR	L	2x 12 AWG - #12G		15A-1P	0.35		0.68		0.33	15A-1P	2x 12 AWG - #12G		LIGHTING 2ND FLOOR	L	10
11	SPACE								0.20	0.20	15A-1P	2x 12 AWG - #12G		LIGHTING 4TH FLOOR	L	12
13	LIGHTING 3RD FLOOR	L	2x 12 AWG - #12G		15A-1P	0.38	1.46			1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES EVENT SPACE	R	14
15	RECEPTACLES BODEGA - RESTROOM	R	2x 10 AWG - #10G		20A-1P	0.90		1.80		0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES BASEMENT LOBBY - RESTROOM	R	16
17	RECEPTACLES GYM	R	2x 10 AWG - #10G		20A-1P	0.54			2.84	2.30	30A-2P	3x 10 AWG - #10G		LAUNDRY	K	18
19	LAUNDRY	K	3x 10 AWG - #10G		30A-2P	2.30	4.60			1.60					K	20
21		K				2.30		3.90		1.60	20A-2P	3x 10 AWG - #10G		LAUNDRY	K	22
23	LAUNDRY	K	3x 10 AWG - #10G		30A-2P	2.30			3.90	1.60					K	24
25		K				2.30	3.50			1.20	20A-1P	2x 10 AWG - #10G		OUTDOOR LIGHTING	L	26
27	ROOF EXHAUST FAN	A	3X 10 AWG - #10G		20A-2P	0.15		0.45		0.30	15A-1P	2x 12 AWG - #12G		LIGHTING STORAGE	L	28
29		A				0.15			7.15	7.00	60A-3P	4X 8 AWG 8 AWG		ELEVATOR	N	30
31	EXIT SIGNS	L	2x 12 AWG - #12G		15A-1P	0.10	7.10			7.00					N	32
33	SMOKE DETECTORS	L	2x 12 AWG - #12G		15A-1P	0.30		7.30		7.00					N	34
35	FAHU	A	3X 8 AWG - #8G		30A-3P	2.00			3.08	1.08	30A-2P	3X 8 AWG - #8G		OU-E-01	A	36
37		A				2.00	3.08			1.08					A	38
39		A				2.00		3.08		1.08	30A-2P	3X 8 AWG - #8G		OU-G-02	A	40
41	DR.BLD	R	2x 10 AWG - #10G		20A-1P	0.50			1.58	1.08					A	42
43														SPACE		44
45	SPACE													SPACE		46
47	SPACE													SPACE		48
	(KVA)															
	Total Connected Load					20.58	17.63	19.11		52.56						

Location: BASEMENT

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	DEMAND TOTAL
L	Lighting	1.25	1.25	0.88	0.38	1.56
R	Convenience Recept	9.04		4.44	4.60	9.04
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	13.00	1.00	6.50	6.50	16.25
P	Process		1.00			
O	Other Continuous		1.25			
K	Kitchen	1.00	2.00		1.00	1.00
N	Noncontinuous		1.00			
			1.00			
	Total	**24.29**		11.82	12.48	27.86

Total Demand Load (KVA)	27.86
Total Demand Current (A)	133.92
Min. Feeder Ampacity (A)	167.40

THIS PANEL WILL BE TOTALLY FED FROM GENERATOR SO ATS WILL BE FEEDING ALL THE PANEL

OFFICE

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #3/0G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 3R

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B		KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING OFFICE - FRONT OFFICE	L	2x 12 AWG - #12G		15A-1P	0.13	0.25			0.13	15A-1P	2x 12 AWG - #12G		LIGHTING UTILITIES - OFFICE	L	2
3	LIGHTING OFFICE - RESTROOM	L	2x 12 AWG - #12G		15A-1P	0.23		0.38		0.15	15A-1P	2x 12 AWG - #12G		LIGHTING HALL	L	4
5	RECEPTACLES CORRIDOR - RESTROOM	R	2x 10 AWG - #10G		20A-1P	0.90	1.33			0.43	15A-1P	2x 12 AWG - #12G		LIGHTING LOBBY - CONFERENCE ROOM	L	6
7	RECEPTACLES OFFICE	R	2x 10 AWG - #10G		20A-1P	0.72		1.62		0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES OFFICE	R	8
9	RECEPTACLES CONFERENCE ROOM	R	2x 10 AWG - #10G		20A-1P	0.72	1.44			0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLES UTILITIES	R	10
11	RECEPTACLES KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.72		1.98		1.26	20A-1P	2x 10 AWG - #10G		RECEPTACLES OFFICE - FRONT OFFICE	R	12
13	RECEPTACLES KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.72	1.80			1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES CONFERENCE ROOM	R	14
15	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.50		1.00		0.50	20A-1P	2x 10 AWG - #10G		MICROWAVE	K	16
17	OU-C-01	A	3X 8 AWG - #8G		30A-2P	2.65	5.30			2.65	30A-2P	3x 8 AWG - #8G		OU-C-02	A	18
19		A				2.65		5.30		2.65					A	20
21	FIRE ALARM PANEL	R	2x 10 AWG - #10G		20A-1P	0.30	1.50			1.20	20A-2P	3X 10 AWG - #10G		OU-H-01	A	22
23	DATA RACK	R	2x 10 AWG - #10G		20A-1P	1.00		2.20		1.20					A	24
25	SPACE						0.20			0.20	15A-1P	2x 12 AWG - #12G		SMOKE DETECTORS	L	26
27	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P						100A-2P	WILL SOME CIRCUITS		CONTACTOR K2 OF ATS		28
29																30
31	SPACE													SPACE		32
	(KVA)															
	Total Connected Load						11.82	12.48								

BODEGA

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #3/0G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 3R

Location: BASEMENT

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	DEMAND TOTAL
L	Lighting	1.10	1.25	0.90	0.20	1.38
R	Convenience Recept	2.20		0.90	1.30	2.20
H	Heating (Space)	6.00	1.25	3.00	3.00	7.50
C	Cooling		1.00			
A	HVAC	12.52	1.00	6.28	6.28	15.66
P	Process	10.40	1.00	5.20	5.20	10.40
O	Other Continuous		1.25			
K	Kitchen	9.80	6.00	4.60	5.20	6.37
N	Noncontinuous		1.00			
			1.00			
	Total	**42.02**		20.86	21.16	43.50

Total Demand Load (KVA)	43.50
Total Demand Current (A)	209.13
Min. Feeder Ampacity (A)	261.42

THIS PANEL WILL BE TOTALLY FED FROM GENERATOR SO ATS WILL BE FEEDING ALL THE PANEL

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B		KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING BREAKROOM - KITCHEN - RESTROOM	L	2x 12 AWG - #12G		15A-1P	0.45	0.90			0.45	15A-1P	2x 12 AWG - #12G		LIGHTING BODEGA	L	2
3	RECEPTACLES BODEGA	R	2x 10 AWG - #10G		20A-1P	0.54		0.90		0.36	20A-1P	2x 10 AWG - #10G		RECETACLES RESTROOMS	R	4
5	RECEPTALES CASH COUNTER	R	2x 10 AWG - #10G		20A-1P	0.54	0.90			0.36	20A-1P	2x 10 AWG - #10G		RECETACLES NEAR SINK	R	6
7	DISHWASHER	K	2x 10 AWG - #10G		20A-1P	1.20		5.20		4.00	40A-2P	3x 8 AWG - #8G		STOVE	K	8
9	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.60	4.60			4.00					K	10
11	WALK IN FREEZER	P	3x 10 AWG - #8G		30A-2P	2.60		5.20		2.60	30A-2P	3x 10 AWG - #8G		WALK IN FREEZER	P	12
13		P				2.60	5.20			2.60					P	14
15	DOOR SENSOR	R	2x 10 AWG - #10G		20A-1P	0.40		0.60		0.20	15A-1P	2x 12 AWG - #12G		SMOKE DETECTORS	L	16
17	OU-B-01	A	3X 8 AWG - #8G		30A-2P	2.06	6.26			4.20	50A-2P	3X 8 AWG - #8G		OU-F-01	A	18
19		A				2.06		6.26		4.20					A	20
21	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P			3.00		3.00	30A-2P	3x 10 AWG - #8G		ELECTRIC WATER HEATER	H	22
23								3.00		3.00					H	24
25	CONTACTOR K2 OF ATS		WILL FEED ALL PANEL		200A-2P									SPACE		26
27														SPACE		28
	(KVA)															
	Total Connected Load						20.86	21.16								

B1

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #3/0G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 3R

Location: Second Floor APT. 1

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	DEMAND TOTAL
L	Lighting	1.35	1.25	1.10	0.25	1.69
R	Convenience Recept	3.78		2.16	1.62	3.78
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	8.40	1.00	4.20	4.20	10.50
P	Process	12.40	0.80	4.80	5.12	9.92
O	Other Continuous		1.25			
K	Kitchen	16.28	6.00	8.10	8.18	10.58
N	Noncontinuous		1.00			
			1.00			
	Total	**42.21**		20.36	19.37	36.47

Total Demand Load (KVA)	36.47
Total Demand Current (A)	175.33
Min. Feeder Ampacity (A)	219.17

LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 1,3,13,15,17,12,14,24,22,26 AND 28 SINCE ITS INPUTS LEG ARE FROM GEN

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B		KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING KITCHEN + LIVING	L	2x 12 AWG - #12G		15A-1P	0.40	1.12			0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLES DINING	R	2
3	LIGHTING BEDROOM	L	2x 12 AWG - #12G		15A-1P	0.10		0.64		0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOM	R	4
5	LIGHTING DINNING	L	2x 12 AWG - #12G		15A-1P	0.25	1.15			0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING	R	6
7	LIGHTING BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.15		1.23		1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOMS	R	8
9	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.15	0.69			0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	10
11	EWH - 01	P	3x 10 AWG - #10G		30A-2P		3.00		3.50	0.50	20A-2P	3x 10 AWG - #10G		MICROWAVE	K	12
13		P					3.00	3.50		0.50					K	14
15	EWH - 02	P	3x 10 AWG - #10G		30A-2P		3.00		3.60	0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	16
17		P					3.00	3.60		0.60					K	18
19	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P		2.50		6.70	4.20	50A-2P	3x 10 AWG - #10G		OU - F - 02	A	20
21		K					2.50	6.70		4.20					A	22
23	ELECTRIC RANGE	K	3x 8 AWG - #8G		40A-2P		4.00		4.18	0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLE KITCHEN	K	24
25		K					4.00	4.50		0.50	20A-1P	2x 10 AWG - #10G		FRIDGE	K	26
27	DISHWASHER	K	2x 10 AWG - #10G		15A-1P	0.40			0.80	0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	28
29	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P			0.30		0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	30
31											20A-1P			SPARE		32
33	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P						20A-1P			SPARE		34
35											20A-1P			SPARE		36
37	SPARE				20A-1P						20A-1P			SPARE		38
39	SPARE				20A-1P						20A-1P			SPARE		40
	(KVA)															
	Total Connected Load						21.56	20.65								

B2

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #1/0G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

Location: Second Floor APT. 2

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	DEMAND TOTAL
L	Lighting	0.87	1.25	0.75	0.12	1.09
R	Convenience Recept	2.70		1.62	1.08	2.70
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	12.20	1.00	5.90	6.30	12.20
O	Other Continuous		1.25			
K	Kitchen	4.28	6.00	2.00	2.28	2.78
N	Noncontinuous		1.00			
			1.00			
	Total	**25.35**		12.92	12.43	25.40

Total Demand Load (KVA)	25.40
Total Demand Current (A)	122.11
Min. Feeder Ampacity (A)	152.64

LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 1,9,12,14,16,17,19,24 AND 26 SINCE ITS INPUTS LEG ARE FROM GEN

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B		KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING LIVING ROOM	L	2x 12 AWG - #12G		15A-1P	0.35	1.79			1.44	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING ROOM	R	2
3	LIGHTING BATHROOM + KITCHEN	L	2x 12 AWG - #12G		15A-1P	0.12		1.20		1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOMS	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.10	0.28			0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLE BATHROOM	R	6
7	RANGE	K	3x 10 AWG - #10G		20A-2P		1.00		1.50	0.50	20A-1P	2x 10 AWG - #10G		FRIDGE	K	8
9		K					1.00	1.60		0.60	20A-2P	3x 10 AWG - #10G		MICROWAVE	K	10
11	RECEPTACLE KITCHEN	K	2x 10 AWG - #10G		20A-1P	0.18		0.78		0.60					K	12
13	DRYING MACHINE	P	3x 10 AWG - #10G		30A-1P	2.30	5.30			3.00	20A-2P	3x 10 AWG - #10G		EWH	P	14
15		P				2.30		5.30		3.00					P	16
17	OU - C - 03	A	3x 8 AWG - #8G		30A-2P	2.65	3.25			0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	P	18
19		A				2.65		3.25		0.60					P	20
21	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P		0.40			0.40	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	22
23								0.40		0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	24
25	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P		0.30			0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	26
27											20A-1P			SPARE		28
29	SPARE				20A-1P						20A-1P			SPARE		30
31	SPARE				20A-1P						20A-1P			SPARE		32
	(KVA)															
	Total Connected Load						12.92	12.43								

Common Areas 2 (CA2)

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 3Φ, 4W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-3P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #2G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	50
FEEDER V. DROP (%)	0.640
FAULT CURRENT	
KAIC RATING	10
ENCLOSURE	TYPE 3R

Location: BASEMENT

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	B	C	DEMAND TOTAL
L	Lighting		1.25				
R	Convenience Recept						
H	Heating (Space)	15.00	1.25	7.50		7.50	18.75
C	Cooling		1.00				
A	HVAC		1.00				
P	Process	20.04	1.00	9.52	3.52	7.00	20.04
O	Other Continuous		1.25				
K	Kitchen		0.65				
N	Noncontinuous		1.00				
M	Motor		1.00				
	Total	**35.04**		17.02	3.52	14.50	38.79

Total Demand Load (KVA)	38.79
Total Demand Current (A)	107.67
Min. Feeder Ampacity (A)	134.59

THIS PANEL WILL NOT BE FED FROM GENERATOR SINCE THIS PANEL IS FEEDING NON ESSENTIAL LOADS

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	C	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	SAUNA	P	3X 10 AWG - #10G		20A-3P	1.00	1.12			0.12	20A-2P	3X 10 AWG - #10G		ROLLERS	P	2
3		P				1.00		1.12		0.12					P	4
5	3600PW	P	3X 8 AWG - #8G		30A-2P	1.00			3.40	2.40	30A-2P	3X 8 AWG - #8G		3600XW	P	6
7		P				2.40	4.80			2.40					P	8
9		P				2.40		2.40			20A-1P			SPARE		10
11	6900TD	P	3X 8 AWG - #8G		30A-2P	3.60			11.10	7.50	80A-2P	3X 3 AWG - #6G		EWH	H	12
13		P				3.60	11.10			7.50					H	14
15	SPACE													SPACE		16
17	SPACE													SPACE		18
	(KVA)															
	Total Connected Load					17.02	3.52	14.50		38.79						

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
ELECTRICAL PANEL BOARDS

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

DRAWING NO.
E 5 . 0 2

REV.

