1. GENERAL
   - A. THE GENERAL CONDITIONS OF THE GENERAL SPECIFICATIONS, AND ALL APPLICABLE INSTRUCTIONS TO BIDDERS SHALL BE PART OF THESE SPECIFICATIONS.
   - B. THE WORD "PROVIDE" AS USED HEREIN MEANS TO FURNISH AND INSTALL COMPLETE.
   - C. THE TERM "CONTRACTOR" AS USED HEREIN MEANS ANY CONTRACTOR OR SUBCONTRACTOR CONTRACTED TO PERFORM WORK INCLUDED IN AND DEFINED BY THIS SECTION.
   - D. MECHANICAL WORK SHALL BE PROVIDED IN STRICT COMPLIANCE WITH THE 2023 FBC - MECHANICAL CODE, 8TH EDITION (IMC 2021), NATIONAL ELECTRICAL CODE (NEC), AND ALL APPLICABLE LOCAL ORDINANCES, STATE LAWS AND FEDERAL LAWS.

2. PRIOR TO BIDDING:
   - A. THOROUGHLY REVIEW THE BID INSTRUCTIONS INCLUDING ALL CIVIL, ARCHITECTURAL, STRUCTURAL, AND MEP CONSTRUCTION DOCUMENTS. OBTAIN AND THOROUGHLY EXAMINE THE MANUFACTURERS'S WRITTEN INSTALLATION INSTRUCTIONS, DETAILS, AND REQUIREMENTS FOR THE SCHEDULED AND SPECIFIED EQUIPMENT AND MATERIALS. FOR AMBIGUOUS, CONTRADICTORY, OR CONFLICTING ITEMS WITHIN THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL REQUEST CLARIFICATION IN A WRITTEN "REQUEST FOR INFORMATION" (RFI), AT LEAST FIVE (5) WORKING DAYS PRIOR TO BID DATE. RFI NOT CLARIFIED PRIOR TO BID SHALL BE PROVIDED PER THE ARCHITECT (ENGINEER) IN STRICT ACCORDANCE WITH THE MOST STRINGENT MATERIALS, EQUIPMENT, AND SCOPE OF WORK.
   - B. EXISTING CONDITIONS: THE CONTRACT DOCUMENTS ARE BASED ON INFORMATION PROVIDED TO CASE ENGINEERING AT THE TIME OF DESIGN. THIS CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS INCLUDING BUT NOT LIMITED TO: EXISTING HVAC SYSTEM LOCATIONS, EXISTING DUCT AND PIPING LAYOUTS, CLEARANCES, ETC. REPORT IN WRITING ANY DISCREPANCIES TO THE ARCHITECT (ENGINEER) AT LEAST FIVE (5) BUSINESS DAYS PRIOR TO BID. DISCREPANCIES NOT CLARIFIED PRIOR TO BID SHALL BE PROVIDED PER THE ARCHITECT (ENGINEER) IN STRICT ACCORDANCE WITH THE MOST STRINGENT MATERIALS, EQUIPMENT, AND SCOPE OF WORK.
   - C. IF THE CONTRACTOR BELIEVES THE DRAWINGS AND SPECIFICATIONS CONFLICT WITH CODE REQUIREMENTS, IMMEDIATELY NOTIFY THE ARCHITECT (ENGINEER) IN WRITING.
   - D. NO ALLOWANCES WILL BE MADE DUE TO CONTRACTOR'S UNFAMILIARITY WITH THE CONSTRUCTION DOCUMENTS OR FOR THE FAILURE OF THE CONTRACTOR TO OBTAIN CLARIFICATIONS PRIOR TO BID.
   - E. VISIT THE JOB SITE AND THOROUGHLY INVESTIGATE CONDITIONS. THE LACK OF SPECIFIC INFORMATION ON THE DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY.
   - F. REFER TO APPLICABLE CODES CITED IN CONSTRUCTION DOCUMENTS, EXAMINE GOVERNING STATE AND LOCAL CODES, AND LOCAL REGULATIONS AND ORDINANCES, AND PROVIDE ALL EQUIPMENT AND INSTALLATION IN STRICT ACCORDANCE WITH SAME.
   - G. REFER TO CONSTRUCTION DOCUMENTS FOR SCHEDULED AND SPECIFIED MATERIALS AND EQUIPMENT. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND DETAILS.

3. BIDDING
   - A. SUBMISSION OF A BID ACKNOWLEDGES THAT THE CONTRACTOR HAS REVIEWED THE BID INSTRUCTIONS, HAS VISITED THE SITE, EXAMINED ALL CONSTRUCTION DOCUMENTS, AND AGREES TO ALL ITEMS AND CONDITIONS WITHIN THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR'S BID SHALL INCLUDE ALL MECHANICAL WORK IN THE CONSTRUCTION DOCUMENTS, INCLUDING MECHANICAL WORK RELATED TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS.

4. PERMITS
   - A. SECURE AND PAY FOR ALL PERMITS, LICENSES, AND INSPECTIONS REQUIRED BY THE AHJ FOR THIS WORK.

5. SUBSTITUTIONS
   - A. MANUFACTURERS' EQUIPMENT AND MATERIALS SCHEDULED, NOTED, AND SPECIFIED IN THE CONSTRUCTION DOCUMENTS ARE THE DESIGN STANDARD. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL BY THE ARCHITECT OR ENGINEER. IN BIDDING, DO NOT ASSUME ACCEPTANCE OF SUBSTITUTIONS. CONTRACTOR MUST STATE IN SUBSTITUTION REQUEST: "PROPOSED SUBSTITUTIONS ARE EQUAL OR OF HIGHER QUALITY, EFFICIENCY AND DEPENDABILITY COMPARED TO THE SPECIFIED EQUIPMENT AND MATERIAL. CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ADDITIONAL ENGINEERING COSTS AND COSTS TO OTHER CONTRACTORS DUE TO SUBSTITUTIONS." IF DEEMED NECESSARY BY THE ARCHITECT OR ENGINEER, SUBSTITUTIONS WHICH ARE NOT APPROVED OR NOT EQUAL TO DESIGN STANDARD SHALL BE REMOVED AND THE SCHEDULED, NOTED, AND SPECIFIED EQUIPMENT AND MATERIALS SHALL BE INSTALLED AT CONTRACTOR'S EXPENSE. SUBMITTING CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ADDITIONAL ENGINEERING COSTS AND COSTS TO OTHER CONTRACTORS DUE TO SUBSTITUTIONS.

6. SCHEDULING
   - A. ALL PERFORMANCE OF CONSTRUCTION SHALL BE AS REQUIRED BY THE PACE OF THE GENERAL CONSTRUCTION, AS SCHEDULED BY THE GC. PROVIDE COMPLETE INFORMATION AND FULL COOPERATION WITH OTHER CONTRACTORS AND TRADES, AS REQUIRED FOR THE TIMELY COMPLETION AND COORDINATION OF THE COMPLETE PROJECT.
   - B. PROVIDE ALL TESTS AND INSPECTIONS REQUIRED BY AHJ.
   - C. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE PROJECT COMPLETION.