Location: Second Floor APT. 4

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.74	1.25	0.58	0.16	0.93
R	Convenience Recept	3.06		1.62	1.44	3.06
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	9.40	1.00	4.50	4.90	9.40
O	Other Continuous		1.25			
K	Kitchen	16.86	6.00	8.70	8.16	10.96
N	Noncontinuous		1.00			
			1.00			
	Total	**35.36**		18.05	17.31	30.97

Total Demand Load (KVA)	30.97	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	148.91	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 10,12,14,16,21,23,22,24,28 AND 30 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	186.14	

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING KITCHEN + BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.08	1.16		1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING	R	2
3	LIGHTING LIVING	L	2x 12 AWG - #12G		15A-1P	0.16		0.70	0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOM	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.20	0.74		0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOM	R	6
7	RECEPTACLES BEDROOM	R	2x 10 AWG - #10G		20A-1P	0.54		0.90	0.36	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	8
9	DISHWASHER	K	2x 10 AWG - #10G		20A-1P	0.40	1.00		0.60	20A-2P	3x 10 AWG - #10G		MICROWAVE	K	10
11	RECEPTACLES KITCHEN	K	2x 10 AWG - #10G		20A-1P	0.36		0.96	0.60					K	12
13	ELECTRIC RANGE	K	3x 8 AWG - #8G		40A-2P	4.00	7.00		3.00	30A-2P	3x 8 AWG - #8G		EWH - 02	P	14
15		K				4.00		7.00	3.00					P	16
17	WASHING MACHINE	K	3x 10 AWG - #10G		20A-2P	0.60	3.20		2.60	20A-2P	3x 10 AWG - #10G		DRYING MACHINE	K	18
19		K				0.60		3.20	2.60					K	20
21	OU - E - 02	A	3x 8 AWG - #8G		30A-2P	2.65	4.15		1.50	20A-2P	3x 8 AWG - #8G		EWH - 01	P	22
23		A				2.65		4.15	1.50					P	24
25	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P		0.50		0.50	20A-1P	2x 10 AWG - #10G		FRIDGE	K	26
27								0.40	0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	28
29	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P		0.30		0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	30
31													SPACE		32
33	SPACE												SPACE		34
35	SPACE												SPACE		36
	(KVA)														
	Total Connected Load						18.05	17.31							

B4

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #2G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

Location: Third Floor APT. 2

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.65	1.25	0.25	0.40	0.81
R	Convenience Recept	1.44		0.72	0.72	1.44
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	2.16	1.00	1.08	1.08	2.70
P	Process	6.40	1.00	3.40	3.00	6.40
O	Other Continuous		1.25			
K	Kitchen	16.50	6.00	8.20	8.30	10.73
N	Noncontinuous		1.00			
			1.00			
	Total	**27.15**		13.65	13.50	22.08

Total Demand Load (KVA)	22.08	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	106.14	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 13,15,19,21,22 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	132.68	

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING STUDIO	L	2x 12 AWG - #12G		15A-1P	0.25	0.79		0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	2
3	LIGHTING BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.10		0.64	0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLE STUDIO	R	4
5	SPACE						0.18		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	6
7	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60		3.20	0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	8
9		K				2.60	3.20		0.60					K	10
11	RECEPTACLE KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.18		0.68	0.50	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	12
13	MICROWAVE	K	3x 10 AWG - #10G		30A-2P	0.60	4.60		4.00	40A-2P	3x 8 AWG - #8G		RANGE	K	14
15		K				0.60		4.60	4.00					K	16
17	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.40	3.40		3.00	30A-2P	3x 8 AWG - #8G		EWH	P	18
19	OU - A - 01	A	3x 10 AWG - #10G		20A-1P	1.08		4.08	3.00					P	20
21		A				1.08	1.48		0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P			0.30	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	24
25													SPACE		26
27	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P								SPACE		28
29													SPACE		30
	(KVA)														
	Total Connected Load						13.65	13.50							

C2

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

Location: Third Floor APT. 4

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.87	1.25	0.45	0.42	1.09
R	Convenience Recept	2.70		1.62	1.08	2.70
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	6.40	1.00	3.40	3.00	6.40
O	Other Continuous		1.25			
K	Kitchen	17.48	6.00	9.00	8.48	11.36
N	Noncontinuous		1.00			
			1.00			
	Total	**32.75**		17.12	15.63	28.18

Total Demand Load (KVA)	28.18	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	135.48	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 10,12,14,16,17,19,21 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	169.35	

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING LIVING ROOM	L	2x 12 AWG - #12G		15A-1P	0.35	1.79		1.44	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING ROOM	R	2
3	LIGHTING BATHROOM + KITCHEN	L	2x 12 AWG - #12G		15A-1P	0.12		1.20	1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOMS	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.10	0.28		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLE BATHROOM	R	6
7	RANGE	K	3x 8 AWG - #8G		40A-2P	4.00		4.50	0.50	20A-1P	2x 10 AWG - #10G		FRIDGE	K	8
9		K				4.00	4.60		0.60	20A-2P	3x 10 AWG - #10G		MICROWAVE	K	10
11	RECEPTACLE KITCHEN	K	2x 10 AWG - #10G		20A-1P	0.18		0.78	0.60					K	12
13	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60	5.60		3.00	20A-2P	3x 10 AWG - #10G		EWH	P	14
15		K				2.60		5.60	3.00					P	16
17	OU - C - 05	A	2x 8 AWG - #8G		30A-2P	2.65	3.25		0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	18
19		A				2.65		3.25	0.60					K	20
21	GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	2x 10 AWG - #10G		20A-1P	0.40	1.60		1.20	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P			0.30	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	24
25										20A-1P			SPARE		26
27	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P					20A-1P			SPARE		28
29										20A-1P			SPARE		30
31	SPARE				20A-1P					20A-1P			SPARE		32
	(KVA)														
	Total Connected Load						17.12	15.63							

C4

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 3Φ, 4W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #2G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

Location: Second Floor APT. 3

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.87	1.25	0.75	0.12	1.09
R	Convenience Recept	2.70		1.62	1.08	2.70
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	6.40	1.00	3.00	3.40	6.40
O	Other Continuous		1.25			
K	Kitchen	17.48	6.00	9.00	8.48	11.36
N	Noncontinuous		1.00			
			1.00			
	Total	**32.75**		17.02	15.73	28.18

Total Demand Load (KVA)	28.18	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	135.48	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 10,12,14,16,17,19,24 AND 26 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	169.35	

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING LIVING ROOM	L	2x 12 AWG - #12G		15A-1P	0.35	1.79		1.44	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING ROOM	R	2
3	LIGHTING BATHROOM + KITCHEN	L	2x 12 AWG - #12G		15A-1P	0.12		1.20	1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOMS	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.10	0.28		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLE BATHROOM	R	6
7	RANGE	K	3 8 AWG - #8G		40A-2P			4.50	0.50	20A-1P	2x 10 AWG - #10G		FRIDGE	K	8
9		K				4.00	4.60		0.60	20A-2P	3x 10 AWG - #10G		MICROWAVE	K	10
11	RECEPTACLE KITCHEN	K	2x 10 AWG - #10G		20A-1P	0.18		0.78	0.60					K	12
13	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60	5.60		3.00	20A-2P	3x 10 AWG - #10G		EWH	P	14
15		K				2.60		5.60	3.00					P	16
17	OU - C - 04	A	3x 8 AWG - #8G		30A-2P	2.65	3.25		0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	18
19		A				2.65		3.25	0.60					K	20
21	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P		1.20		1.20	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	22
23								0.40	0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	24
25	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P		0.30		0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	26
27										20A-1P			SPARE		28
29	SPARE				20A-1P					20A-1P			SPARE		30
31	SPARE				20A-1P					20A-1P			SPARE		32
	(KVA)														
	Total Connected Load						17.02	15.73							

B3

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

Location: Third Floor APT. 1

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.65	1.25	0.25	0.40	0.81
R	Convenience Recept	1.62		0.90	0.72	1.62
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	4.12	1.00	2.06	2.06	5.16
P	Process	6.40	1.00	3.40	3.00	6.40
O	Other Continuous		1.25			
K	Kitchen	16.50	6.00	8.20	8.30	10.73
N	Noncontinuous		1.00			
			1.00			
	Total	**29.29**		14.81	14.48	24.71

Total Demand Load (KVA)	24.71	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	118.81	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 13,15,19,21,23,22 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	148.51	

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING STUDIO	L	2x 12 AWG - #12G		15A-1P	0.25	0.97		0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	2
3	LIGHTING BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.10		0.64	0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLE STUDIO	R	4
5	SPACE						0.18		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	6
7	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60		3.20	0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	8
9		K				2.60	3.20		0.60					K	10
11	RECEPTACLE KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.18		0.68	0.50	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	12
13	MICROWAVE	K	3x 10 AWG - #10G		30A-2P	0.60	4.60		4.00	40A-2P	3x 8 AWG - #8G		RANGE	K	14
15		K				0.60		4.60	4.00					K	16
17	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.40	3.40		3.00	30A-2P	3x 8 AWG - #8G		EWH	P	18
19	OU - B - 02	A	3X 10 AWG - #10G		30A-2P	2.06		5.06	3.00					P	20
21		A				2.06	2.46		0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P			0.30	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	24
25													SPACE		26
27	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P								SPACE		28
29													SPACE		30
	(KVA)														
	Total Connected Load						14.81	14.48							

C1

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

Location: Third Floor APT. 3

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.75	1.25	0.35	0.40	0.94
R	Convenience Recept	1.98		1.08	0.90	1.98
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	4.12	1.00	2.06	2.06	5.16
P	Process	6.40	1.00	3.40	3.00	6.40
O	Other Continuous		1.25			
K	Kitchen	16.50	6.00	8.20	8.30	10.73
N	Noncontinuous		1.00			
			1.00			
	Total	**29.75**		15.09	14.66	25.20

Total Demand Load (KVA)	25.20	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	121.14	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 13,15,19,23,21,22 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	151.43	

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING STUDIO	L	2x 12 AWG - #12G		15A-1P	0.35	1.25		0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	2
3	LIGHTING BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.10		0.82	0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLE STUDIO	R	4
5	SPACE						0.18		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	6
7	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60		3.20	0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	8
9		K				2.60	3.20		0.60					K	10
11	RECEPTACLE KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.18		0.68	0.50	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	12
13	MICROWAVE	K	3x 10 AWG - #10G		30A-2P	0.60	4.60		4.00	40A-2P	3x 8 AWG - #8G		RANGE	K	14
15		K				0.60		4.60	4.00					K	16
17	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.40	3.40		3.00	30A-2P	3x 8 AWG - #8G		EWH	P	18
19	OU - B - 03	A	3x 10 AWG - #10G		20A-2P	2.06		5.06	3.00					P	20
21		A				2.06	2.46		0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P			0.30	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	24
25													SPACE		26
27	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P								SPACE		28
29													SPACE		30
	(KVA)														
	Total Connected Load						15.09	14.66							

C3

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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:

B SQUARE TOWER PROJECT

TITLE:

Electrical Panel Board

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

DRAWING NO.

E 5 . 0 3

REV.

Location: Third Floor APT. 6

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.87	1.25	0.45	0.40	1.06
R	Convenience Recept	1.98		1.08	0.90	1.98
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC		1.00			
P	Process	10.12	1.00	5.06	5.06	10.12
O	Other Continuous		1.25			
K	Kitchen	16.50	6.00	8.20	8.30	10.73
N	Noncontinuous	0.40	1.00	0.40		0.40
			1.00			
	Total	**29.85**		15.19	14.66	24.29

Total Demand Load (KVA)	24.29	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	116.79	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 13,15,19,21,16,18,20,22 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	145.98	

C6

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING STUDIO	L	2x 12 AWG - #12G		15A-1P	0.25	1.15		0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	2
3	LIGHTING BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.10		0.82	0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLE STUDIO	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.20	0.38		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	6
7	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60		3.20	0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	8
9		K				2.60	3.20		0.60					K	10
11	RECEPTACLE KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.18		0.68	0.50	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	12
13	MICROWAVE	K	3x 10 AWG - #10G		30A-2P	0.60	4.60		4.00	40A-2P	3x 8 AWG - #8G		RANGE	K	14
15		K				0.60		4.60	4.00					K	16
17	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.40	3.40		3.00	30A-2P	3x 8 AWG - #8G		EWH	P	18
19	OU - B - 04	P	3x 10 AWG - #10G		20A-2P	2.06		5.06	3.00					P	20
21		P				2.06	2.46		0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	N	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P			0.30	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	24
25													SPACE		26
27	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P								SPACE		28
29													SPACE		30
	(KVA)														
	Total Connected Load						15.19	14.66							

Location: Fourth Floor Apt. 1

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	1.27	1.25	0.62	0.65	1.59
R	Convenience Recept	3.06		1.26	1.80	3.06
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	12.40	1.00	6.00	6.40	12.40
O	Other Continuous		1.25			
K	Kitchen	17.56	6.00	9.36	8.20	11.41
N	Noncontinuous		1.00			
			1.00			
	Total	**39.59**		19.89	19.70	35.09

Total Demand Load (KVA)	35.09	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	168.71	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 15,17,23,25,20,22,24,26,27 AND 28 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	210.89	

D1

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #1/0G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING LIVING	L	2x 12 AWG - #12G		15A-1P	0.32	0.86		0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING - 1	R	2
3	LIGHTING KITCHEN	L	2x 12 AWG - #12G		15A-1P	0.20		0.92	0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING - 2	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.30	0.66		0.36	20A-1P	2x 10 AWG - #10G		RECEPTACLE BATROOMS	R	6
7	LIGHTIGN BATHROOM	L	2x 10 AWG - #10G		15A-1P	0.15		1.23	1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLE BEDROOMS	R	8
9	RECEPTACLES KTICHEN	K	2x 10 AWG - #10G		20A-1P	0.36	0.96		0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	10
11	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.40		1.00	0.60					K	12
13	DISHWASHER	K	2x 10 AWG - #10G		20A-1P	1.20	3.80		2.60	30A-2P	3x 10 AWG - #10G		DRYING MACHINE	K	14
15	MICROWAVE	K	3x 10 AWG - #10G		20A-2P	0.60		3.20	2.60					K	16
17		K				0.60	0.96		0.36	20A-1P	2x 10 AWG - #10G		RECEPTACLES KITCHEN 2	R	18
19	RANGE	K	3x 10 AWG - #10G		40A-2P	4.00		7.00	3.00	30A-2P	3x 10 AWG - #10G		EWH - 01	P	20
21		K				4.00	7.00		3.00					P	22
23	OU - E - 03	A	3x 10 AWG - #10G		30A-2P	2.65		5.65	3.00	30A-2P	3x 10 AWG - #10G		EWH - 02	P	24
25		A				2.65	5.65		3.00					P	26
27	GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	2x 10 AWG - #10G		20A-1P	0.40		0.70	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	28
29	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P					100A-2P	WILL SOME CIRCUITS		CONTACTOR K2 OF ATS		30
31															32
	(KVA)														
	Total Connected Load						19.89	19.70							

Location: Fourth Floor Apt. 2

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	1.27	1.25	0.62	0.65	1.59
R	Convenience Recept	2.70		0.90	1.80	2.70
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	12.40	1.00	6.40	6.00	12.40
O	Other Continuous		1.25			
K	Kitchen	16.86	6.00	8.66	8.20	10.96
N	Noncontinuous		1.00			
			1.00			
	Total	**38.53**		19.23	19.30	34.28

Total Demand Load (KVA)	34.28	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	164.79	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 15,17,23,25,19,20,22,24,26 AND 28 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	205.99	

D2

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #1/0G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING LIVING	L	2x 12 AWG - #12G		15A-1P	0.32	0.86		0.54	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING - 1	R	2
3	LIGHTING KITCHEN	L	2x 12 AWG - #12G		15A-1P	0.20		0.92	0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING - 2	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.30	0.66		0.36	20A-1P	2x 10 AWG - #10G		RECEPTACLE BATROOMS	R	6
7	LIGHTIGN BATHROOM	L	2x 10 AWG - #10G		15A-1P	0.15		1.23	1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLE BEDROOMS	R	8
9	RECEPTACLES KTICHEN	K	2x 10 AWG - #10G		20A-1P	0.36	0.96		0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	10
11	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.40		1.00	0.60					K	12
13	DISHWASHER	K	2x 10 AWG - #10G		20A-1P	0.50	3.10		2.60	30A-2P	3x 10 AWG - #10G		DRYING MACHINE	K	14
15	MICROWAVE	K	3x 10 AWG - #10G		20A-2P	0.60		3.20	2.60					K	16
17		K				0.60	3.60		3.00	30A-2P	3x 8 AWG - #8G		EWH - 01	P	18
19	RANGE	K	3x 8 AWG - #8G		40A-2P	4.00		7.00	3.00					P	20
21		K				4.00	7.00		3.00	30A-2P	3x 8 AWG - #8G		EWH - 02	P	22
23	OU - E - 04	A	2x 8 AWG - #8G		30A-2P	2.65		5.65	3.00					P	24
25		A				2.65	3.05		0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	26
27	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P				0.30	0.30	15A-3P	2x 12 AWG - #12G	SMOKE DETECTORS	L	28
29										100A-2P	WILL SOME CIRCUITS		CONTACTOR K2 OF ATS		30
31															32
33													SPACE		34
	(KVA)														
	Total Connected Load						19.23	19.30							

Location: Third Floor APT. 5

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	0.87	1.25	0.45	0.42	1.09
R	Convenience Recept	2.70		1.62	1.08	2.70
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	6.40	1.00	3.40	3.00	6.40
O	Other Continuous		1.25			
K	Kitchen	16.68	6.00	8.20	8.48	10.84
N	Noncontinuous		1.00			
			1.00			
	Total	**31.95**		16.32	15.63	27.66

Total Demand Load (KVA)	27.66	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	115.25	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 18,12,14,16,17,19,21 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	144.06	

C5

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	240/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.527
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING LIVING ROOM	L	2x 12 AWG - #12G		15A-1P	0.35	1.79		1.44	20A-1P	2x 10 AWG - #10G		RECEPTACLES LIVING ROOM	R	2
3	LIGHTING BATHROOM + KITCHEN	L	2x 12 AWG - #12G		15A-1P	0.12		1.20	1.08	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOMS	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.10	0.28		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLE BATHROOM	R	6
7	RANGE	K	3x 8 AWG - #8G		40A-2P	4.00		4.50	0.50	20A-1P	2x 10 AWG - #10G		FRIDGE	K	8
9		K				4.00	4.60		0.60	20A-2P	3x 10 AWG - #10G		MICROWAVE	K	10
11	RECEPTACLE KITCHEN	K	2x 10 AWG - #10G		20A-1P	0.18		0.78	0.60					K	12
13	DRYING MACHINE	K	3x 10 AWG - #10G		30A-2P	2.60	5.60		3.00	20A-2P	3x 10 AWG - #10G		EWH	P	14
15		K				2.60		5.60	3.00					P	16
17	OU - C - 06	A	3x 8 AWG - #8G		30A-2P	2.65	3.25		0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	18
19		A				2.65		3.25	0.60					K	20
21	GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	2x 10 AWG - #10G		20A-1P	0.40	0.80		0.40	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P			0.30	0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	24
25										20A-1P			SPACE		26
27	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P					20A-1P			SPACE		28
29										20A-1P			SPACE		30
31	SPARE				20A-1P					20A-1P			SPACE		32
	(KVA)														
	Total Connected Load						16.32	15.63							

Location: Third Floor APT. 7

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	1.00	1.25	0.90	0.10	1.25
R	Convenience Recept	1.98		1.08	0.90	1.98
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	6.40	1.00	3.40	3.00	6.40
O	Other Continuous		1.25			
K	Kitchen	16.10	6.00	7.80	8.30	10.47
N	Noncontinuous		1.00			
			1.00			
	Total	**30.78**		15.83	14.95	26.73

Total Demand Load (KVA)	26.73	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	128.49	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 13,15,17,19,18,20,21 AND 22 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	180.61	

C7

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	150A
SYSTEM TYPE	NORMAL
FEEDER PROT	150A-1P C/B Bus Plug
CONDUCTOR SIZE	1/0 AWG - #4G CU
CONDUCTOR/PHASE	1
MAINS	150A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.762
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING STUDIO	L	2x 12 AWG - #12G		15A-1P	0.40	1.30		0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	2
3	LIGHTING BATHROOM	L	2x 12 AWG - #12G		15A-1P	0.10		0.82	0.72	20A-1P	2x 10 AWG - #10G		RECEPTACLE STUDIO	R	4
5	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.20	0.38		0.18	20A-1P	2x 10 AWG - #10G		RECEPTACLES BATHROOM	R	6
7	DRYING MACHINE	K	3x 10 AWG - #10G		20A-2P	2.60		3.20	0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	8
9		K				2.60	3.20		0.60					K	10
11	RECEPTACLE KITCHEN	R	2x 10 AWG - #10G		20A-1P	0.18		0.68	0.50	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	12
13	MICROWAVE	K	3x 10 AWG - #10G		30A-2P	0.60	4.60		4.00	40A-2P	3x 8 AWG - #8G		RANGE	K	14
15		K				0.60		4.60	4.00					K	16
17	OU - C - 07	A	3x 8 AWG - #8G		30A-2P	2.65	5.65		3.00	30A-2P	3x 8 AWG - #8G		EWH	P	18
19		A				2.65		5.65	3.00					P	20
21	GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	2x 10 AWG - #10G		20A-1P	0.40	0.70		0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	22
23	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		150A-2P					100A-2P	WILL SOME CIRCUITS		CONTACTOR K2 OF ATS	N	24
25															26
	(KVA)														
	Total Connected Load						15.83	14.95							

Updated xx.xx.xxxx

Location: Fourth Floor Apt. 3

*	LOAD SUMMARY	CL	DF	CONNECTED LOAD A	CONNECTED LOAD B	DEMAND TOTAL
L	Lighting	1.17	1.25	0.87	0.30	1.46
R	Convenience Recept	3.96		2.70	1.26	3.96
H	Heating (Space)		1.25			
C	Cooling		1.00			
A	HVAC	5.30	1.00	2.65	2.65	6.63
P	Process	12.40	1.00	6.00	6.40	12.40
O	Other Continuous		1.25			
K	Kitchen	16.50	6.00	8.30	8.20	10.73
N	Noncontinuous		1.00			
			1.00			
	Total	**39.33**		20.52	18.81	35.18

Total Demand Load (KVA)	35.18	LEG OF CONTACTOR K1 FROM THE ATS WILL FEED ALL CIRCUITS SINCE ITS INPUTS LEG ARE FROM PANEL A
Total Demand Current (A)	169.12	LEG OF CONTACTOR K2 FROM THE ATS WILL FEED CIRCUITS 11,13,23,25 AND 24 SINCE ITS INPUTS LEG ARE FROM GEN
Min. Feeder Ampacity (A)	211.40	

D3

PANELBOARD DESIGNATION

SYSTEM VOLTAGE	208/120V, 1Φ, 3W
BUS SIZE	200A
SYSTEM TYPE	NORMAL
FEEDER PROT	200A-1P C/B Bus Plug
CONDUCTOR SIZE	3/0 AWG - #1/0G CU
CONDUCTOR/PHASE	1
MAINS	200A MCB
SCCR	FULLY RATED
MCB RATING	80%
GROUND FAULT	NO
FEEDER LENGTH (FT)	100
FEEDER V. DROP (%)	1.478
FAULT CURRENT	14.060
KAIC RATING	22
ENCLOSURE	TYPE 1

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	KVA	CB	WIRE	GRD	DESCRIPTION	*	
1	LIGHTING SUITE	L	2x 12 AWG - #12G		15A-1P	0.45	1.89		1.44	20A-1P	2x 10 AWG - #10G		RECEPTACLES STUDIO	R	2
3	LIGHTING BEDROOMS	L	2x 12 AWG - #12G		15A-1P	0.30		1.20	0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLES BEDROOM 1	R	4
5	LIGHTING BATHROOMS	L	2x 12 AWG - #12G		15A-1P	0.12	1.02		0.90	20A-1P	2x 10 AWG - #10G		RECEPTACLE BEDROOM 2	R	6
7	RECEPTACLE BATHROOMS	R	2x 10 AWG - #10G		20A-1P	0.36		0.76	0.40	20A-1P	2x 10 AWG - #10G		DISHWASHER	K	8
9	FRIDGE	K	2x 10 AWG - #10G		20A-1P	0.50	1.10		0.60	20A-2P	3x 10 AWG - #10G		WASHING MACHINE	K	10
11	MICROWAVE	K	3x 10 AWG - #10G		20A-2P	0.60		1.20	0.60					K	12
13		K				0.60	0.96		0.36	20A-1P	2x 10 AWG - #10G		RECEPTACLES KITHCEN	R	14
15	RANGE	K	3x 8 AWG - #10G		40A-2P	4.00		7.00	3.00	30A-2P	3x 10 AWG - #10G		EWH - 02	P	16
17		K				4.00	7.00		3.00					P	18
19	EWH - 01	P	3x 10 AWG - #10G		20A-2P	3.00		5.60	2.60	30A-2P	3x 10 AWG - #10G		DRYING MACHINE	K	20
21		P				3.00	5.60		2.60					K	22
23	OU - D - 01	A	3x 8 AWG - #8G		30A-2P	2.65		3.05	0.40	20A-1P	2x 10 AWG - #10G		GENERATOR-GENERAL USE LIGHTING AND RECEPTACLES	P	24
25		A				2.65	2.95		0.30	15A-3P	2x 12 AWG - #12G		SMOKE DETECTORS	L	26
27	CONTACTOR K1 OF ATS		WILL FEED ALL PANEL		200A-2P					100A-2P	WILL SOME CIRCUITS		CONTACTOR K2 OF ATS		28
29															30
31	CONTACTOR K2 OF ATS		WILL SOME CIRCUITS		100A-2P								SPACE		32
33													SPACE		34
35													SPACE		36
	(KVA)														
	Total Connected Load						20.52	18.81							

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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:

B SQUARE TOWER PROJECT

TITLE:

Electrical Panel Board

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

DRAWING NO.

E 5 . 0 4

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 PEMITTED 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 2018 INTERNATIONAL PLUMBING CODE, 2018 INTERNATIONAL BUILDING CODE, 2018 INTERNATIONAL 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. 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 RECIRCULATION PIPING (EXCEPT RUNOUTS 12 FT. OR SHORTER TO INDIVIDUAL FIXTURES) SHALL BE INSULATED TO MEET THE REQUIREMENTS OF THE 2018 INTERNATIONAL 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. INSIDE GAS PIPING SHALL BE BLACK IRON SCHEDULE 40 WITH MALLEABLE IRON FITTINGS. OUTSIDE SHALL BE GALVANIZED IRON SCHEDULE 40 WITH GALVANIZED FITTINGS. GAS LINE TO BE PAINTED GRAY IN COLOR. A 24 HOUR METERED GAS TEST SHALL BE REQUIRED.
E. ALL PIPING NOT ENCLOSED IN CONDITION SPACE OR AT EXTERIOR WALLS SHALL BE INSULATED.
F. 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 INTERNATIONAL 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, AND GAS 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 BACKFLOW PREVENTOR SHALL BE PROPERLY INSTALLED UPSTREAM OF ANY POTENTIAL HAZARD BETWEEN THE POTABLE WATER SUPPLY AND SOURCE OF COMTAMINATION.
28. WATER SUPPLY CARBONATORS SHALL BE PROTECTED BY AN APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTOR. THE RELIEF VALVE SHALL DRAIN IN-DIRECTLY TO A FLOOR SINK WITH A 1" MIN. AIR GAP.

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

BATHTUBS AND WHIRLPOOL BATHTUBS. THE MAX. HOT WATER TEMPERATURE DISCHARGING SHALL BE LIMITED TO 120 DEGREES.

BATHTUBS WASTE OPENING IN FLOOR OVER CRAWL SPACES SHALL BE PROTECTED BY A METAL SCREEN NOT EXCEEDING 12" OR SOLID COVER.

SHOWERS AND TUB-SHOWERS COMBINATIONS IN ALL BUILDINGS SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION OF BOTH THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION. VALVES SHALL BE ADJUSTED TO DELIVER A MAXIMUM MIXED WATER
SETTING OF 120 DEGREES FAHRENHEIT. THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A SUITABLE CONTROL FOR MEETING THIS PROVISION.
VERIFY AND WHERE WATER PRESSURE EXCEEDS 80 PSI AN APPROVED PRESSURE REGULATOR PRECEDED BY AN ADEQUATE STRAINER SHALL BE INSTALLED
1-INSTALL TEMPERATURE AND PRESSURE RELIEF VALVE WITH MINIMUM 34" DRAIN PIPE AND TERMINATE TO THE EXTERIOR OF THE BUILDING OVER WINDOW, DOOR OR VISIBLE LOCATION. DISCHARGE FROM A RELIEF VALVE INTO A WATER HEATER PAN SHALL BE PROHIBITED
.
2-PROVIDE (ON THE PLANS) A GAS PIPING DIAGRAM OF THE GAS PIPING SYSTEM THAT INCLUDES ALL PIPE SIZES, PIPE LENGTHS AND BTU RATINGS.

3-SUBMIT GAS LOAD CALCULATIONS IN ACCORDANCE WITH IPC TABLE 12-8 TO VERIFY THE PIPE SIZES ARE ADEQUATE FOR THE MAXIMUM DELIVERY CAPACITY OF CUBIC FEET OF GAS PER HOUR.
4- A WHOLE HOUSE HAS TEST IS REQUIRED UPON COMPLETION OF THE INSTALLATION, ALTERATION, OR REPAIR OF ANY GAS PIPING.
THE CITY SHALL BE NOTIFIED WHEN GAS PIPING IS READY FOR INSPECTION.
5- 2 GPM SHOWER FIXTURE, MAX.1.5 GPM BATHROOM FAUCET, MAX. 2 GPM KITCHEN FAUCET, AND MAX 1.28 WATER CLOSET TO CONFORM TO CITY GREEN REQUIREMENTS.
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 BACKDRAFT 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.

6-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 PRE-VENTER 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-When a shower is provided with multiple shower heads, the sum of flow to all the heads shall not exceed 1.8 gpm @ 80 psi, or the shower shall be designed so that only one head is on at a time. CGC Section 4.303.1.3.2.
4-Landscape irrigation water use shall have weather or soil based controllers. CGC Section 4.304.1.
5-The plans that a minimum of 65% of construction waste is to be recycled. CGC Section 4.408.1.
6-The contractor shall submit a Construction Waste Management Plan per CGC Section 4.408.2.
7-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.
8-The gas fireplace(s) shall be a direct-vent sealed- combustion type. Woodstove or pellet stoves must be US EPA Phase II rated appliances. CGC Section 4.503.1.

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
3- THE MAXIMUM VOLUME OF WATER PER FLUSH FROM A URINAL AND THE ASSOCIATED FLUSH VALVE, IF ANY, SHALL NOT EXCEED AN AVERAGE OF ONE GALLON 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 0.00	PLUMBING GENERAL NOTES AND SPECIFICATIONS.	NTS
P 0.01	PLUMBING CODE CHECKING.	NTS
P 1.01	BASEMENT PLAN - WATER SUPPLY LAYOUT.	1/4"=1'-0"
P 1.02	FIRST FLOOR - WATER SUPPLY LAYOUT.	1/4"=1'-0"
P 1.03	SECOND FLOOR - WATER SUPPLY LAYOUT.	1/4"=1'-0"
P 1.04	THIRD FLOOR - WATER SUPPLY LAYOUT.	1/4"=1'-0"
P 1.05	FOURTH FLOOR - WATER SUPPLY LAYOUT.	1/4"=1'-0"
P 2.01	BASEMENT PLAN - SEWER LAYOUT.	1/4"=1'-0"
P 2.02	FIRST FLOOR - SEWER LAYOUT.	1/4"=1'-0"
P 2.03	SECOND FLOOR - SEWER LAYOUT.	1/4"=1'-0"
P 2.04	THIRD FLOOR - SEWER LAYOUT.	1/4"=1'-0"
P 2.05	FOURTH FLOOR - SEWER LAYOUT.	1/4"=1'-0"
P 5.01	HOT WATER CALCULATION AND DATASHEETS.	NTS
P 6.01	PLUMBING GENERAL DETAILS.	NTS

CLIENT:

ADDRESS:
420 SOUTH AVE,
SPRINGFIELD, MO 65806

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:
B SQUARE TOWER PROJECT

TITLE:
PLUMBING GENERAL NOTES & SPECIFICATIONS.

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

DRAWING NO.
P 0.00

REV.

INTERNATIONAL PLUMBING CODE CHECKING:

PIPE SUPPORTS:

TABLE 313.3
HANGERS AND SUPPORTS

MATERIALS	TYPES OF JOINTS	HORIZONTAL	VERTICAL
Cast	Lead and Oakum	5 feet, except 10 feet where 10 foot length are installed[1, 2, 3]	Base and each floor, not to exceed 15 feet
	Compression Gasket	Every other joint, unless over 4 feet then support each joint[1, 2, 3]	Base and each floor, not to exceed 15 feet
Cast-Iron Hubless	Shielded Coupling	Every other joint, unless over 4 feet then support each joint[1, 2, 3, 4]	Base and each floor, not to exceed 15 feet
Copper & Copper Alloys	Soldered, Brazed, Threaded, or Mechanical	1 1/4 inches and smaller, 6 feet; 2 inches and larger, 10 feet	Each floor, not to exceed 10 feet[5]
Steel Pipe for Water or DWV	Threaded or Welded	1/4 inch and smaller, 10 feet; 1 inch and smaller, 12 feet	Every floor, not to exceed 25 feet[5]
Steel Pipe for Gas	Threaded or Welded	1/4 inch, 6 feet; 3/8 inch and 1 inch, 8 feet; 1 1/4 inches and larger, 10 feet	1/4 inch, 6 feet; 3/8 inch and 1 inch, 8 feet; 1 1/4 inches every floor level
Schedule 40 PVC and ABS DWV	Solvent Cemented	All sizes, 4 feet; allow for expansion every 30 feet[3]	Base and each floor; provide mid-story guides; provide for expansion every 30 feet
CPVC	Solvent Cemented	1 inch and smaller, 3 feet; 1 1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides
CPVC-AL-CPVC	Solvent Cemented	1/2 inch, 5 feet; 3/4 inch, 65 inches; 1 inch, 6 feet	Base and each floor; provide mid-story guides
Lead	Wiped or burned	Continuous Support	Not to exceed 4 feet
Steel	Mechanical	In accordance with standards acceptable to the Authority Having Jurisdiction	
PEX	Cold Expansion, Insert and Compression	1 inch and smaller, 32 inches; 1 1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides
PEX-AL-PEX	Metal Insert and Metal compression	1/2 inch, 3/4 inch, 1 inch — All sizes 98 inches	Base and each floor; provide mid-story guides
PE-AL-PE	Metal Insert and Metal compression	1/2 inch, 3/4 inch, 1 inch — All sizes 98 inches	Base and each floor; provide mid-story guides
PE-RT	Insert and Compression	1 inch and smaller, 32 inches; 1 1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides
Polypropylene (PP)	Fusion weld (socket, but, saddle, electrofusion), threaded (metal threads only), or mechanical	1 inch and smaller, 32 inches; 1 1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides

For SI units; 1 inch = 25.4 mm, 1 foot = 304.8 mm

Notes:

1 Support adjacent to joint, not to exceed 18 inches (457 mm)

2 Brace not to exceed 40 foot (12 192 mm) intervals to prevent horizontal movement.

3 Support at each horizontal branch connection.

4 Hangers shall not be placed on the coupling.

5 Vertical water lines shall be permitted to be supported in accordance with recognized engineering principles with regard to expansion and contraction, where first approved by the Authority Having Jurisdiction.

DRAINAGE:

Cleanouts.

Locations. Cleanouts shall be placed inside the build ing near the connection between the building drain and the building sewer or installed outside the building at the lower end of the building drain and extended to grade.

Additional building sewer cleanouts shall be installed at intervals not to exceed 100 feet (30 480 mm) in straight runs and for each aggregate horizontal change in direction exceeding 135 degrees (2.36 rad)

No additional Cleanouts. Where a building sewer or a branch thereof does not exceed 10 feet (3048 mm) in length and is a straight-line projection from a building drain that is provided with a cleanout, no cleanout will be required at its point of connection to the building drain.