7. SCOPE
   - A. PROVIDE PERMIT(S), INSPECTIONS, FINAL CERTIFICATE(S) OF INSPECTION BY AHJ, PERMIT AND INSPECTION FEES, AND ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY FOR A COMPLETE AND FULLY OPERATING HVAC SYSTEM.
   - B. INSTALL ALL WORK AND EQUIPMENT RIGID, DEAD LEVEL, PLUMB, AND TRUE-TO-LINE. UNLESS NOTED OTHERWISE, SUPPORT AND MOUNTING OF EQUIPMENT, DUCT, PIPING, ETC., ARE THIS CONTRACTOR'S MEANS AND METHODS. THE CONTRACTOR SHALL UNDERSTAND THE SPECIFIED AND SCHEDULED EQUIPMENT AND MATERIALS AND MEANS AND METHODS OF INSTALLATION. THIS CONTRACTOR SHALL PROVIDE ALL ACCESSORIES REQUIRED FOR PROPER SUPPORT WHETHER SHOWN ON THE DRAWINGS OR NOT. IF SUPPORTS ARE REQUIRED, CONTRACTOR SHALL SUBMIT DRAWINGS TO THE ARCHITECT FOR APPROVAL.
   - C. PROVIDE ACCESSORY MOUNTING HARDWARE INCLUDING BUT NOT LIMITED TO STRUCTURAL STEEL, STRUT SYSTEMS, ALL THREAD RODS, AND BRACES, AS REQUIRED TO MOUNT EQUIPMENT. PROVIDE STEEL SHAPES AND FRAMES TO SUPPORT EQUIPMENT WHERE NEEDED. ALL SYSTEMS SHALL BE SUPPORTED INDEPENDENT OF AND ISOLATED FROM EQUIPMENT VIBRATION.
   - D. PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' PRINTED INSTALLATION AND MAINTENANCE LITERATURE. COMPONENTS REQUIRING PERIODIC MAINTENANCE OR ADJUSTMENTS SHALL BE INSTALLED AS TO PERMIT ACCESS WITHOUT DAMAGE TO STRUCTURE, FINISHES, OR OTHER EQUIPMENT.
   - E. DEMOLITION: REFER TO THE ARCHITECTURAL DRAWINGS FOR THE GENERAL SCOPE OF DEMOLITION. THIS CONTRACTOR SHALL DISCONNECT AND CAREFULLY REMOVE ALL EXISTING HVAC EQUIPMENT LOCATED IN DEMOLISHED AREAS INCLUDING ROOF, PLENUMS, CEILINGS, WALLS, AND FLOORS. U.N.O., DISCONNECT AND REMOVE EXISTING HVAC SYSTEMS COMPLETE, INCLUDING EQUIPMENT, CURBS, DUCTS, INSULATION, AIR DEVICES, AND PIPING LOCATED IN THESE AREAS. ALL HVAC SYSTEM COMPONENTS INCLUDING AIR TERMINAL UNITS, FANS, MOTORS, CONTROL DEVICES AND SENSORS, DAMPERS, ACTUATORS, HANGERS, RESTRAINTS, MOUNTING HARDWARE, ETC., SHALL BE REMOVED AND LEGALLY DISPOSED OF BY THIS CONTRACTOR.
   - F. UNLESS NOTED OTHERWISE, ABANDONMENT IN PLACE (AIP) IS NOT ACCEPTABLE. UNUSED EQUIPMENT, DUCT, PIPING, AND OTHER COMPONENTS WITHIN OR SERVING THIS SPACE MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. ENDS OF SYSTEMS BEYOND GENERAL SCOPE OF DEMOLITION MAY BE ABANDONED ONLY WITH WRITTEN APPROVAL OF ARCHITECT (ENGINEER). WHERE THESE ABANDONED ENDS TERMINATE, TRIM CLEANLY AND PROPERLY CAP OR SEAL IN AN APPROVED MANNER, LEAVING TERMINATION SAFE AND SECURE BEHIND NEW FINISHES. MAINTAIN SYSTEM CONTINUITY TO HVAC SYSTEMS SERVING AREAS BEYOND GENERAL DEMOLITION, AS NEEDED. THIS INCLUDES BUT IS NOT LIMITED TO REMOVAL, MODIFICATION AND/OR REINSTALLATION OF EQUIPMENT, AS NEEDED. COMPLETION OF THIS PROJECT SHALL INCLUDE RETURNING THESE ADJACENT AREAS TO FULLY FUNCTIONING OPERATION.
   - G. CONTRACTOR SHALL PROVIDE DAILY CLEAN-UP, REMOVAL AND LEGAL DISPOSAL OF ALL RUBBISH GENERATED BY THIS WORK.
   - H. AS-BUILT DRAWINGS: DURING CONSTRUCTION, AS WORK PROCEEDS, MAINTAIN AS-BUILT MARK-UPS OF ACTUAL INSTALLATION. AT CONSTRUCTION COMPLETION AND PRIOR TO TURNOVER TO OWNER (TENANT), PROVIDE FINAL MARK-UPS IN PDF FORMAT TO ARCHITECT AND ENGINEER.
   - I. PROVIDE FINAL CONNECTIONS TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS, AS NOTED (GAS FIRED EQUIPMENT, COMMERCIAL KITCHEN EQUIPMENT, ETC.).
   - J. DO NOT ROUTE ANY PIPING OR DUCTWORK ABOVE ELECTRICAL PANELS.
   - K. UNLESS NOTED OTHERWISE, ALL DUCT AND PIPE SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO WALLS, BEAMS, OR COLUMNS. PIPE SHALL BE RUN AS DIRECT AS POSSIBLE - AVOID UNNECESSARY OFFSETS AND MAXIMIZE HEADROOM.
   - L. PRIOR TO ORDERING EQUIPMENT, THIS CONTRACTOR SHALL PROVIDE FINAL COORDINATION OF ELECTRICAL POWER REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
   - M. CONTRACTOR SHALL MAINTAIN ACTIVITIES WITHIN AREA APPROVED BY OWNER OR GC. CONTRACTOR'S ACTIVITIES SHALL NOT INTERFERE WITH THE OWNER'S OPERATIONS, EXCEPT AS APPROVED.
   - N. EXCEPT THOSE COORDINATED AND APPROVED BY THE G.C., CONTINUITY OF ALL BUILDING SERVICES AND UTILITIES SERVING BUILDING FACILITIES SHALL BE MAINTAINED UNINTERRUPTED AT NO ADDITIONAL COST. PROVIDE ALL NECESSARY CROSS CONNECTIONS AND TEMPORARY CONNECTIONS REQUIRED TO PERFORM THE CONSTRUCTION, AS DETERMINED BY THE G.C., AND NEEDED TO MAINTAIN CONTINUITY OF THE BUILDING SERVICE(S). THIS CONTRACTOR SHALL SCHEDULE WORK SUCH THAT ANY AND ALL CONNECTIONS, AND/OR REARRANGEMENT OF EXISTING EQUIPMENT, PIPING, ETC., SHALL ASSURE FULL RESUMPTION OF SERVICE(S) AT THE G.C.'S DESIGNATED TIME.

8. CODE REQUIREMENTS
   - A. ALL WORK SHALL COMPLY WITH THE CONSTRUCTION DOCUMENTS OR, AS DIRECTED BY THE ARCHITECT (ENGINEER), AND SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS OF THE AHJ, WHETHER SO SHOWN OR NOT. CONTRACTOR SHALL BE FAMILIAR WITH PROVISIONS OF ALL APPLICABLE CODES AND SHALL INSURE THE WORK COMPLIES WITH ALL LOCAL, STATE AND FEDERAL CODES, TRADE STANDARDS AND MANUFACTURER'S RECOMMENDATIONS. IF CONTRACTOR BELIEVES THE DRAWINGS AND/OR SPECIFICATIONS CONFLICT WITH CODE REQUIREMENTS, IMMEDIATELY NOTIFY THE G.C. IN WRITING. DO NOT INSTALL WORK NOT COMPLYING WITH CODE REQUIREMENTS. IN CASE OF CONFLICT BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CODES AND ORDINANCES, THE HIGHEST STANDARD SHALL APPLY. AS A MINIMUM STANDARD, CONTRACTOR SHALL SATISFY CODE REQUIREMENTS. ALL MODIFICATIONS REQUIRED BY AHJ SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE

   OWNER. BEFORE COMMENCING WORK NOT SHOWN IN DOCUMENTS BUT REQUIRED TO ACHIEVE FULL COMPLIANCE WITH CODES, CONTRACTOR SHALL NOTIFY ARCHITECT (ENGINEER).