Location.

Building Sewer. Except as provided in Section 721.2, no building sewer shall be located in a lot other than the lot that is the site of the building or structure served by such sewer nor shall a building sewer be located at a point having less than the minimum distances referenced in Table 721.1.

Changes in Direction of Drainage Flow.

Approved Fittings. Changes in the direction of drainage piping shall be made by the approximate use of approved fittings and shall be of the angles presented by a one-sixteenth bend, one-eight bend, or one-sixth bend, or other approved fittings of equivalent sweep.

Horizontal to Vertical. Horizontal drainage lines, connecting with a vertical stack, shall enter through 45 degree (0.79 rad) wye branch, 60 degree (1.05 rad) wye branches, combination wye and one-eighth bend branches, sanitary tee or sanitary tapped tee branches, or other approved fittings of equivalent sweep.

Vertical to Horizontal. Vertical drainage lines con necting with horizontal drainage lines shall enter through 45 degree (0.79 rad) wye branches, combination wye and one-eighth bend branches, or other approved fittings of equiva- lent sweep. Branches, or other approved fittings of equiva- lent sweep. Branches or offsets of 60 degrees (1.05 rad) shall be permitted to be used where installed in a true vertical posi- tion.

Location. Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal, and each run of piping, that s more than 100 feet (30 480 mm) in total developed length, shall be provided with a cleanout for each 100 feet (30 480 mm), or fraction thereof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change in direction exceeding 135 degrees (2.36 rad). A cleanout shall be installed above the fixture connecting fitting, serving each urinal, regardless of the location of the urinal in the building.

Exceptions

(1) Cleanouts shall be permitted to be omitted on a horizontal drain line less than 5 feet (1524 mm) in length unless such line is serving sinks or urinals

MAXIMUM UNIT LOADING AND MAXIMUM LENGTH OF DRAINAGE AND VENT PIPING

SIZE OF PIPE (inches)	1 1/4	1 1/2	2	3	4	5	6	8	10	12
Maximum Units Drainage Piping[1]										
Vertical	1	2[2]	16[3]	48[4]	256	600	1380	3600	5600	8400
Horizontal	1	1	8[3]	35[4]	216[5]	428[5]	720[5]	2640[5]	4680[5]	8200[5]
Maximum Length Drainage Piping										
Vertical	45	65	85	212	300	390	510	750	–	–
Horizontal										
Vent Piping Horizontal and Vertical[6]										
Maximum Units	1	8[3]	24	84	256	600	1380	3600	–	–
Maximum Lengths, (feet)	45	60	120	212	300	390	510	750		

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm

Notes:

1 Excluding trap arm.

2 Except for sinks, urinals, and dishwashers – exceeding 1 fixture unit.

3 Except for six-unit traps or water closets.

4 Only four water closets or six-unit traps allowed on a vertical pipe or stack, and not to exceed three water closets or six-unit traps on a horizontal branch or drain.

5 Based on 1/4 inch per foot (20.8 mm/m) slope, For 1/8 of an inch per foot (10.4 mm/m) slope, multiply horizontal fixture units by a factor of 0.8.

6 The diameter of an individual vent shall be not less than 1 1/4 inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. Fixture unit load values for drainage and vent piping shall be computed from Table 702.1 and Table 702.2(2). Not to exceed one third of the total permitted length of a vent shall be permitted to be installed in a horizontal position. Where vents are increased one pipe size for their entire length, the maximum length limitations specified in this table do not apply. This table is in accordance with the requirements of Section 901.3.

Cleaning. Each cleanout shall be installed so that it opens to allow cleaning in the direction of flow of the soil or waste or at right angles thereto and, except in the case of wye branch and end-of-line cleanouts, shall be installed vertically above the flow line of the pipe.

Grade of Horizontal Drainage Piping.

General. Horizontal drainage piping shall be run in practical alignment and a uniform slope of not less than 1/4 inch per foot (20.8 mm/m) or 2 percent toward the point of disposal provided that, where it is impractical due to the depth of the street sewer, to the structural features, or to the arrangement of a building or structure to obtain a slope of 1/4 inch per foot (20.8 mm/m) or 2 percent, such pipe or piping 4 inches (100 mm) or larger in diameter shall be permitted to have a slope of not less than 1/8 inch per foot (10.4 mm/m) or 1 percent, where first approved by the Authority Having Jurisdiction.

MINIMUM HORIZONTAL DISTANCE REQUIRED FROM BUILDING SEWER (feet)

Buildings or structures[1]	2
Property line adjoing private property	Clear[2]
Water supply wells	50[3]
Streams	50
On-site domestic water service line	1[4]
Public water main	10[5, 6]

WATER CONVERSION & WATER CONSUMPTION:

WATER CONSERVING PLUMBING FIXTURES AND FITTINGS
Plumbing fixtures and fittings shall comply with the following:

(2018 CGBSC, INTERNATIONAL Plumbing Code (IPC) and Table 1401.1 of the IPC)

4303.1.1	All Water closets: ≤1.28 gal/flush Tank type water closet shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-type Toilets.
4303.1.2	Urinals: ≤0.5 gal/flush
4303.1.3.1	Single showerheads: ≤1.8 gpm @ 80 psi
4303.1.3.2	Multiple showerheads: combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gpm @ 80 psi or only one shower outlet is to be in operation at a time.
4303.1.4.1	Residential Lavatory Faucets: 0.8 gpm @ 20 psi < Flow Rate ≤1.2 gpm @ 60 psi
4303.1.4.2	Lavatory Faucets in common and Public Use Areas (outside of dwellings or sleeping units) in residential buildings: ≤0.5 gpm @ 60 psi
4303.1.4.3	Metering Faucets: ≤0.25 gallons per cycle
4303.1.4.4	Kitchen Faucets: ≤1.8 gpm @ 60 psi; Maximum Flow Rate of 1.8 gpm

PLUMBING FIXTURE CERTIFICATION REQUIRED:
A plumbing fixture certification must be completed and signed by either a licensed general contractor, or a plumbing subcontractor, or the building owner certifying the flow rate of the fixtures installed. A copy of the certification can be obtained from the development services department.

Limitation of Hot water Temperature for Public Lavatories.
Hot water delivered from public-use lavatories shall be limited to a maximum temperature of 120°F (49°C) by a device that complies with ASSE 1070/ASME A112.1070/CSA B125.70. The water heater thermostat shall not be considered a control for meeting this provision.

Waste Outlet. Lavatories shall have a waste outlet and fixtures tailpiece not less than 1 1/4 inches (32 mm) in diameter.

Limitation of Hot Water in Bathtubs and Whirlpool Bathtubs. The maximum hot water temperature discharging from the bathtub and whirlpool bathtub filler shall be limited to 120°F (49°C) by a device that complies with ASSE 1070/ASME A112.1070/CSA B125.70. The water heater thermostat shall not be considered a control for meeting this provision.

WATER HEATER:

Applicability.
The minimum capacity for storage water heaters shall be in accordance with the first-hour rating listed in Table 501.1(2).

Number of Bathrooms	1 to 1.5			2 to 2.5				3 to 3.5			
Number of Bedrooms	1	2	3	2	3	4	5	3	4	5	6
First hour rating,[2] Gallons	38	49	49	49	62	62	74	62	74	74	74

For SI units: 1 gallon = 3.785 L.

Notes:

1 The first-hour rating is found on the "Energy Guide" label.

2 Solar water heaters shall be sized to meet the appropriate first-hour rating as shown in the table.

Water Heater Requirements.

Location. Water heater installations in bedrooms and bathrooms shall comply with one of the following [NFPA54:10.27.1]:

(1) Fuel-burning water heaters shall be permitted to be installed in a closet located in the bedroom or bathroom provided the closet is equipped with a listed, gasketed door assembly and a listed self-closing device. The self- closing door assembly shall meet the requirements of Section 504.1.1. The door assembly shall meet the requirements of Section 504.1.2. Combustion air for such installations shall be obtained from the outdoors in accordance with Section 504.4. The closet shall be for the exclusive use of the water heater.

(2) Water heater shall be of the direct vent type. [NFPA 54: 10.27.1(2)]

Vent. Water heaters of other than the direct-vent type shall be located as close as practical to the chimney or gas vent.

Seismic provisions. *Water heaters shall be anchored or strapped to resist horizontal displacement due to earthquake motion. Strapping shall be at points within the upper one third (1/3) and lower one-third (1/3) of its vertical dimensions. At the lower point, a minimum distance of four (4) inches (102 mm) shall be maintained above the controls with the strapping.*

Ground Support. 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.

Drainage Pan. Where a water heater is located in an attic, in or on an attic ceiling assembly, floor-ceiling assembly, or floor-subfloor assembly where damage results from a leaking water heater, a watertight pan of corrosion-resistant materials shall be installed beneath the water heater with not less than 3/4 of an inch (20 mm) diameter drain to an approved location. Such pan shall be not less than 1 1/2 (38 mm) in depth.

Installation in Residential Garages. Appliances in residential garages and in adjacent spaces that open to the garage and are not part of the living space of a dwelling unit shall be installed so that all burners and burner-ignition devices are located not less than 18 inches (457 mm) above the floor unless listed as flammable vapor ignition resistant. [NFPA 54:9.1.10.1]

Lighting and Convenience Outlet. A permanent 120 V receptacle outlet and a lighting fixture shall be installed near the appliance. The switch controlling the lighting fixture shall be located at the entrance to the passageway. [NFPA 54:9.5.3]

Installation at roof; Clearance. Appliances shall be installed on a well-drained surface of the roof. At least 6 feet (1829 mm) of clearance shall be available between any part of the appliance, and the edge of a roof or similar hazard, or rigidly fixed rails, guards, parapets, or other building structures at least 42 inches (1067 mm) in height shall be provided on the exposed side. [NFPA 54:9.4.2.2]

VENT:

Vent Termination.

Roof Termination. 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.

Clearance. 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 hot line, alley and street excepted.

Special Venting for Island Fixtures.

General. Traps for island sinks and similar equipment shall be roughed in above the floor and shall be permitted to be vented by extending the vent as high as possible, but not less than the drainboard height and then returning it down- ward and connecting it to the horizontal sink drain immediately downstream from the vertical fixture drain. The return vent shall be connected to the horizontal drain through a wye-branch fitting and shall, in addition, be provided with a foot vent taken off the vertical fixture vent by means of a wye branch immediately below the floor and extending to the nearest partition and then through the roof to the open air, or shall be permitted to be connected to other vents at a point not less than 6 inches (152 mm) above the flood-level rim of the fixtures served. Drainage fittings shall be used on the vent below the floor level, and a slope of not less than 1/4 inch per foot (20.8 mm/m) back to the drain shall be maintained. The return bend used under the drainboard shall be a one-piece fitting or an assembly of a 45 degree (0.79 rad), a 90 degree (1.57 rad), and a 45 degree (0.79 rad) elbow in the order named. Pipe sizing shall be as elsewhere required in this code.

The island sink drain, upstream of the returned vent, shall serve no other fixtures. An accessible cleanout shall be installed in the vertical portion of the foot vent.

WATER SUPPLY:

TABLE 611.4
SIZING OF RESIDENTIAL WATER SOFTENERS[4]

REQUIRED SIZE OF SOFTENER CONNECTION (inches)	NUMBER OF BATHROOM GROUPS SERVED[1]
3/4	up to 2[2]
1	up to 4[3]

For Si units: 1 inch = 25 mm

Notes:

1 Installation of a kitchen sink and dishwasher, laundry tray, and automatic clothes washer permitted without additional size increase.

2 An additional water closet and lavatory permitted.

3 Over four bathroom groups, the softener size shall be engineered for the specific installation.

4 See also Appendix A, Recommended Rules for Sizing the Water Supply Systems, and Appendix C, Alternate Plumbing Systems, for alternate methods of sizing water supply systems.

A backflow preventer shall not be required to separate a stand-alone sprinkler syste from the water distribution system where the sprinkler system material is in accordance with the requirements of Section 604.0.

General. 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. Valves carrying water used in potable water systems intended to supply drinking water shall comply with the requirements of NSF 61 and ASME A112.4.14, ASME B16.34, ASTM F1970, ASTM F2389 AWWA C500, AWWA C504, AWWA C507, IAPMO Z1157, MSS SP-67, MSS SP- 70, MSS SP-71, MSS SP-72, MSS SP-78, MSS SP-80, MSS SP-110, MSS SP-122, or NSF 359.

Pressure Relief Valves. Each pressure relief valve shall be an approved automatic type with drain, and each such relief valve shall be set at a pressure of not more than 150 psi (1034 kPa). No shutoff valve shall be installed between the relief valve and the system.

FIRESTOP PROTECTION

Combustible Piping Installations.

Fire-Resistance Rating. Where penetrating a fire-resistance-rated wall, partition, floor, floor-ceiling assembly, roof-ceiling assembly, or shaft enclosure, the fire-resistance rating of the assembly shall be restored to its original rating.

Firestop Systems. Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E119, ASTM E814, UL 263, or UL 1479 with a positive pressure differential of not less than 0.01 of an inch of water (0.002 kPa). Systems shall have and F rating of not less than 1 hour but not less than the required fire-resistance rating of the assembly being penetrated. Systems protecting floor penetrations shall have a T rating of not less than 1 hour but not less than the required fire-resistance rating of the floor penetrations shall have a T rating of not less than 1 hour but not less than the required fire-resistance rating of the floor being penetrated. Floor penetrations contained within the cavity of a wall at the location of the floor penetration do not require a T rating. No T rating shall be required for floor penetrations by piping that is not in direct contact with combustible material.

Sleeves. Where sleeves are used, the sleeves shall be securely fastened to the fire-resistance-rated assembly. The (inside) annular space between the sleeve and the fire-resistance-rated assembly shall be firestopped in accordance with this chapter.

Noncombustible Piping Installations.

Firestop Systems. Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E119, ASTM E814, UL 263, or UL 1479 with a positive pressure differential of not less than 0.01 of an inch of water (0.002 kPa). Systems shall have an F rating of not less than 1 hour but not less than the required fire-resistance rating of the assembly being penetrated. Systems protecting floor penetrations shall have a T rating of not less than 1 hour but not less than the required fire-resistance rating of the floor being penetrated. Floor penetrations contained within the cavity of a wall at a location of the floor penetration do not require a T rating. No T rating shall be required for floor penetrations by piping that is not in direct contact with combustible material.

Sleeves. Where sleeves are used, the sleeves shall be securely fastened to the fire-resistance-rated assembly. The (inside) annular space between the sleeve and the penetrating item and the (outside) annular space between the sleeve and the fire-resistance-rated assembly shall be firestopped in accordance with this chapter.

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

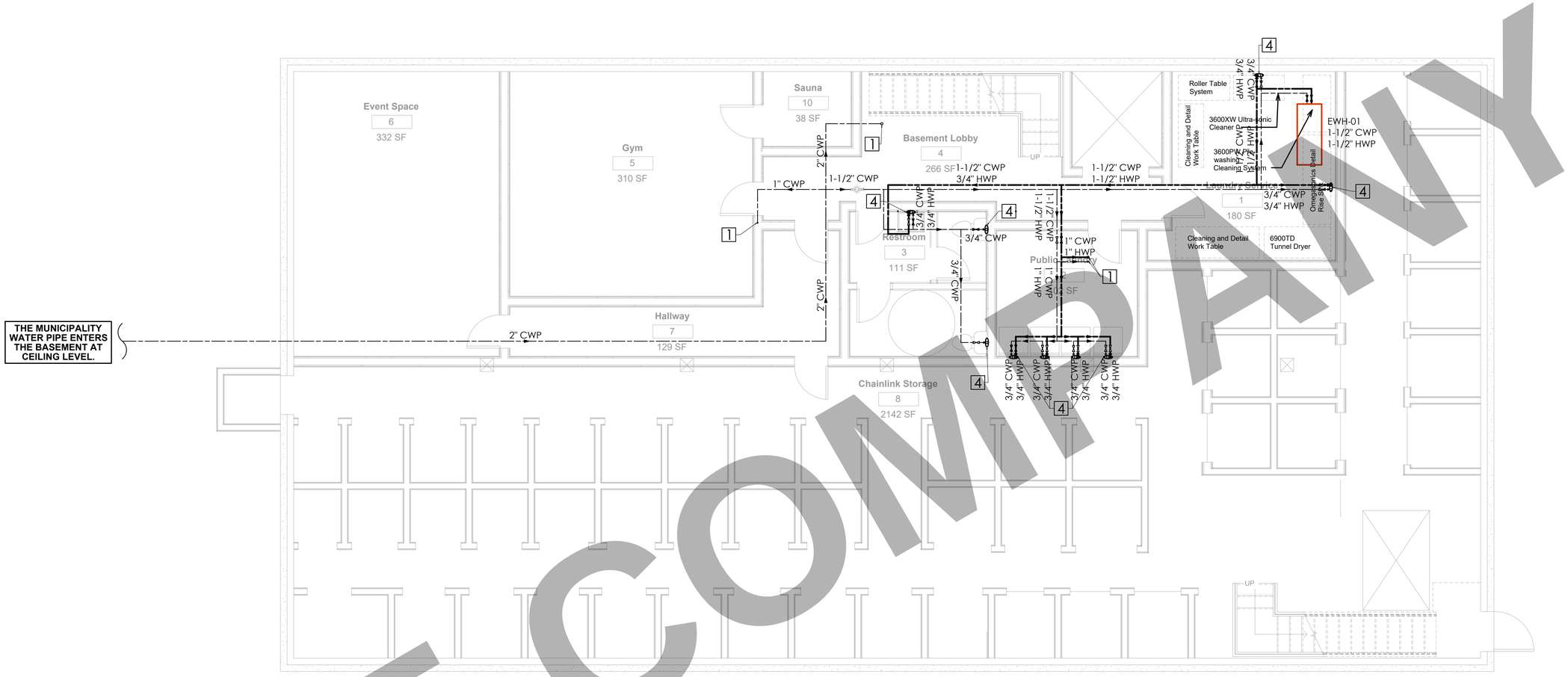
PLUMBING CODE CHECKING.

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

DRAWING NO.

P 0 . 0 1

REV.



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 3" 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.

SCHEDULE No. 1

BASEMENT & 1ST FLOOR ELECTRIC WATER HEATER SCHEDULE

TAG	EWH-01
LOCATION	LAUNDRY SERVICE (ABOVE CEILING)
MANUFACTURER	A.O SMITH
MODEL	DSE-40A
TYPE	ELECTRIC - TANK
MAX. POWER (KW)	15
NB OF ELEMENTS / POWER OF ONE (W)	1 / 15,000
VOLTAGE (V / PH /HZ)	240 / 1 / 60
FLA (A)	62.5
TANK CAPACITY (GAL)	40
APPROXIMATE WEIGHT (LBS)	245
WIDTH x DEPTH x HEIGHT (in.)	22" X 22" X 54.75"
CW / HW CONNECTION SIZES (in.)	1-1/4" / 1-1/4" NPT

WATER SUPPLY SHEET NOTES:

1. DCW RISE TO FLOOR ABOVE.
2. DCW RISE FROM FLOOR BELOW TO CEILING LEVEL.
3. DCW RISE FROM FLOOR BELOW TO FLOOR ABOVE.
4. DCW AND/OR DHW TO FIXTURE CONNECTION.

BUILDING WATER LOAD

DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	128	-	2"
DHW	101	-	2"
TOT. COMBINED	185.6	-	2"

BASEMENT WATER LOAD

DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	19	-	1-1/2"
DHW	15	-	1-1/2"
TOT. COMBINED	30	-	1-1/2"

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

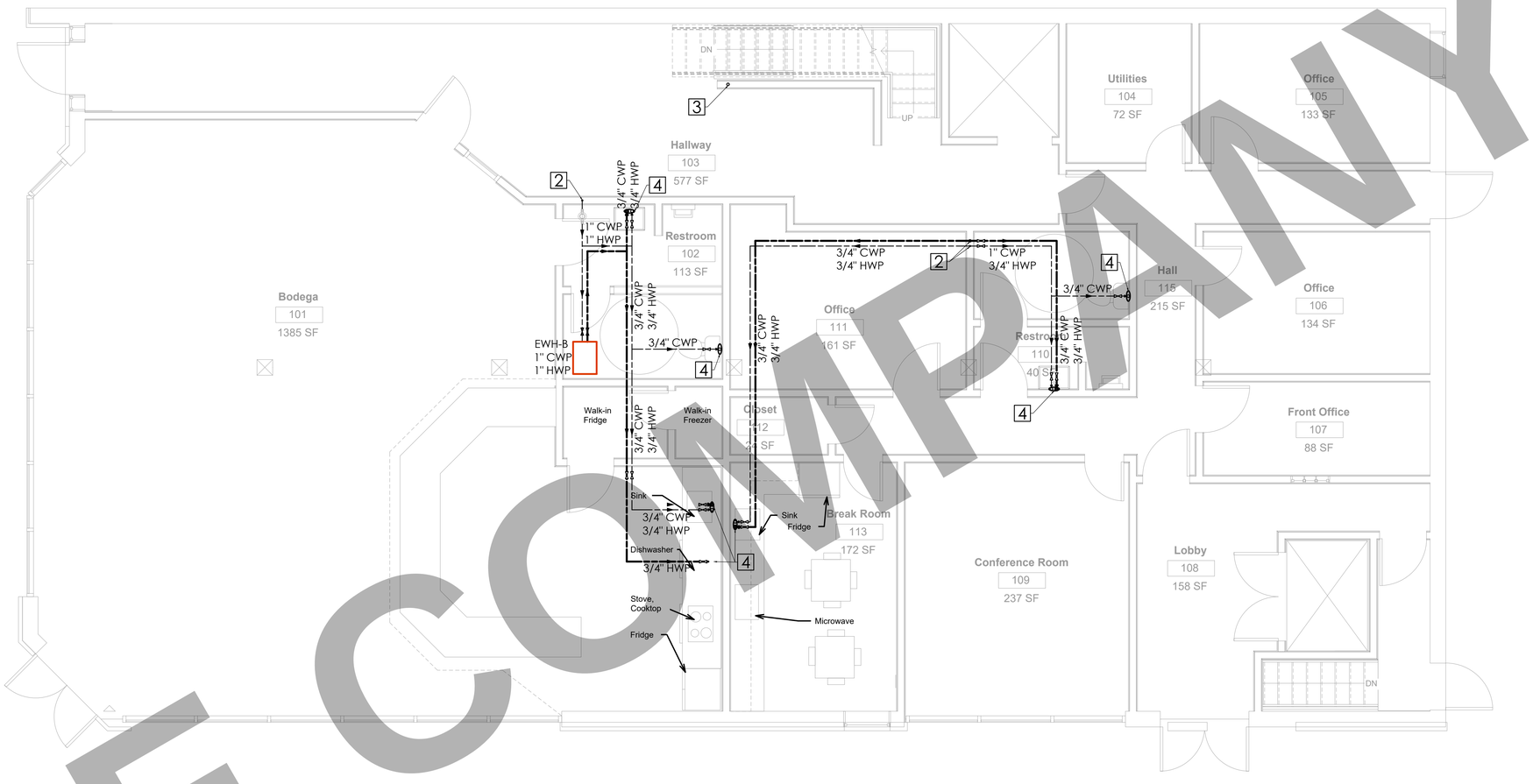
BASEMENT PLAN - WATER SUPPLY LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.

P 1 . 0 1

REV.



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 3" AND SMALLER SHALL BE SLOPED AT ¼" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT ⅛" PER FOOT.
11. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT ⅛" 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.

SCHEDULE No. 1

ELECTRIC WATER HEATER OF BODEGA

TAG	EWH-B
LOCATION	ABOVE CEILING OF BATHROOM
MANUFACTURER	A.O SMITH
MODEL	EJCS-20
TYPE	ELECTRIC - TANK
MAX. POWER (KW) / NB OF ELEMENTS	6 / 1
VOLTAGE (V / PH /HZ)	240 / 1 / 60
NOMINAL TANK CAPACITY (GAL)	19
RATED STORAGE VOLUME (GAL)	17
APPROXIMATE WEIGHT (LBS)	68
WIDTH x DEPTH x HEIGHT (in.)	18" X 18" X 24-3/4"

WATER SUPPLY SHEET NOTES:

1. DCW RISE TO FLOOR ABOVE.
2. DCW RISE FROM FLOOR BELOW TO CEILING LEVEL.
3. DCW RISE FROM FLOOR BELOW TO FLOOR ABOVE.
4. DCW AND/OR DHW TO FIXTURE CONNECTION.

BUILDING WATER LOAD

DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	128	-	2"
DHW	101	-	2"
TOT. COMBINED	185.6	-	2"

BODEGA WATER LOAD

DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	4.5	-	1"
DHW	3.9	-	1"
TOT. COMBINED	6.8	-	1"

FIRST FLOOR WATER LOAD

DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	11	-	1-1/2"
DHW	8.4	-	1"
TOT. COMBINED	14.8	-	1-1/2"

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

FIRST FLOOR - WATER SUPPLY LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

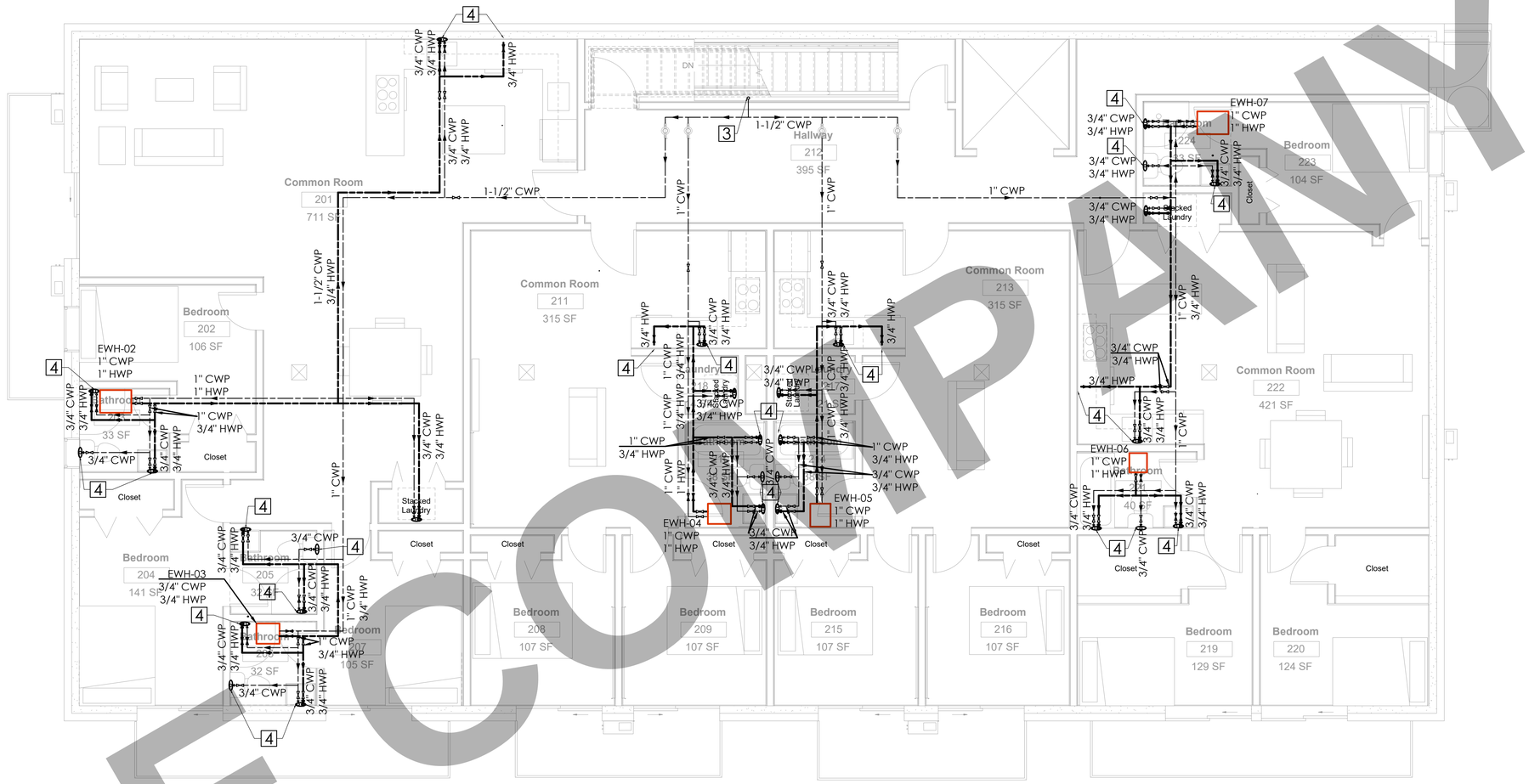
DRAWING NO.

P 1 . 0 2

REV.

WATER SUPPLY SHEET NOTES:

1. DCW RISE TO FLOOR ABOVE.
2. DCW RISE FROM FLOOR BELOW TO CEILING LEVEL.
3. DCW RISE FROM FLOOR BELOW TO FLOOR ABOVE.
4. DCW AND/OR DHW TO FIXTURE CONNECTION.



GENERAL NOTES:

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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 3" AND SMALLER SHALL BE SLOPED AT ¼" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT ⅛" PER FOOT.
11. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT ⅛" 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.

SCHEDULE No. 1

ELECTRIC WATER HEATERS OF 2ND FLOOR

TAG	EWH-03,04,05	EWH-06	EWH-02,07
LOCATION	ABOVE CEILING OF BATHROOM	ABOVE CEILING OF BATHROOM	ABOVE CEILING OF BATHROOM
MANUFACTURER	A.O SMITH	A.O SMITH	A.O SMITH
MODEL	EJC-10	EJC-6	EJCS-20
TYPE	ELECTRIC - TANK	ELECTRIC - TANK	ELECTRIC - TANK
MAX. POWER (KW) / NB OF ELEMENTS	6 / 1	3 / 1	6 / 1
VOLTAGE (V / PH /HZ)	240 / 1 / 60	240 / 1 / 60	240 / 1 / 60
NOMINAL TANK CAPACITY (GAL)	10	6	19
RATED STORAGE VOLUME (GAL)	9	6	17
APPROXIMATE WEIGHT (LBS)	41	35	68
WIDTH x DEPTH x HEIGHT (in.)	16" X 16" X 18-1/4"	14-1/4" X 14-1/4" X 15-1/4"	18" X 18" X 24-3/4"

BUILDING WATER LOAD			
DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	128	-	2"
DHW	101	-	2"
TOT. COMBINED	185.6	-	2"

SECOND FLOOR WATER LOAD			
DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	32.5	-	1-1/2"
DHW	24.1	-	1-1/2"
TOT. COMBINED	45.5	-	1-1/2"

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

SECOND FLOOR - WATER SUPPLY LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

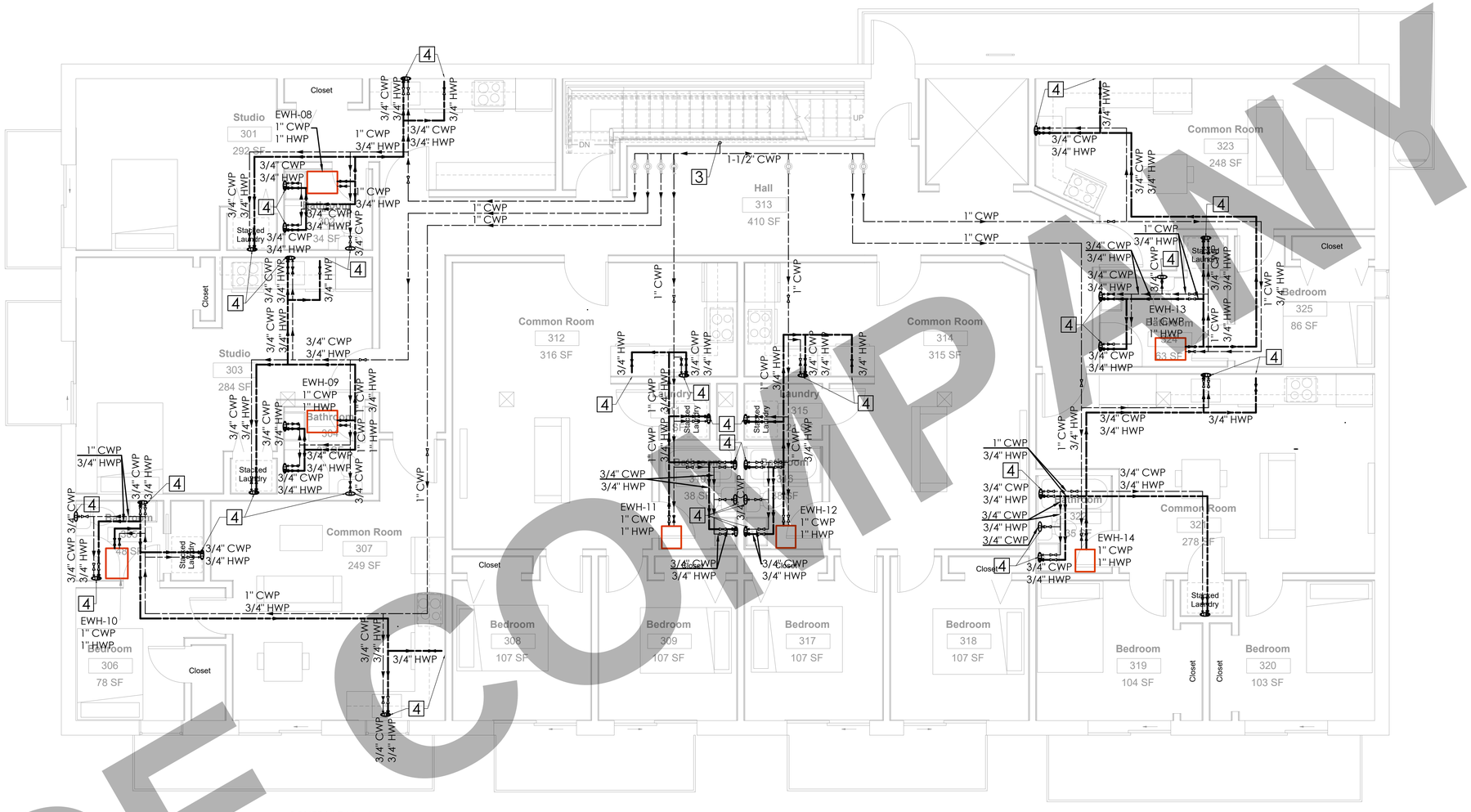
DRAWING NO.