   APPLICABLE CODES:

   1. 2023 FBC - BUILDING, 8TH EDITION - (AMENDED FROM IBC 2021)
   2. 2023 FBC - MECHANICAL, 8TH EDITION - (AMENDED FROM IMC 2021)
   3. 2023 FBC - FUEL GAS, 8TH EDITION - (AMENDED FROM IFGC 2021)
   4. 2023 FBC - ENERGY CONSERVATION, 8TH EDITION - (AMENDED FROM IECC 2021)
   5. 2023 FBC - PLUMBING, 8TH EDITION - (AMENDED FROM IPC 2021)
   6. FLORIDA ELECTRICAL CODE 2020 - (AMENDED FROM NFPA70, 2020)
   7. FLORIDA FIRE CODE 2021 - (AMENDED FROM NFPA 1, 2021)

9. CUTTING & PATCHING
   - A. CORE-DRILL OR SAW-CUT EXISTING FLOORS, WALLS, ROOF, ETC., AS REQUIRED FOR EQUIPMENT, PIPE, OR DUCTWORK. PRIOR TO CUTTING, PERFORM NON-DESTRUCTIVE TESTING TO VERIFY LOCATION OF STRUCTURAL COMPONENTS. NOTIFY ARCHITECT (ENGINEER) OF ANY DISCREPANCIES. PATCH SURROUNDING AREAS FLUSH WITH ADJACENT SURFACE AND READY TO RECEIVE FINISH. PATCH AND REPAIR ROOF TO MATCH EXISTING ROOFING. ALL ROOF WORK SHALL MEET WARRANTY REQUIREMENTS OF EXISTING ROOFING. COORDINATE REQUIRED OPENINGS AND PENETRATIONS WITH THE GC AND OTHER TRADES. (OPENINGS IN FOUNDATIONS, FLOORS, WALLS, CEILINGS, AND ROOF SHALL BE BUILT INTO THE STRUCTURE WITH SLEEVES, CURBS, ETC.)

10. FIRE STOPPING
   - A. PROVIDE FIRE STOPPING FOR PENETRATIONS OF DUCT, PIPING, AND OTHER MECHANICAL EQUIPMENT THROUGH FIRE-RATED VERTICAL BARRIERS (WALLS AND PARTITIONS), HORIZONTAL BARRIERS (FLOOR/CEILING ASSEMBLIES), AND VERTICAL SERVICE SHAFT WALLS AND PARTITIONS. FIRESTOP SYSTEM INSTALLATION MUST MEET REQUIREMENTS OF ASTM E 814 OR UL 1479 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO OR GREATER THAN THAT OF CONSTRUCTION BEING PENETRATED. INSTALL IN STRICT ACCORDANCE WITH UL FIRE RESISTANCE DIRECTORY, AHJ, AND MANUFACTURER'S SPECIFIED REQUIREMENTS. ONLY TESTED FIRESTOP SYSTEMS BY "3M", "HILTI", OR EQUAL SHALL BE USED. REFER TO ARCHITECTURAL DRAWINGS FOR ASSEMBLY RATING.

11. MATERIALS AND WORKMANSHIP
   - A. ALL MANUFACTURED ARTICLES, MATERIALS, AND EQUIPMENT SHALL BE NEW U.N.O., FREE OF DEFECTS, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND DETAILS, AND INDEPENDENTLY TESTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY -UNDERWRITERS LABORATORIES (UL) OR INTERTEK (ETL). ALL LIKE MATERIALS USED SHALL BE OF THE SAME MANUFACTURE AND QUALITY U.N.O.
   - B. ALL MATERIALS WITHIN PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E84 OR UL 723. ALL MATERIALS INSTALLED IN PLENUM SPACES SHALL BE LISTED AND LABELED FOR SUCH APPLICATION.
   - C. ALL WORK SHALL BE SUPERVISED BY THE INSTALLING CONTRACTOR'S COMPETENT AND SKILLED FOREMAN. ALL WORK SHALL BE PERFORMED BY COMPETENT AND SKILLED WORKERS, WITH ALL TRADE AND MANUFACTURER REQUIRED TRAINING, AND EXECUTED IN A NEAT AND WORKMANLIKE MANNER. ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE BEST QUALITY STANDARDS OF THE TRADE AND IN CONFORMANCE WITH ALL FEDERAL, STATE, AND LOCAL CODES AND STANDARDS, INCLUDING APPLICABLE OSHA REGULATIONS. PROPERLY PROTECT WORK DURING CONSTRUCTION. AT CONSTRUCTION COMPLETION, THOROUGHLY CLEAN WORK AND REMOVE ALL DEBRIS FROM THE PREMISES.

12. PROTECTION OF WORK AND PROPERTY
   - A. PROTECT ALL WORK FROM DAMAGE AND PROTECT THE OWNER'S PROPERTY FROM DIRT, DAMAGE, OR LOSS ARISING FROM CONTRACTOR WORK.
   - B. COMPLY WITH OSHA REQUIREMENTS AND TAKE ALL NECESSARY PRECAUTIONS FOR EMPLOYEE SAFETY.
   - C. PROTECT ALL OPEN PIPING, DUCT, AND EQUIPMENT, EXISTING AND NEW FROM CONSTRUCTION DIRT AND DUST. COVER, CAP, OR PLUG OPEN ENDS OF PIPING AND DUCT. KEEP EQUIPMENT CLOSED OR COVER AND SEAL EQUIPMENT OPENINGS. ANY MECHANICAL SYSTEMS, NEW AND/OR EXISTING OPERATED DURING CONSTRUCTION SHALL BE PROTECTED BY COVERING EACH RETURN AIR DUCT OPENING WITH MERV 8 FILTERS AND INSTALLING MERV 8 FILTER(S) IN EQUIPMENT FILTER RACK. PRIOR TO TESTING AND BALANCING, REMOVE FILTERS FROM FILTER RACKS AND INSTALL NEW MERV 8 FILTERS.
   - D. AT COMPLETION OF WORK, PRIOR TO EQUIPMENT START-UP, REMOVE COVERS, CAPS, OR PLUGS ON DUCT AND PIPING.

13. DAMAGE BY LEAKS
   - A. THIS CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL DAMAGES TO THE PROPERTY (GROUNDS, WALKS, ROADS, BUILDING COMPONENTS, FINISHES, PIPING SYSTEMS, ELECTRICAL SYSTEMS, HVAC SYSTEMS, AND THEIR EQUIPMENT AND CONTENT) CAUSED BY LEAKS IN THE SYSTEMS BEING INSTALLED OR HAVING BEEN INSTALLED AS PART OF THIS WORK. ALL REPAIRS WILL BE MADE AT THIS CONTRACTOR'S EXPENSE.