P 1 . 0 3

REV.

WATER SUPPLY SHEET NOTES:

1. DCW RISE TO FLOOR ABOVE.
2. DCW RISE FROM FLOOR BELOW TO CEILING LEVEL.
3. DCW RISE FROM FLOOR BELOW TO FLOOR ABOVE.
4. DCW AND/OR DHW TO FIXTURE CONNECTION.



GENERAL NOTES:

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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 3" AND SMALLER SHALL BE SLOPED AT ¼" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT ⅛" PER FOOT.
11. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT ⅛" 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.

SCHEDULE No. 1

ELECTRIC WATER HEATERS OF 3RD FLOOR

TAG	EWH-08,09,10,13	EWH-11,12,14
LOCATION	ABOVE CEILING OF BATHROOM	ABOVE CEILING OF BATHROOM
MANUFACTURER	A.O SMITH	A.O SMITH
MODEL	EJCS-20	EJC-10
TYPE	ELECTRIC - TANK	ELECTRIC - TANK
MAX. POWER (KW) / NB OF ELEMENTS	6 / 1	6 / 1
VOLTAGE (V / PH /HZ)	240 / 1 / 60	240 / 1 / 60
NOMINAL TANK CAPACITY (GAL)	19	10
RATED STORAGE VOLUME (GAL)	17	9
APPROXIMATE WEIGHT (LBS)	68	41
WIDTH x DEPTH x HEIGHT (in.)	18" X 18" X 24-3/4"	16" X 16" X 18-1/4"

BUILDING WATER LOAD			
DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	128	-	2"
DHW	101	-	2"
TOT. COMBINED	185.6	-	2"

THIRD FLOOR WATER LOAD			
DESCRIPTION	LOAD		PIPE SIZE
	FU	GPM	PEX
DCW	38.5	-	1-1/2"
DHW	34.3	-	1-1/2"
TOT. COMBINED	58.1	-	1-1/2"

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

THIRD FLOOR - WATER SUPPLY LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

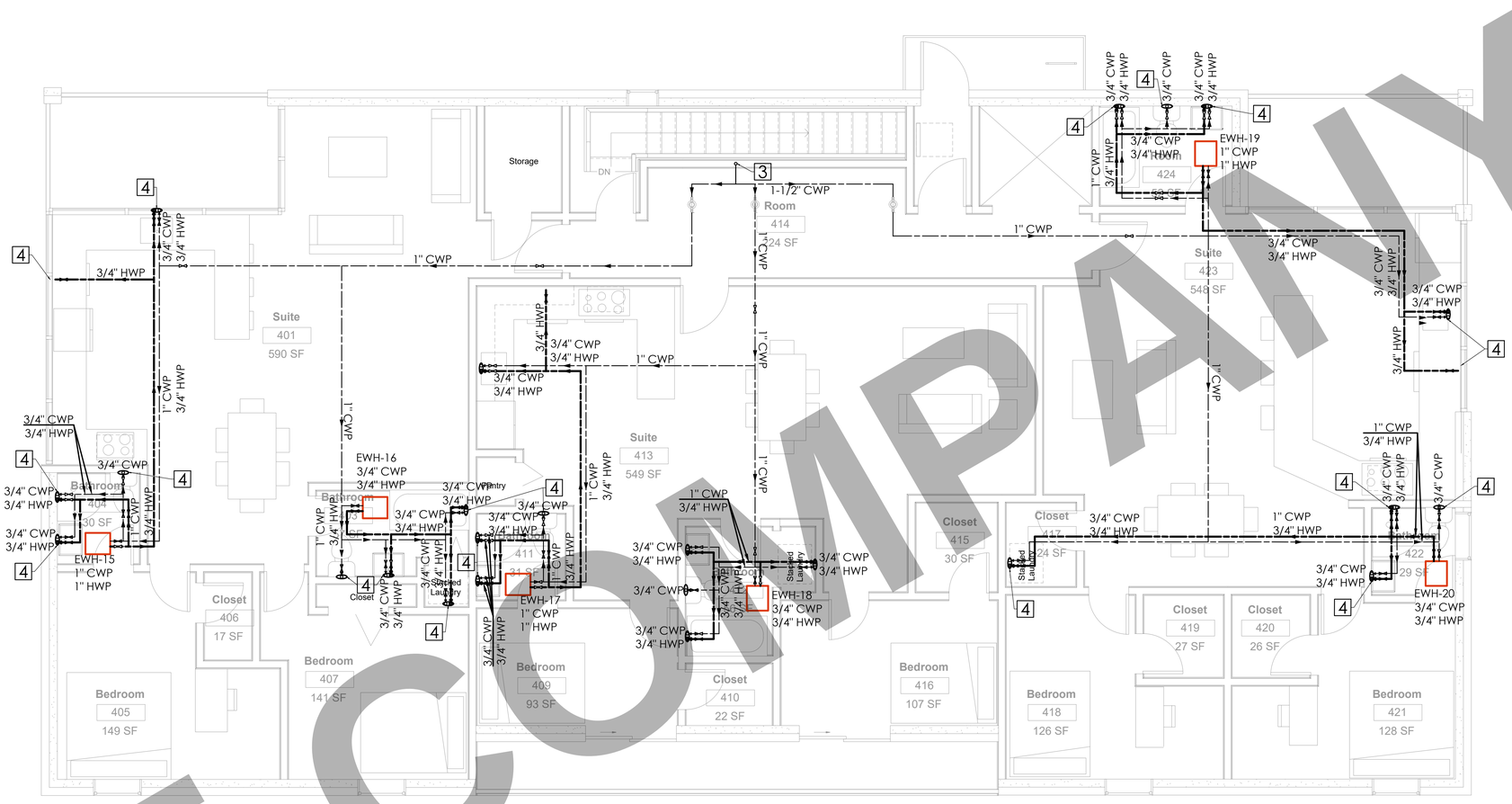
DRAWING NO.

P 1 . 0 4

REV.

WATER SUPPLY SHEET NOTES:

1. DCW RISE TO FLOOR ABOVE.
2. DCW RISE FROM FLOOR BELOW TO CEILING LEVEL.
3. DCW RISE FROM FLOOR BELOW TO FLOOR ABOVE.
4. DCW AND/OR DHW TO FIXTURE CONNECTION.



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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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 3" AND SMALLER SHALL BE SLOPED AT $\frac{1}{4}$" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT $\frac{1}{8}$" PER FOOT.
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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.

SCHEDULE No. 1

ELECTRIC WATER HEATERS OF 4TH FLOOR

TAG	EWH-15 TO EWH-20
LOCATION	ABOVE CEILING OF BATHROOM
MANUFACTURER	A.O SMITH
MODEL	EJC-10
TYPE	ELECTRIC - TANK
MAX. POWER (KW) / NB OF ELEMENTS	6 / 1
VOLTAGE (V / PH /HZ)	240 / 1 / 60
NOMINAL TANK CAPACITY (GAL)	10
RATED STORAGE VOLUME (GAL)	9
APPROXIMATE WEIGHT (LBS)	41
WIDTH x DEPTH x HEIGHT (in.)	16" X 16" X 18-1/4"

BUILDING WATER LOAD			
DESCRIPTION	LOAD		PIPE SIZE PEX
	FU	GPM	
DCW	128	-	2"
DHW	101	-	2"
TOT. COMBINED	185.6	-	2"

FOURTH FLOOR WATER LOAD			
DESCRIPTION	LOAD		PIPE SIZE PEX
	FU	GPM	
DCW	27	-	1-1/2"
DHW	19.2	-	1-1/2"
TOT. COMBINED	37.2	-	1-1/2"

CLIENT:

ADDRESS:

420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

FOURTH FLOOR - WATER SUPPLY LAYOUT.

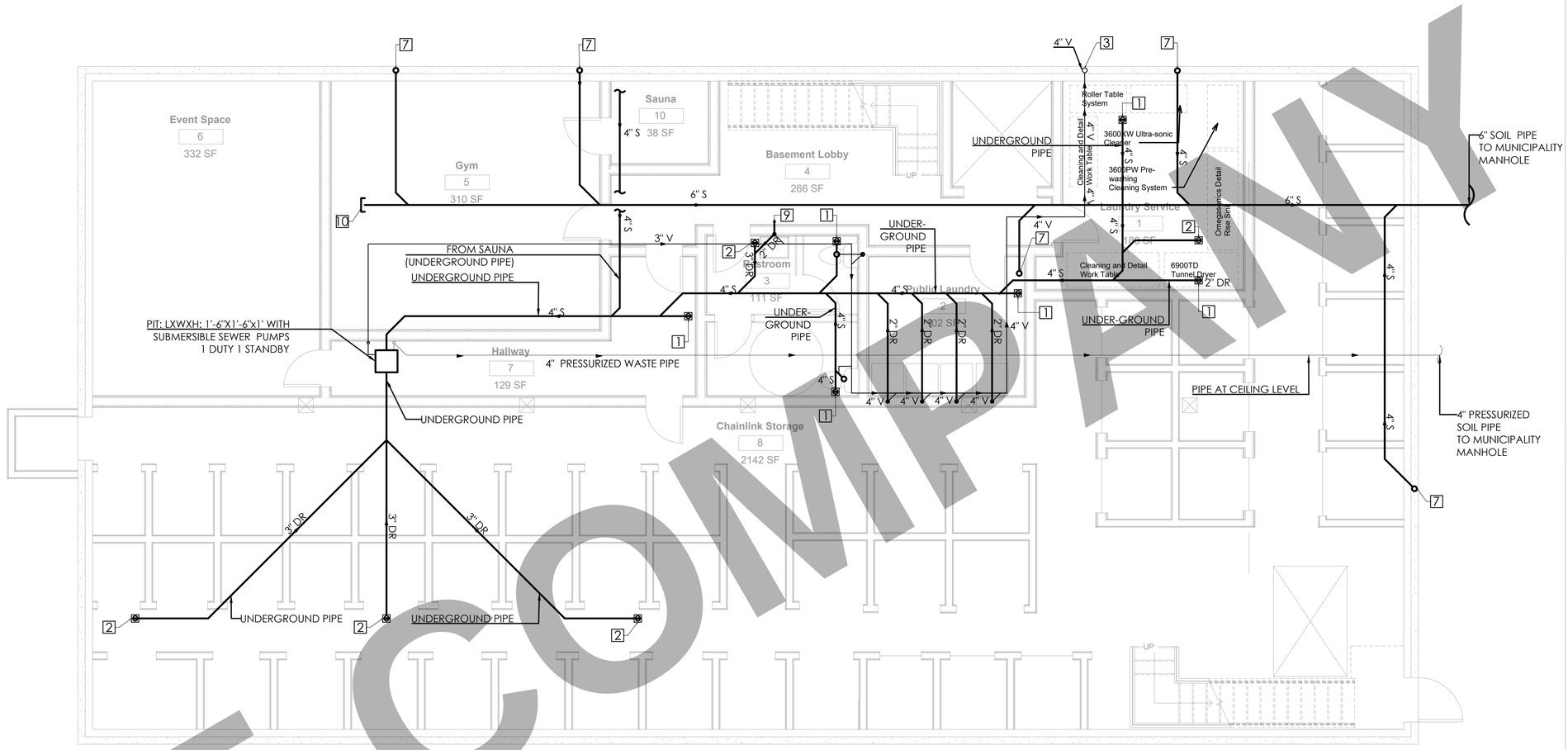
PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.

P 1 . 0 5

REV.

ALL HVAC INDOOR UNITS TO HAVE 1"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.
ALL WATER HEATERS TO HAVE 3/4"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.



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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.
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SANITARY SHEET NOTES:

1. 4" FLOOR CLEAN-OUT.
2. 3" FLOOR DRAIN.
3. VENT STACK TO ABOVE.
4. VENT STACK FROM BELOW.
5. VENT STACK FROM BELOW TO ABOVE.
6. 4" SOIL AND WASTE DROP TO BELOW.
7. 4" SOIL AND WASTE DROP FROM ABOVE.
8. 4" SOIL AND WASTE DROP FROM ABOVE TO BELOW.
9. 3/4" CONDENSATE DRAIN DROP IN WALL.
10. 4" CEILING CLEAN-OUT.

MINIMUM PIPE SIZE PER FIXTURE

FIXTURE UNIT	DR (INCH)	VENT (INCH)
WATER CLOSET	4	2
LAVATORY	2	2
KITCHEN SINK	2	2
DISHWASHER	2	2
BATHTUB	2	2
LAUNDRY MACHINE	2	2
CLOTHES DRYER	2	2

SCHEDULE No. 1
SUBMERSIBLE SEWER PUMPS

TAG	SP-01,02
LOCATION	SUMP PIT IN BASEMENT
TYPE	SUBMERSIBLE SUMP PUMP
POWER (HP)	1.5
VOLTAGE (V / PH / HZ)	230 / 1 / 60
FLOW RATE (GPM)	31.7
PRESSURE HEAD (FT)	26.24

NOTES
1. EQUIPPED WITH SUMP HIGH LEVEL ALARM.

CLIENT:

ADDRESS:
420 SOUTH AVE,
SPRINGFIELD, MO 65806

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

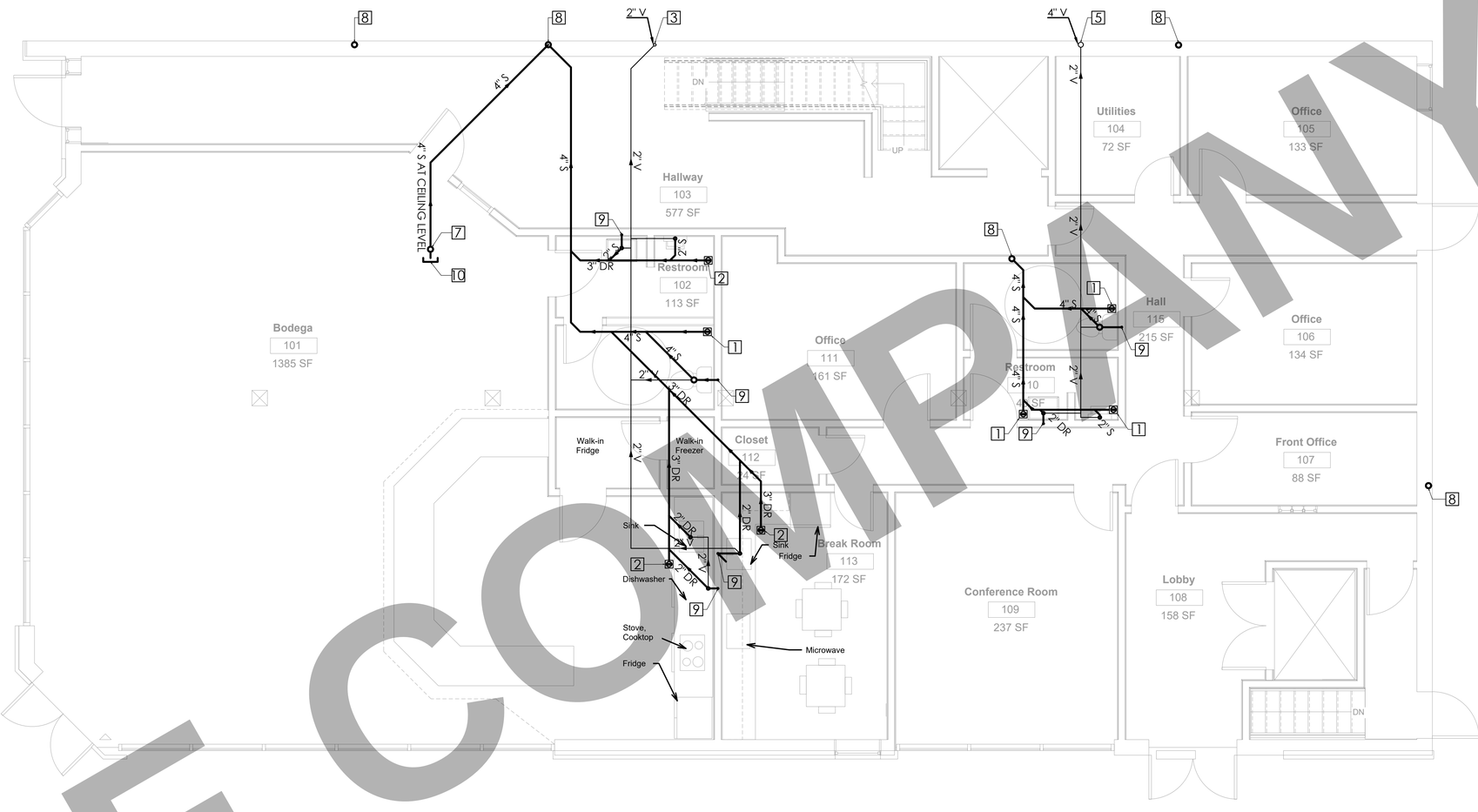
TITLE:
BASEMENT PLAN - SEWER LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.
P 2 . 0 1

REV.