14. DRAWINGS AND SPECIFICATIONS
   - A. DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO SHOW GENERAL LOCATIONS OF DUCTS, PIPES, AND EQUIPMENT AND THE METHODS OF CONNECTING AND CONTROL. THE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONDITIONS AND THE WORK OF OTHER TRADES PERMIT. THE DRAWINGS ARE NOT INTENDED TO SHOW EVERY CONNECTION IN DETAIL OR ALL OFFSETS, TRANSITIONS, OR FITTINGS REQUIRED FOR A COMPLETE SYSTEM NOR IS IT IMPLIED THAT ALL CONFLICTS BETWEEN BUILDING ELEMENTS AND/OR OTHER TRADES ARE INDICATED. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR EXACT LOCATION OF DOORS, WINDOWS, LIGHTS, ETC.
   - B. THE DRAWINGS AND SPECIFICATIONS ARE MUTUALLY COMPLEMENTARY, AND ANY WORK REQUIRED BY ONE BUT NOT BY THE OTHER SHALL BE REQUIRED BY BOTH.
   - C. PRIOR TO INSTALLING EQUIPMENT, DUCT, OR PIPE COORDINATE PROPOSED LOCATIONS WITH EACH TRADE/DISCIPLINE AND GC. EXAMINE EACH DISCIPLINE'S DRAWINGS FOR CONSTRUCTION DETAILS, CEILING HEIGHTS, REQUIRED CLEARANCES, AND SPACE CONSTRAINTS. PROVIDE SYSTEMS INSTALLATION BASED ON THIS EXAMINATION AND COORDINATION. IMMEDIATELY REPORT INSTALLATION CONFLICTS IN WRITING TO THE GC. RESOLVE ALL CONFLICTS WITH GC AND OTHER TRADES PRIOR TO PROCEEDING. INSTALLING CONTRACTOR IS FULLY RESPONSIBLE FOR CORRECT INTERPRETATION AND APPLICATION OF ALL SIZES AND DIMENSIONS.
   - D. SIGNIFICANT DEVIATIONS OR CHANGES FROM THE DRAWINGS, WHICH ARE REQUIRED TO ACCOMPLISH THE INTENT OF THE CONTRACT DOCUMENTS MUST BE REVIEWED AND APPROVED BY THE ARCHITECT (ENGINEER) BEFORE PROCEEDING. IF THE CONTRACTOR BELIEVES CHANGES TO THE CONTRACT DRAWINGS ARE NECESSARY, SHOP DRAWINGS WITH WRITTEN DESCRIPTIONS OF THE PROPOSED CHANGES SHALL BE SUBMITTED TO THE ARCHITECT (ENGINEER) FOR APPROVAL.
   - E. ALL PIPE, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED WATERPROOF. PROVIDE ALL FLASHING FOR PIPE AND DUCTWORK PENETRATING BUILDING ENVELOPE. PROVIDE DUCT AND/OR PIPE SLEEVES AT WALL PENETRATIONS. SEAL ANNULAR SPACE WEATHER TIGHT.

15. CONTROLS
   - A. PROVIDE COMPLETE EQUIPMENT CONTROLS, INCLUSIVE OF ALL COMPONENTS, VOLTAGES, PROGRAMMING, (PNEUMATIC TUBING), WIRING ETC. FOR COMPLETE AND OPERATIONAL SYSTEMS. MOUNT THERMOSTATS AND SWITCHES 4'-0" ABOVE FINISHED FLOOR. MOUNT OTHER SENSORS (HUMIDITY, CO2, CO, NOX, ETC.) PER MANUFACTURER'S IOM. PRIOR TO MOUNTING, COORDINATE THERMOSTAT LOCATION(S) WITH FINAL FIXTURES AND EQUIPMENT. DO NOT MOUNT THERMOSTATS IN DIRECT SUNLIGHT, IN DISCHARGE OF SUPPLY GRILLE(S), NEAR HEAT PRODUCING APPLIANCES OR EQUIPMENT, ON WALLS WITH INTERNAL HEAT SOURCES (DUCT OR PIPING), OR ON EXTERIOR WALLS. IF EXTERIOR WALL MOUNTING IS NECESSARY, PROVIDE INSULATED MOUNTING BASE. WHERE THERMOSTAT LOCATION IS SUBJECT TO DAMAGE, PROVIDE LOCKABLE HIGH-IMPACT GUARD.

16. DUCT MOUNTED SMOKE DETECTORS
   - A. SUPPLY AIR DUCT MOUNTED SMOKE DETECTORS SHALL BE PROVIDED BY E.C. AND UPON DETECTING SMOKE, SHALL SHUT DOWN PROTECTED AIR SYSTEM (APPLICABLE TO UNITS >2000 CFM).

17. SHOP DRAWINGS
   - A. SUBMIT SHOP DRAWINGS ON SCHEDULED AND NOTED EQUIPMENT AND MATERIALS. PRIOR TO SUBMITTAL, EACH SHOP DRAWING SHALL BE REVIEWED BY THE CONTRACTOR TO ASSURE THAT THE PROPOSED EQUIPMENT IS CLEARLY MARKED, HIGHLIGHTED, AND NOTED. ALL DIMENSIONS, QUANTITIES, CONNECTIONS, CAPACITATES AND ACCESSORIES SHALL BE CLEARLY SHOWN IN CONFORMANCE WITH THE CONTRACT DOCUMENTS, AND SHALL BE MARKED OR STAMPED TO CONFIRM THAT SUCH REVIEW WAS MADE AND COMPLIANCE WAS CONFIRMED. SHOP DRAWING SUBMITTED WITHOUT BEING MARKED, HIGHLIGHTED, AND NOTED WILL BE REJECTED WITHOUT REVIEW.
   - B. PROVIDE ADEQUATE TIME FOR REVIEW AND CORRECTIONS, IF ANY, TO PREVENT CONSTRUCTION DELAY.
   - C. REVIEW OF SHOP DRAWINGS BY THE OWNER, OWNER'S AGENT, ARCHITECT, OR ENGINEER IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR IS SOLELY RESPONSIBILITY FOR COMPLYING WITH ALL TERMS OF THE CONTRACT DOCUMENTS AND FOR PERFORMANCE OF ALL EQUIPMENT AND MATERIALS PURCHASED, FOR QUANTITIES, PROPER FIT, AND OTHER DIMENSIONAL REQUIREMENTS.

18. DUCTWORK
   - A. REFER TO DUCT INSULATION SCHEDULE FOR CLARIFICATION OF DUCT DIMENSIONS. PROVIDE ALL DUCTWORK IN STRICT ACCORDANCE WITH THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA) "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE", LATEST EDITION. U.N.O. ALL RIGID DUCTWORK SHALL BE GALVANIZED SHEET METAL. NO FIBERGLASS DUCTBOARD WILL BE ALLOWED. ALL EXPOSED DUCTWORK SHALL HAVE A MILL-PHOSPHATIZED FINISH FOR PAINT ADHESION. EXPOSED ROUND DUCT SHALL BE SPIRAL SEAM TYPE.
   - B. REMOVE UNUSED SECTIONS OF DUCTWORK AS DESIGNATED. UNUSED OPENINGS IN EXISTING DUCT SHALL BE SEALED WITH GALVANIZED SHEET METAL OF THE SAME GAUGE AS THE DUCT. INSULATE AND/OR LINE WITH INSULATION TO MATCH EXISTING. SEAL GALVANIZED SHEET METAL CAP TO EXISTING DUCT WITH APPROVED MASTIC. EXISTING DUCT INSULATION AND/OR INSULATION SCRIM DAMAGED BY THIS WORK SHALL BE REPAIRED. SEAL ALL INSULATION SEAMS AND JOINTS.
   - C. PROVIDE DAMPERS AT EACH BRANCH DUCT SERVING AIR DEVICES AND AS SHOWN AND DETAILED. ALL FLEXIBLE DUCT SHALL BE THERMAFLEX TYPE MKE, MAXIMUM 8'-0" LONG. FLEXDUCT SHALL BE INSTALLED IN ACCESSIBLE CONCEALED SPACES ONLY AND WITHOUT SAGS. INSTALLATION ABOVE INACCESSIBLE CEILINGS IS UNACCEPTABLE.