ALL HVAC INDOOR UNITS TO HAVE 1"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.
ALL WATER HEATERS TO HAVE 3/4"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.



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7. 4" SOIL AND WASTE DROP FROM ABOVE.
8. 4" SOIL AND WASTE DROP FROM ABOVE TO BELOW.
9. 3/4" CONDENSATE DRAIN DROP IN WALL.
10. 4" CEILING CLEAN-OUT.

MINIMUM PIPE SIZE PER FIXTURE

FIXTURE UNIT	DR (INCH)	VENT (INCH)
WATER CLOSET	4	2
LAVATORY	2	2
KITCHEN SINK	2	2
DISHWASHER	2	2
BATHTUB	2	2
LAUNDRY MACHINE	2	2
CLOTHES DRYER	2	2

CLIENT:

ADDRESS:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

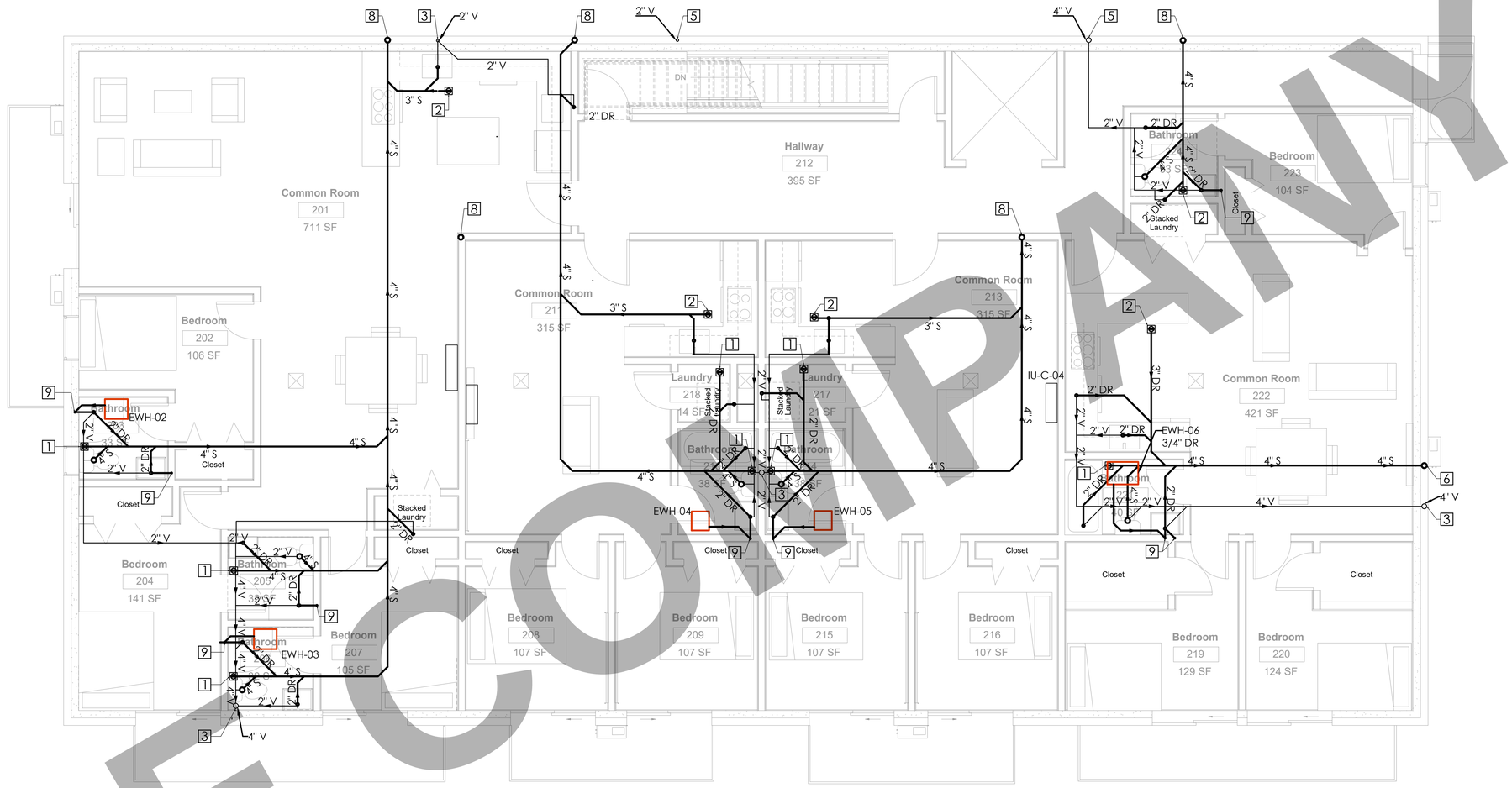
TITLE:
FIRST FLOOR - SEWER LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.
P 2 . 0 2

REV.

ALL HVAC INDOOR UNITS TO HAVE 1"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.
ALL WATER HEATERS TO HAVE 3/4"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.



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9. 3/4" CONDENSATE DRAIN DROP IN WALL.
10. 4" CEILING CLEAN-OUT.

MINIMUM PIPE SIZE PER FIXTURE

FIXTURE UNIT	DR (INCH)	VENT (INCH)
WATER CLOSET	4	2
LAVATORY	2	2
KITCHEN SINK	2	2
DISHWASHER	2	2
BATHTUB	2	2
LAUNDRY MACHINE	2	2
CLOTHES DRYER	2	2

CLIENT:

ADDRESS:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

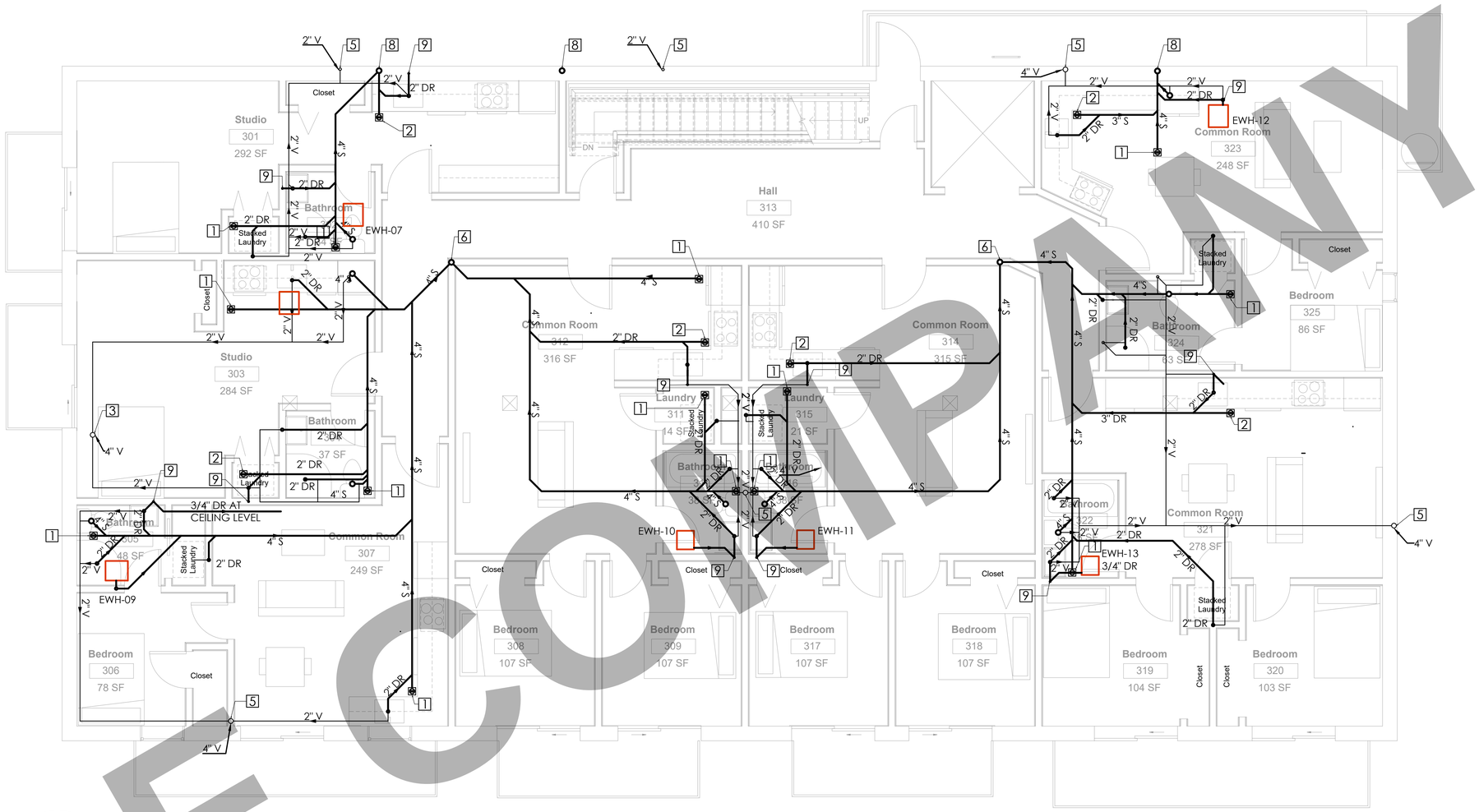
TITLE:
SECOND FLOOR - SEWER LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.
P 2 . 0 3

REV.

ALL HVAC INDOOR UNITS TO HAVE 1"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.
ALL WATER HEATERS TO HAVE 3/4"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.



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MINIMUM PIPE SIZE PER FIXTURE

FIXTURE UNIT	DR (INCH)	VENT (INCH)
WATER CLOSET	4	2
LAVATORY	2	2
KITCHEN SINK	2	2
DISHWASHER	2	2
BATHTUB	2	2
LAUNDRY MACHINE	2	2
CLOTHES DRYER	2	2

CLIENT:

ADDRESS:

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REV. NO.	DESCRIPTION	DATE	BY

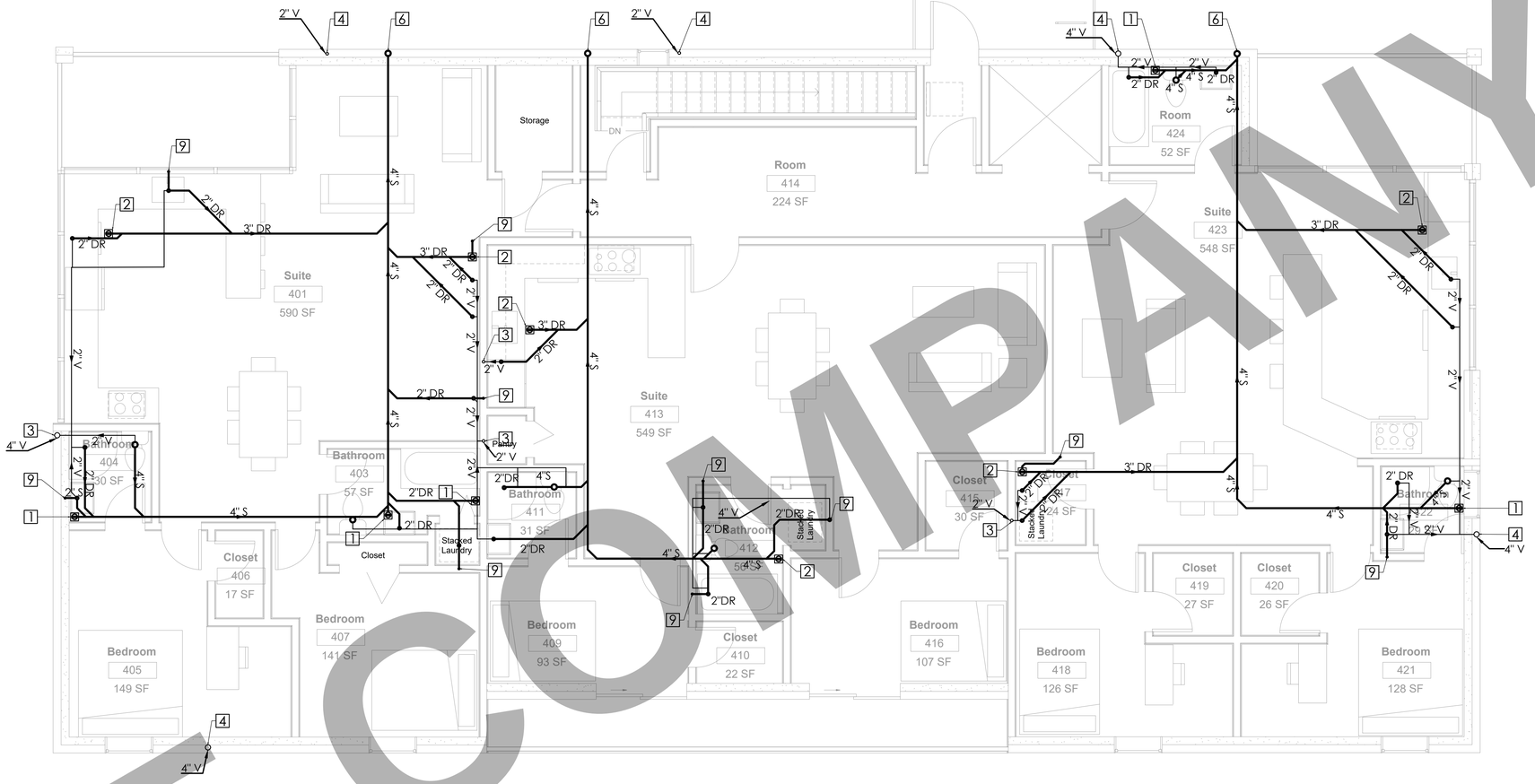
PROJECT:
B SQUARE TOWER PROJECT

TITLE:
THIRD FLOOR - SEWER LAYOUT.

PROJ. NO. | PROJ. ENGR. | SCALE @ 24X36: **1/4" = 1'-0"**

DRAWING NO.: **P 2 . 0 4** | REV.

ALL HVAC INDOOR UNITS TO HAVE 1"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.
ALL WATER HEATERS TO HAVE 3/4"Ø CDP CONNECTED TO NEAREST TAILPIECE DRAIN.



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10. 4" CEILING CLEAN-OUT.

MINIMUM PIPE SIZE PER FIXTURE

FIXTURE UNIT	DR (INCH)	VENT (INCH)
WATER CLOSET	4	2
LAVATORY	2	2
KITCHEN SINK	2	2
DISHWASHER	2	2
BATHTUB	2	2
LAUNDRY MACHINE	2	2
CLOTHES DRYER	2	2

CLIENT:

ADDRESS:

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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:
B SQUARE TOWER PROJECT

TITLE:
FOURTH FLOOR - SEWER LAYOUT.

PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		1/4" = 1'-0"

DRAWING NO.
P 2 . 0 5

REV.

A. O. Smith COMMERCIAL ELECTRIC WATER HEATERS

FEATURES AND BENEFITS (CONTINUED)

STANDARD VOLTAGES
- 208, 240 and 480 volt single and three phase. All 208 and 240 volt at 24kW and below are supplied phase convertible (single to three and vice versa). 277 volt single phase also available. Consult factory for 120 volt power circuit availability.

TERMINAL BLOCK
- To accept copper or aluminum leads (on units with more than one contactor).

120 VOLT CONTROL CIRCUIT
- Powered by fused transformer.

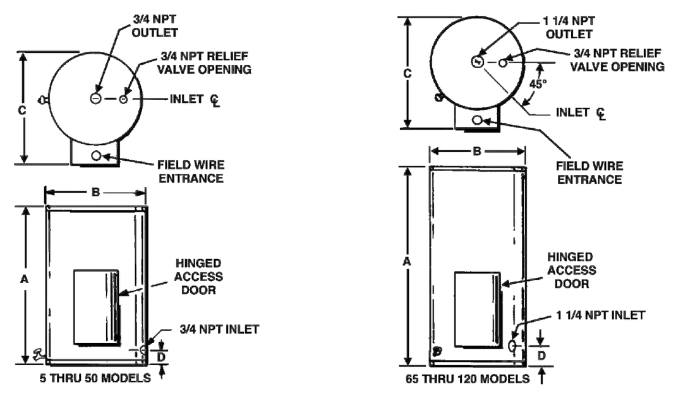
MAGNETIC CONTACTORS
- Heavy-duty UL rated for 100,000 cycles.

POWER CIRCUIT FUSING (120 AMP CURRENT DRAW AND ABOVE)
- Meets National Electric Code and UL requirements that water heaters must have internal fusing when current draw exceeds 120 amps.

SIMPLIFIED CIRCUITRY, COLOR-CODED FOR EASE OF SERVICE

HINGED CONTROL COMPARTMENT DOOR

CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE



ROUGH-IN DIMENSIONS

Model Number	Tank Capacity		Maximum kW Input	Dimensions in Inches (mm)				Approx. Shipping Weight	
	Gallons	Litres		A	B	C	D	lbs.	Kg.
DSE-5A	5	19	3	22 in	16 in	24 in	4.25 in	82	37.2
DSE-10A	10	38	6	28.13 in	18 in	26 in	5.25 in	116	48.1
DSE-20A	20	76	18	31.75 in	22 in	28 in	5.75 in	145	65.7
DSE-30A**	30	114	24	43.25 in	22 in	28 in	5.75 in	218	98.9
DSE-40A**	40	151	36*	54.75 in	22 in	28 in	5.75 in	245	111.1
DSE-50A**	50	189	90	66.19 in	22 in	28 in	5.75 in	291	132.0
DSE-65A**	65	246	90	57.25 in	26.5 in	32.5 in	11.38 in	344	156.0
DSE-80A**	80	303	90	58.13 in	28 in	35 in	12.5 in	406	184.2
DSE-100A**	100	379	90	70.25 in	28 in	35 in	12.5 in	419	190.1
DSE-120A**	120	450	90	70.25 in	30.13 in	37 in	12.5 in	453	205.5

**30-120 gallon models not available below 12.3KW.
Some 40 gallon models may require the larger control box, depending on the electrical configuration.