19. DUCT SEALING
   - A. IN CONDITIONED AREAS, SEAL ALL LONGITUDINAL AND TRANSVERSE JOINTS WITH A NON-HARDENING, NON-MIGRATING MASTIC OR LIQUID ELASTIC SEALANT, WITH VOC CONTENT NO GREATER THAN 250G/L AND RECOMMENDED BY THE MANUFACTURER FOR SEALING SHEET METAL DUCT. SEAL ALL JOINTS, SPIN-IN FITTINGS, AND FASTENING SCREWS WITH MASTIC. HVAC SYSTEM LEAKAGE SHALL NOT EXCEED 5% OF DESIGN FLOW.
   - B. IN UNCONDITIONED AREAS (INCLUDING BUT NOT LIMITED TO EXTERIOR OF BUILDING, ATTIC, CRAWL SPACES, ETC.): SEAL ALL LONGITUDINAL AND TRANSVERSE JOINTS WITH CARLISLE'S "HARDCAST FOIL-SEALANT DUCT SEALING SYSTEM" - NO EXCEPTIONS. INSTALL IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE INITIAL SEALANT OF HARDCAST'S IRON-GRIP 601, SPRAY-SEAL, OR VERSA-GRIP 181 LIQUID MASTIC SEALANT. AFTER SEALANT HAS CURED COMPLETELY, OVERLAY THE MASTIC WITH 4" WIDE STRIP OF AFT-701 ROLLED SEALANT. SEAL ALL JOINTS, SPIN-IN FITTINGS, AND FASTENERS. HVAC SYSTEM LEAKAGE SHALL NOT EXCEED 5% OF DESIGN FLOW.

20. DUCT INSULATION
   - A. SEE DUCT INSULATION SCHEDULE.

   MINIMUM INSULATION REQUIREMENTS AS PER 2023 FBC ENERGY CONSERVATION, EIGHTH EDITION:

	SUPPLY	RETURN
UNCONDITIONED SPACES WITHIN BUILDING:	R-4.2	R-4.2
INDIRECTLY CONDITIONED SPACES:	R-6	R-4.2
OUTSIDE OF BUILDING:	R-6	R-4.2

21. EQUIPMENT
   - A. INSTALL ALL EQUIPMENT AND MATERIALS IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION AND OPERATIONS MANUAL AND IN STRICT ACCORDANCE WITH ALL LOCAL CODES AND REGULATIONS.
   - B. U.N.O. PROVIDE ALL MOTORIZED EQUIPMENT WITH VIBRATION ISOLATION MOUNTING AND FLEXIBLE DUCT AND FLEXIBLE PIPE CONNECTIONS.
   - C. LABEL EQUIPMENT WITH ENGRAVED PHENOLIC RESIN NAMEPLATES ADHERED TO UNIT CABINET WITH RTV SILICONE. LETTERING SHALL BE 1" HIGH BLACK ON WHITE BACKGROUND.
   - D. ALL EQUIPMENT, DUCT, PIPE, ETC. MOUNTED FROM BOLTED CONNECTIONS SHALL HAVE DOUBLE NUTS AT ATTACHMENT TO STRUCTURE AND HANGER, NO EXCEPTIONS.

22. FIRE AND FIRE-SMOKE DAMPERS
   - A. PROVIDE FIRE DAMPERS AND/OR FIRE SMOKE DAMPERS AT DUCT PENETRATIONS OF RATED ASSEMBLIES AND AS REQUIRED BY AHJ. REFER TO ARCHITECTURAL DRAWINGS FOR ASSEMBLY RATINGS. INSTALL DAMPERS IN STRICT ACCORDANCE WITH MANUFACTURER'S DETAILS AND MAINTAIN MANUFACTURER'S DETAILS ONSITE FOR AHJ REVIEW. PROVIDE ACCESS PANELS OF ADEQUATE SIZE TO FACILITATE SERVICE ACCESS OF DAMPER. IN LIEU OF ACCESS PANELS, A REMOVABLE DUCT SECTION IS ACCEPTABLE.

23. OUTDOOR AIR INTAKES
   - A. PROVIDE A MINIMUM (10'-0") HORIZONTAL CLEARANCE BETWEEN MECHANICAL EQUIPMENT OUTDOOR AIR INTAKES AND EXHAUST FAN DISCHARGES, COMBUSTION EXHAUST, PLUMBING VENTS, AND ANY OTHER HAZARDOUS OR NOXIOUS CONTAMINANT.

24. AIR FILTERS
   - A. PROVIDE THREE (3) SETS OF NEW MERV 8 DISPOSABLE AIR FILTERS, PER THE FOLLOWING: FOR HVAC SYSTEMS OPERATED DURING CONSTRUCTION, PROVIDE FILTERS IN EQUIPMENT AND ON RETURN AIR DUCT OPENINGS TO PROTECT DUCT FROM DIRT; IN HVAC EQUIPMENT PRIOR TO AIR TESTING, ADJUSTING, AND BALANCING; AND AT PROJECT COMPLETION - ONE (1) SPARE SET FOR HVAC EQUIPMENT.

25. COMPLETION OF WORK
   - A. UPON COMPLETION OF WORK, INSPECT INSTALLATION OF ALL EQUIPMENT AND SYSTEMS. OPEN ALL ACCESS COVERS ON EQUIPMENT. REMOVE ALL SURPLUS MATERIALS AND DEBRIS AND PROPERLY DISPOSE OF SAME.

26. TESTING, ADJUSTING, & BALANCING
   - A. PRIOR TO EQUIPMENT START-UP, REMOVE COVERS, CAPS, OR PLUGS ON DUCT AND PIPING.
   - B. UPON COMPLETION OF WORK, MC SHALL PROVIDE HVAC TESTING:
     1. AFTER INSTALLING EQUIPMENT AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.
     2. INSPECT FOR AND REMOVE SHIPPING BOLTS, BLOCKS, AND TIE-DOWN STRAPS.
     3. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION, BELT TENSION, DAMPER FUNCTION, COOLING FUNCTION, HEATING FUNCTION, AND UNIT OPERATION.
     4. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
     5. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.
     6. SUBMIT TESTING REPORT TO ARCHITECT (ENGINEER).
   - C. UPON COMPLETION OF WORK, PROVIDE AN HVAC TESTING, ADJUSTING, AND BALANCING REPORT PERFORMED BY A(N INDEPENDENT) CONTRACTOR CERTIFIED BY AABC, NEBB, OR TABB. BALANCE SYSTEMS WITHIN 10% OF DESIGN FLOW. TAB SHALL BE PERFORMED IN STRICT ACCORDANCE WITH SMACNA'S "TAB PROCEDURAL GUIDE", LATEST EDITION. MC SHALL BE PRESENT DURING TAB SHOULD ANY CORRECTIONS BE REQUIRED. (EXISTING HVAC SYSTEMS: PRIOR TO START OF WORK, TEST AND RECORD FLOW OF EXISTING DEVICES AND SYSTEMS. AT COMPLETION OF WORK ADJUST FLOW TO NEW DEVICES, AS INDICATED ON DRAWINGS. RESTORE EXISTING DEVICES NOT IN SCOPE OF WORK TO ORIGINAL VOLUMETRIC FLOW RATES.)

27. CLOSEOUT - AT CONSTRUCTION COMPLETION AND PRIOR TO TURNOVER TO OWNER (TENANT):
   - A. PROVIDE FINAL MARK-UPS IN PDF (DWG) FORMAT TO ARCHITECT AND ENGINEER.
   - B. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE PROJECT COMPLETION.
   - C. PROVIDE THE OWNER WITH A BOUND OWNER'S MANUAL. THE MANUAL SHALL CONSIST OF A THREE-RING LOOSE-LEAF BINDER CONTAINING ALL PRINTED MATERIAL FOR INSTALLED EQUIPMENT INCLUDING BUT NOT LIMITED TO: WARRANTY INFORMATION, SERVICE AND CLEANING INSTRUCTIONS, NOTICES TO OWNER, OPERATING MANUALS, AND MAINTENANCE INSTRUCTIONS.
   - D. TRAIN THE OWNER IN THE THERMOSTATS FUNCTIONS AND OPERATING THE EQUIPMENT USING THE THERMOSTATS. CONTRACTOR SHALL PROGRAM THE THERMOSTATS PER THE OWNER'S TIME SCHEDULES AND

28. WARRANTY
   - A. ON ALL WORK INCLUDED IN THIS CONTRACT, PROVIDE ONE (1) YEAR UNCONDITIONAL WRITTEN WARRANTY FOR LABOR, EQUIPMENT, AND MATERIALS TO REPLACE ALL FAULTY MATERIALS AND/OR LABOR, AT NO COST TO OWNER, BEGINNING ON DATE OF ACCEPTANCE BY OWNER.
   - B. WITHIN THE WARRANTY PERIOD, DURING THE OPPOSITE SEASON (HEATING/COOLING) FROM THAT IN WHICH THE INITIAL ADJUSTMENTS WERE MADE, THIS CONTRACTOR SHALL MAKE AN INSPECTION OF THE INSTALLED BUILDING SYSTEMS. AT THIS INSPECTION, WITH SYSTEMS OPERATING, THIS CONTRACTOR SHALL MAKE ANY NECESSARY MODIFICATIONS TO THE INITIAL ADJUSTMENTS REQUIRED TO PRODUCE OPTIMUM OPERATION OF THE SYSTEM COMPONENTS, TO PRODUCE THE PROPER CONDITIONS IN EACH SPACE.

-- END OF SPECIFICATIONS --

FLORIDA BUILDING DEPARTMENT NOTES:

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2023 FBC - BUILDING, 8TH EDITION , AND ALL RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
2. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2023 FBC - MECHANICAL, 8TH EDITION, CHAPTER 4.
3. AS PER C408.2.5 OF 2023 FBC - ENERGY CONSERVATION, 8TH EDITION , CONSTRUCTION DOCUMENT SHALL REQUIRE THAT, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER.
4. AS PER C408.3.2 OF 2023 FBC - ENERGY CONSERVATION, 8TH EDITION, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTAINED MANUAL BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
5. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2023 FBC - BUILDING, 8TH EDITION, REQUIREMENTS AS OUTLINES IN SECTION.
6. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
7. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF 2023 FBC - MECHANICAL, 8TH EDITION CHAPTER 4:
   MECHANICAL VENTILATION - SECTION 403.
8. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
   - A. STANDARDS OF HEATING - 2023 FBC - MECHANICAL, 8TH EDITION.
   - B. DUCT CONSTRUCTION AND INSTALLATION-SECTION 603 OF 2023 FBC - MECHANICAL, 8TH EDITION.
   - C. AIR INTAKES, EXHAUSTS AND RELIEF-SECTION 401 OF 2023 FBC - MECHANICAL, 8TH EDITION.
   - D. AIR FILTERS -SECTION 605 OF 2023 FBC - MECHANICAL, 8TH EDITION.
   - E. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS -SECTION 513 OF 2023 FBC - MECHANICAL, 8TH EDITION.
9. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
10. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2023 FBC - MECHANICAL, 8TH EDITION CHAPTER 4 SECTION 403.3. HVAC SYSTEM SHALL BE BALANCED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS AS REQUIRED BY 2023 FBC - ENERGY CONSERVATION, 8TH EDITION SECTION 408.2.2.
11. SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION 606 2023 FBC - MECHANICAL, 8TH EDITION, TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN.
12. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
13. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

THERMOSTATIC CONTROL NOTES:

A. GENERAL:

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, NOT FEWER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

EXCEPTION:

INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:

1. THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ± 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM).
2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.

B. DEADBAND:

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEAD BAND OF NOT LESS THAN 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTIONS:

1. THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.

C. THERMOSTATIC SETBACK CAPABILITIES:

THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).

D. AUTOMATIC SETBACK AND SHUTDOWN CAPABILITIES:

AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

E. SETPOINT OVERLAP RESTRICTION:

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION DEADBAND

F. AUTOMATIC AND OPTIMUM START CAPABILITES:

AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THEHVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.

INDIVIDUAL HEATING AND COOLING SYSTEMS WITH SETBACK CONTROLS AND DIRECT DIGITAL CONTROL SHALL HAVE OPTIMUM START CONTROLS. THE CONTROL ALGORITHM SHALL,AS A MINIMUM, BE A FUNCTION OF THE DIFFERENCE BETWEEN SPACE TEMPERATURE AND OCCUPIED SET POINT, THE OUTDOOR TEMPERATURE, AND THE AMOUNT OF TIMEPRIOR TO SCHEDULED OCCUPANCY. MASS RADIANT FLOOR SLAB SYSTEMS SHALL INCORPORATE FLOOR TEMPERATURE INTO THE OPTIMUM START ALGORITHM.

G. OFF-HOUR CONTROLS

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.OUR CONTROLS

EXCEPTIONS:

1. ZONES THAT WILL BE OPERATED CONTINUOUSLY.
2. ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A READILY ACCESSIBLE MANUAL SHUTOFF SWITCH.

MECHANICAL SYMBOLS LIST

Symbol	Description
AIR DEVICES	
	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN
	CEILING DIFFUSER EXHAUST
DUCT ACCESSORIES	
BD	BACKDRAFT DAMPER
VD VD	VOLUME DAMPER W/ ACCESS DOOR
HVAC PIPING	
CP	NEW CONDENSATE PIPING
CONTROLS AND SENSORS	
T	THERMOSTAT
T S	TEMPERATURE SENSOR
S D	DUCT MOUNTED SMOKE DETECTOR
DUCTWORK	
	AIR DUCT W/ 1.5" ACOUSTICAL LINING
	FLEXIBLE DUCT
FC FC	FLEXIBLE CONNECTION
24X12	RECTANGULAR DUCT (WIDTH X DEPTH)
Ø12	ROUND DUCT (DIAMETER)
	ROUND DUCT CROSS SECTION
	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	RETURN AIR RECTANGULAR DUCT CROSS SECTION
MECHANICAL SYMBOLS LISTS	
	POINT OF NEW CONNECTION TO EXISTING
	POINT OF DISCONNECTION FROM EXISTING

MECHANICAL ABBREVIATIONS

AC	AIR CONDITIONING UNIT
AL	ACOUSTIC LINING
GD	GRAVITY DAMPER
BOD	BOTTOM OF DUCT
BOE	BOTTOM OF EQUIPMENT
CFM	CUBIC FEET OF AIR PER MINUTE
COP	COEFFICIENT OF PERFORMANCE
CP	CONDENSATE PUMP
CD	CEILING DIFFUSER
DN	DOWN
(E)	EXISTING
EER	ENERGY EFFICIENCY RATIO
EG	EXHAUST GRILLE
FC	FLEXIBLE CONNECTION
FD/AD	FIRE DAMPER W/ACCESS DOOR
FD	FIRE DAMPER W/FUSIBLE LINK
FSD	FIRE SMOKE DAMPER
HSPF	HEATING SEASONAL PERFORMANCE FACTOR
IEER	INTEGRATED ENERGY EFFICIENCY RATIO
(N)	NEW
RG	RETURN GRILLE
RTU	ROOF TOP UNIT
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SG	SUPPLY GRILLE
VD	VOLUME DAMPER
W.M.S	WIRE MESH SCREEN

MECHANICAL DRAWING LIST

M0.1	MECHANICAL GENERAL NOTES, SYMBOL LISTS & ABBREVIATIONS
M1.0	MECHANICAL FLOOR & ROOF PLAN
M2.0	MECHANICAL SCHEDULES
M3.0	MECHANICAL DETAILS (1 OF 2)
M3.1	MECHANICAL DETAILS (2 OF 2)