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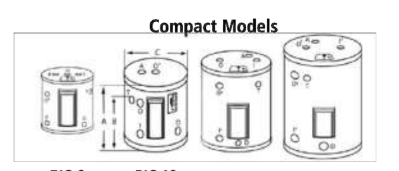
AOSCE15100

A. O. Smith COMMERCIAL-GRADE RESIDENTIAL ELECTRIC WATER HEATERS

Model Number	Nominal Capacity	Rated Storage Volume	First Hour Rating (Gallons)	UEF	Element Wattage		Recovery @ 90°F Rise Gallons Per Hour	Dimensions in Inches			Approx. Shipping Weight (lbs)
					Standard	Maximum		A	B	C	
Compact Models					120V	240V					
EJC-6	6	6	N/A	N/A	1650	3000	8	15-1/4	10-3/4	14-1/4	35
EJC-10	10	9	N/A	N/A	1650	6000	8	18-1/4	12-1/4	16	41
EJCS-20	19	17	N/A	N/A	2500	6000	11	24-3/4	18-5/8	18	68
EJCT-20	19.9	18	N/A	N/A	2500	6000	11	31-5/8	25-3/4	16	68
Lowboy Side-Connect Model					240V						
ENJB-30*	28	26	47	0.90	4500	6000	21	30	21-3/4	22	101
ENJ-30	28	26	43	0.91	4500	6000	21	31-1/4	21-3/4	24	115
ENJB-40*	38	35	57	0.94	4500	6000	21	31-3/4	24	24	118
ENJB-40W*	38	35	38	0.91	-	4000	18	31-3/4	24	24	118
ENJ-40	38	35	54	0.93	4500	6000	21	33-1/2	24	26	118
ENJ-40W	38	35	38	0.91	-	4000	18	33-1/2	24	26	118
Table Top Model					240V						
ENTT-38	38	35	55	0.90	4500	5500	21	36	24	25	150
Point-Of-Use-Models					120V						
EPU-2.5	2.5	2.6	N/A	N/A	1440 @ 120V		7	14-1/2"	10 3/8	11 3/4	17
EPU-4	4	3.8	N/A	N/A	1440 @ 120V		7	19-1/4	10 3/8	11 3/4	20
EPU-6	6	5.9	N/A	N/A	1440 @ 120V		7	20	12 1/2	13-3/4	24

*Models ship with a supplied insulation blanket.
When ordering models ENJ-40 or ENJB-40 the model number will change for wattages of 4kW to 1kW. The new model number will include a "W" suffix (example: ENJB-40W)
Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.
Top mounted T&P adds approximately 3" to overall installation height.
Water connection is 3/4" on Table Top and Compact models and 1/2" NPT on Point-Of-Use Models

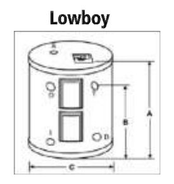
Compact Models



EJC-6 EJC-10 EJCS-20 EJCT-20

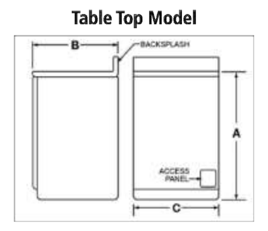
I	INLET	D	DRAIN	I*	PLUGGED INLET	A	ANODE
O	OUTLET	T	T&P	O*	PLUGGED OUTLET		

Lowboy

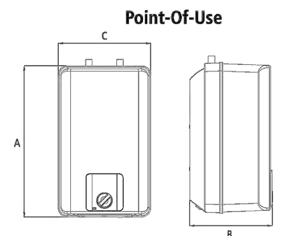


ENJ-30, ENJB-30
ENJ-40, ENJB-40

Table Top Model



Point-Of-Use



For Technical Information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.

www.hotwater.com | 800-527-1953 Toll-Free USA | A. O. Smith Corporation | 500 Tennessee Waltz Parkway | Ashland City, TN 37015

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AOSRE50603

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - BASEMENT AND FIRST FLOOR			Checked by:
Hot Water Calculation			Approved by:

Application Type: Hotel

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Public lavatory				8	x	2	=	16	gph
Laundry, Stationary Tub				28	x	5	=	140	gph
Kitchen Sink				30	x	1	=	30	gph
Service Sink				30	x	1	=	30	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	75	x	1 =	75	x	0	=	0	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	216	gph
Demand Factor	=	0,25	gph
Maximum Probable Demand	=	54	gph
Maximum Probable Demand	=	0,90	gpm
	=	0,06	L/s
Heater Recovery Capacity	=	0,90	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	32,4	gal
		122,5	liters
Actual Selection		123	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,9	x	90	/	0,9	=	45.000	btu/hr
									=	13,2	kW
						Actual Selection			=	14	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - BODEGA			Checked by:
Hot Water Calculation			Approved by:

Application Type:

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Public lavatory				15	x	1	=	15	gph
Kitchen Sink				20	x	1	=	20	gph
Dishwasher				60	x	1	=	60	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	225	x	1 =	225	x	0	=	0	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	95	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	23,75	gph
Maximum Probable Demand	=	0,40	gpm
	=	0,03	L/s
Heater Recovery Capacity	=	0,40	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	14,25	gal
		53,9	liters
Actual Selection		54	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,4	x	90	/	0,9	=	20.000	btu/hr
									=	5,9	kW
						Actual Selection			=	6	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 2 - APARTMENT 1 - 1st EWH			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	2	=	4	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	2	=	60	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	64	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	16	gph
Maximum Probable Demand	=	0,27	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,27	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	9,6	gal
		36,3	liters
Actual Selection		37	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,27	x	90	/	0,9	=	13.500	btu/hr
									=	4	kW
						Actual Selection			=	4	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 2 - APARTMENT 1 - 2nd EWH			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Kitchen Sink				10	x	1	=	10	gph
Dishwasher				15	x	1	=	15	gph
Laundry, Stationary Tub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	1	=	30	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	77	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	19,25	gph
Maximum Probable Demand	=	0,33	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,33	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	11,55	gal
		43,7	liters
Actual Selection		44	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,33	x	90	/	0,9	=	16.500	btu/hr
									=	4,9	kW
						Actual Selection			=	5	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 2 - APARTMENTS 2 & 3			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Kitchen Sink				10	x	1	=	10	gph
Bathtub				20	x	1	=	20	gph
Dishwasher				15	x	1	=	15	gph
Laundry, Stationary Tub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	0	=	0	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	67	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	16,75	gph
Maximum Probable Demand	=	0,28	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,28	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	10,05	gal
		38	liters
Actual Selection		38	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,28	x	90	/	0,9	=	14.000	btu/hr
									=	4,2	kW
						Actual Selection			=	5	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 2 - APARTMENT 4 -1ST EWH			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Kitchen Sink				10	x	1	=	10	gph
Dishwasher				15	x	1	=	15	gph
Laundry, Stationary Tub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	1	=	30	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	77	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	19,25	gph
Maximum Probable Demand	=	0,33	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,33	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	11,55	gal
		43,7	liters
Actual Selection		44	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,33	x	90	/	0,9	=	16.500	btu/hr
									=	4,9	kW
						Actual Selection			=	5	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 2 - APARTMENT 4 - 2ND EWH			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Bathtub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	0	=	0	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	22	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	5,5	gph
Maximum Probable Demand	=	0,10	gpm
	=	0,01	L/s
Heater Recovery Capacity	=	0,10	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	3,3	gal
		12,5	liters
Actual Selection		13	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,1	x	90	/	0,9	=	5.000	btu/hr
									=	1,5	kW
						Actual Selection			=	2	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: Q SQUARE TOWER - FLOOR 3 - APARTMENTS 1,2,3,6			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Kitchen Sink				10	x	1	=	10	gph
Dishwasher				15	x	1	=	15	gph
Laundry, Stationary Tub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	1	=	30	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	77	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	19,25	gph
Maximum Probable Demand	=	0,33	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,33	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	11,55	gal
		43,7	liters
Actual Selection		44	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,33	x	90	/	0,9	=	16.500	btu/hr
									=	4,9	kW
						Actual Selection			=	5	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: Q SQUARE - FLOOR 3 - APARTMENTS 4,5,&7			Checked by:
Hot Water Calculation			Approved by:

Application Type: Private Residence

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Kitchen Sink				10	x	1	=	10	gph
Bathtub				20	x	1	=	20	gph
Dishwasher				15	x	1	=	15	gph
Laundry, Stationary Tub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	0	=	0	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	67	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	16,75	gph
Maximum Probable Demand	=	0,28	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,28	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	10,05	gal
		38	liters
Actual Selection		38	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,28	x	90	/	0,9	=	14.000	btu/hr
									=	4,2	kW
						Actual Selection			=	5	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 4 - APARTMENT 2 - EWH 1			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Kitchen Sink				10	x	1	=	10	gph
Dishwasher				15	x	1	=	15	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	1	=	30	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	57	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	14,25	gph
Maximum Probable Demand	=	0,24	gpm
	=	0,02	L/s
Heater Recovery Capacity	=	0,24	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	8,55	gal
		32,4	liters
Actual Selection		33	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,24	x	90	/	0,9	=	12.000	btu/hr
									=	3,6	kW
						Actual Selection			=	4	kW

Design calculation sheet

Project no:	Date: 01/11/2022	Sheet no.: 1 of 1	Computed by: M.J.
Subject: B SQUARE TOWER - FLOOR 4 - APARTMENT 2 - EWH 1			Checked by:
Hot Water Calculation			Approved by:

Application Type: Apartment House

Water Temperature						
Tin	=	50	°F	=	10	°C
Tout	=	140	°F	=	60	°C
⌂T	=	90	°F	=	50	°C

Fixture				GPH		QTY.			
Basin, Private lavatory				2	x	1	=	2	gph
Bathtub				20	x	1	=	20	gph
Laundry, Stationary Tub				20	x	1	=	20	gph
Showers	**GPH**		**Shower Factor**	**GPH**		**QTY.**			
Showers	30	x	1 =	30	x	0	=	0	gph
Other				**GPH**		**QTY.**			

Maximum Possible Demand	=	42	gph
Demand Factor (Custom)	=	0,25	gph
Maximum Probable Demand	=	10,5	gph
Maximum Probable Demand	=	0,18	gpm
	=	0,01	L/s
Heater Recovery Capacity	=	0,18	gpm
Storage Factor (Custom)	=	0,6	
Storage Tank Capacity	=	6,3	gal
		23,9	liters
Actual Selection		24	Liters

Heater or Coil	=	500	x	gpm	x	⌂T	/	Efficiency			
Capacity	=	500	x	0,18	x	90	/	0,9	=	9.000	btu/hr
									=	2,7	kW
						Actual Selection			=	3	kW

CLIENT:

ADDRESS:
420 SOUTH AVE,
SPRINGFIELD, MO 65806

NOTES:

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4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY TEMPORARY SUPPORT TO THE BUILDING AND ANY ADJACENT STRUCTURES.

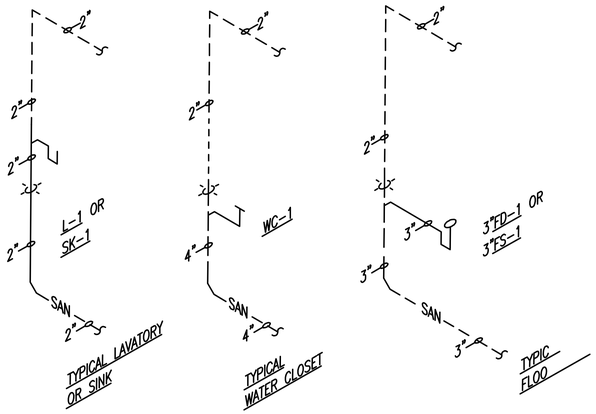
REV. NO.	DESCRIPTION	DATE	BY

PROJECT:
B SQUARE TOWER PROJECT

TITLE:
PLUMBING EQUIPMENT DATASHEETS.

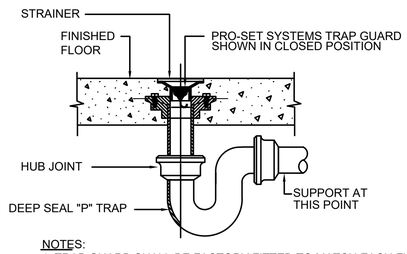
PROJ. NO.	PROJ. ENGR.	SCALE @ 24X36
		NTS

DRAWING NO.	REV.
P3.01	



1 TYPICAL WASTE AND VENT RISERS

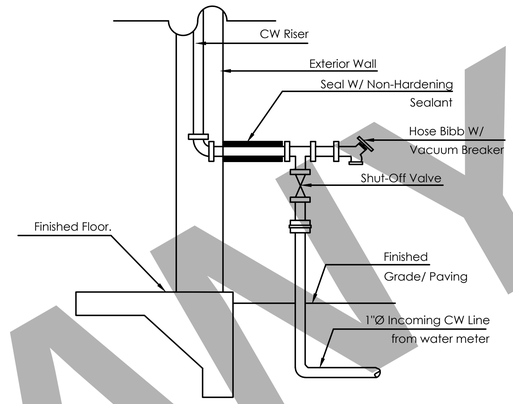
SCALE: NONE



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.

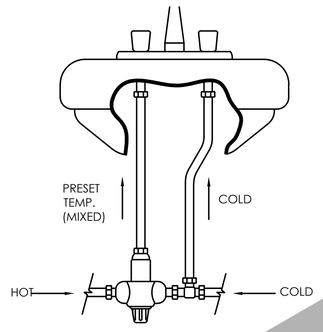
3 FLOOR DRAIN WITH TRAP SEAL PROTECTION

SCALE: NONE



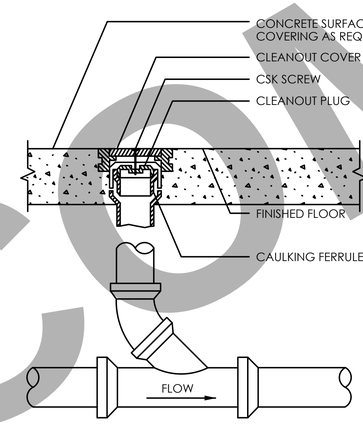
WATER ENTRY DETAIL

NO SCALE



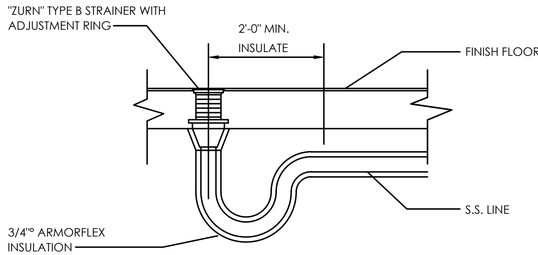
ANTI-SCALD MIXING VALVE

NO SCALE



FLOOR CLEANOUT DETAIL

NO SCALE

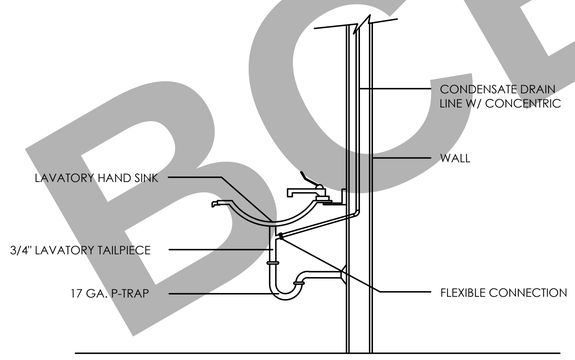


CONTRACTOR TO REFER TO PLUMBING DRAWINGS FOR SIZE AND LOCATION OF SANITARY SEWER LINE.

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

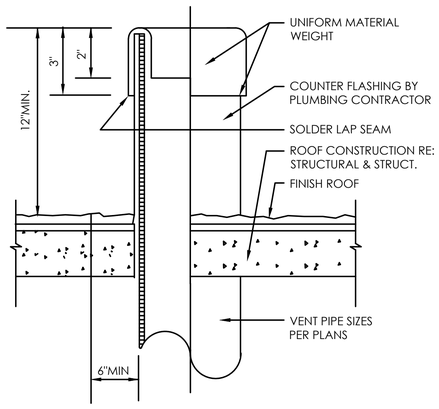
FLOOR DRAIN DETAIL

NO SCALE



CONDENSATE DETAIL

NO SCALE



VENT THRU ROOF DETAIL

NO SCALE

CLIENT:

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REV. NO.	DESCRIPTION	DATE	BY

PROJECT:

B SQUARE TOWER PROJECT

TITLE:

PLUMBING GENERAL DETAILS.

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

DRAWING NO.

P 4 . 0 1

REV.