1	SCALE N.T.S	MECHANICAL GENERAL NOTES, SYMBOL LISTS & ABBREVIATIONS

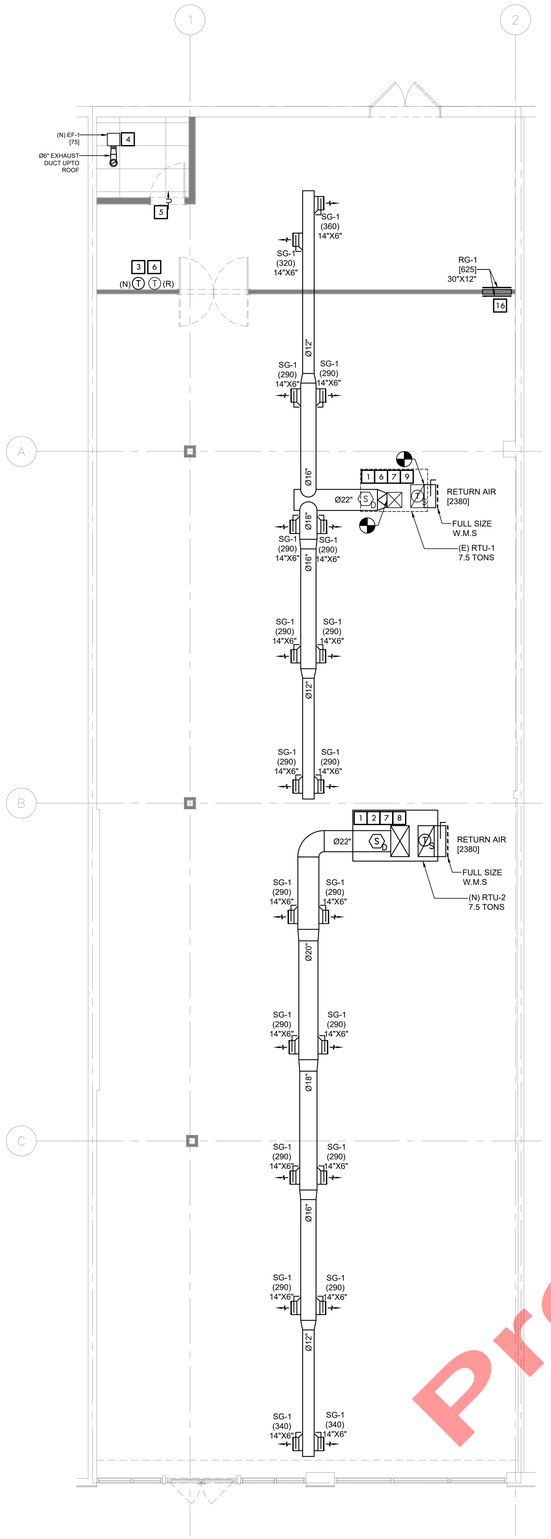
MATTRESS WAREHOUSE

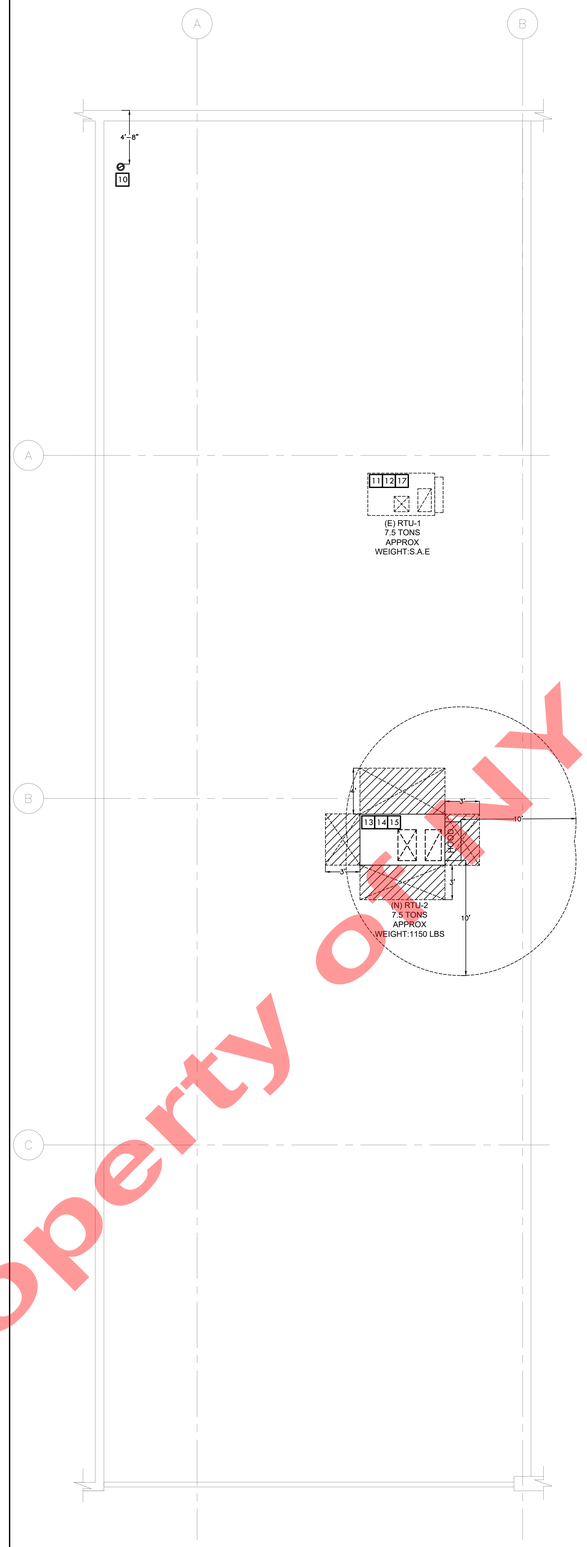
Description

MECHANICAL GENERAL NOTES, SYMBOL LISTS & ABBREVIATIONS

SHEET

M0.1





GENERAL NOTES:

A. CONTRACTOR TO VISIT SITE TO VERIFY ON FIELD CONDITION ALONG WITH THE DRAWINGS & INFORM THE ENGINEER FOR ANY DISCREPANCIES FOUND BEFORE COMMENCING BIDS.
B. CONTRACTOR SHALL BALANCE EACH AIR DIFFUSER WITH THE CFM SHOWN PLAN.
C. DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR DUCTWORK ROUTING. OFFSET AND RUN DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
D. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURE ENGINEERS.
E. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
F. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.
G. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
H. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
I. ALL EXPOSED ROUND DUCTWORK SHALL BE INTERNALLY INSULATED.
J. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.
K. COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS.
L. TAKE NECESSARY PRECAUTIONS TO PREVENT DUST AND DIRT MIGRATING TO OCCUPIED AREAS OF THE BUILDING. THIS INCLUDES BLANKING OFF ANY RETURN AIR GRILLES/ DUCTS IN THE WORK AREA. PROVIDE TEMPORARY EXHAUST FANS, DUCTED DIRECTLY TO OUTDOORS, TO MAINTAIN NEGATIVE PRESSURE WITHIN THE WORK AREA.
M. KEEP ALL ADJOINING AREAS ADJACENT TO THE WORK AREAS CLEAN AND FREE OF DEBRIS.
N. MECHANICAL CONTRACTOR TO COORDINATE ALL DUCT WORK, CROSSINGS, OVERLAPPING AND PENETRATIONS WITH SITE CONDITIONS AND AS PER EXISTING JOIST LAYOUT AND BEAM IN FIELD. MODIFY DUCT WORK WHEREVER REQUIRED.
O. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS/SLABS. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.
P. CONTRACTOR TO CONTACT THE LANDLORD'S ROOFING CONTRACTOR FOR ANY NECESSARY PENETRATIONS.

KEYED NOTES:

1. EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM HVAC EQUIPMENT AS SHOWN. ACOUSTICALLY LINE THE FIRST 10-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
2. PROVIDE REMOTE TEMP./HUMIDITY SENSOR MOUNTED IN RETURN DUCT AND WIRE BACK TO T-STAT.
3. LOCATION OF DIGITAL THERMOSTAT CONTROL. INSTALL AND WIRE THE HONEYWELL TH9320WF5003 WIFI 9000 COLOR TOUCH-SCREEN PROGRAMMABLE THERMOSTAT, SIZED 3.5" X 4.5", IN WHITE COLOR. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN AND PROVIDE LOCKABLE COVER.
4. CEILING MOUNTED EXHAUST FAN TO BE INTERLOCKED WITH LIGHT SWITCH. PROVIDE FAN WITH BACKDRAFT DAMPER. EXHAUST DUCT SHALL BE GALVANIZED STEEL. FIELD VERIFY ALL ROUTING AND REQUIREMENTS PRIOR TO BID.
5. PROVIDE 1" DOOR UNDERCUT FOR AIR PASSAGE. COORDINATE WITH ARCHITECT.
6. EXISTING THERMOSTAT & TEMPERATURE SENSOR TO BE REUSED AND RELOCATED AS SHOWN ON THE PLAN. CONTRACTOR TO VERIFY IN FIELD. REPLACE IN KIND IF DAMAGED.
7. EXISTING MAIN SUPPLY & RETURN DROPS FROM THE RTU TO REMAIN. CONTRACTOR TO FIELD VERIFY EXISTING RTU PENETRATION. CONNECT NEW BRANCH DUCT AS SHOWN ON THE PLAN.
8. CONTRACTOR SHALL PROVIDE DUCT SMOKE DETECTOR IN SUPPLY AIR DUCTWORK. UPON DETECTION OF SMOKE, EQUIPMENT WILL SHUTDOWN AND ACTIVATE ALARM. COORDINATE INSTALLATION LOCATION & ACCESS REQUIREMENT WITH RTU MANUFACTURER FOR COMPATIBLE CONTROLS AS REQUIRED.
9. EXISTING SMOKE DETECTOR TO BE RELOCATED & REUSED AS SHOWN ON THE PLAN, COORDINATE INSTALLATION LOCATION WITH ACCESS REQUIREMENT. REPLACE IN KIND IF DAMAGED.
10. ENSURE TERMINATION OF THE EXHAUST DUCT AT ROOF PROVIDED WITH GOOSENECK AND INSECT SCREEN AND SHALL BE 3 FEET (914 MM) FROM THE PROPERTY LINES; 3 FEET (914 MM) FROM OPERABLE OPENINGS INTO BUILDINGS; 10 FEET (3048 MM) FROM MECHANICAL AIR INTAKES.
11. EXISTING MECHANICAL ROOF TOP UNIT (E) RTU-1 TO REMAIN ALONG WITH ALL ASSOCIATED RETURN AIR TEMPERATURE SENSOR, ALL OTHER SENSORS & CONTROLS. CLEAN & REFURBISH TO LIKE NEW CONDITION REPAIR/REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT. VERIFY IN FIELD PRIOR TO BID. ENSURE UNIT OA INTAKE IS BALANCED AS SHOWN IN THE AIR BALANCING SCHEDULE.
12. CONTRACTOR TO FIELD VERIFY EXISTING DRAIN LINE FROM (E) RTU-1 AND KEEP AS IT IS. FLUSH WITH EXISTING DRAIN. REPLACE WITH KIND IF DAMAGED.
13. CONTRACTOR TO INSTALL NEW ROOFTOP UNIT (N) RTU-2 WITH CURB ADAPTERS/ NEW CURB AS REQUIRED. PROVIDE FLEXIBLE CONNECTORS ON SUPPLY AND RETURN DUCT CONNECTIONS. SET OUTSIDE AIR AS INDICATED ON ROOFTOP UNIT SCHEDULES. MECHANICAL CONTRACTOR SHALL SCRIBE INTO UNIT POSITION OF OUTSIDE AIR DAMPER AND LABEL OUTSIDE AIR VOLUME AND PERCENT OF OUTSIDE AIR. TRANSITION AND CONNECT SUPPLY AND RETURN DUCTWORK FROM BELOW. COORDINATE ROUTING THROUGH STRUCTURAL TRUSSES AND OFFSET AS REQUIRED IN CURB SPACE.
14. ROUTE 1" CONDENSATE DRAIN FROM (N) RTU-2 ON THE ROOF TO THE NEAREST APPROVED POINT OF DISPOSAL. CONNECT TO A DRAIN LINE VIA AIR GAP IN AN APPROVED MANNER.
15. COORDINATE FINAL WEIGHT OF EQUIPMENT WITH STRUCTURAL ENGINEER.
16. PROVIDE TRANSFER DUCT OF SIZE 30"X12" ON THE WALL WITH GRILLE ON BOTH SIDES OF TRANSFER DUCT AS SHOWN ON PLAN.
17. CONTRACTOR SHALL FIELD VERIFY WHETHER THE EXISTING (E)RTU-1 INCLUDES AN EXISTING ELECTRIC HEATER WITH A MINIMUM CAPACITY OF 18 kW. IF NOT PRESENT, NOTIFY THE ENGINEER OF RECORD AND PROVIDE A DUCT HEATER AS REQUIRED.

THE CONTRACTOR SHALL FIELD-VERIFY THE CAPACITY AND LOCATION OF THE SPECIFIED UNITS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES

Property of NY Engineers

MATTRESS WAREHOUSE

1	SCALE 3/16"=1'-0"	MECHANICAL FLOOR PLAN
2	SCALE 3/16"=1'-0"	MECHANICAL ROOF PLAN

Description
MECHANICAL FLOOR & ROOF PLAN

SHEET
M1.0

ROOF TOP UNIT SCHEDULE

UNIT ID	MANUFACTURER	EFFICIENCY	MODEL	AREA SERVED	NOMINAL TONS	REFRIGERANT	SUPPLY FAN			ELECTRIC HEATER	HEATING		COP	COOLING					ELECTRICAL				EER	IEER	OPERATING WEIGHT (LBS)	NOTES
							TOTAL CFM	OUTSIDE AIR CFM	EXTERNAL STATIC PRESSURE(IN. W.G.)	TOTAL KW	TOTAL MBH (@47 DEG F)	ENTERING DB	-	TOTAL MBH	SENSIBLE MBH	AMBIENT DB (°F)	ENTERING DB / WB(°F)	STAGES	VOLTS	PHASE	MCA(A)	MOCP(A)				
(E) RTU-1	TRANE (V.I.F)	S.A.E	TSC090F4E0A (V.I.F)	SEE PLAN	7.5 (V.I.F)	S.A.E	3000 (V.I.F)	620	S.A.E	18 (V.I.F)	-	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	460 (V.I.F)	3 (V.I.F)	29.3 (V.I.F)	30 (V.I.F)	S.A.E	S.A.E	S.A.E	1-8
(N) RTU-2	TRANE (OR EQUIVALENT)	HIGH	WHK090A4S00**	SEE PLAN	7.5	R-454B	3000	620	1	-	66.61	64.65	3.71	90	69	95	80/67	2	460	3	27	30	12	15.5	1150	9-25

NOTES / ACCESSORIES -

1	S.A.E : SAME AS EXISTING, V.I.F : VERIFY IN FIELD
2	EXISTING RTU WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.
3	CONTRACTOR TO FIELD VERIFY RTU IS WORKING AT THEIR 100% RATED CAPACITY. INFORM TO DESIGN ENGINEER IF ANY DISCREPANCIES ARE FOUND IN PERFORMANCE PRIOR TO CONSTRUCTION.
4	CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF UNIT ON SITE.
5	IF REQUIRED, PROVIDE NEW THERMOSTAT AND TEMPERATURE SENSOR COMPATIBLE WITH EXISTING RTU. CO-ORDINATE FINAL LOCATION OF T-SENSOR WITH ARCHITECT/OWNER.
6	REPLACE FILTERS, IF REQUIRED.
7	CONTRACTOR SHALL VERIFY EXACT ELECTRICAL CONNECTIONS, WIRE SIZES, BREAKER, DISCONNECT ETC. PRIOR TO ORDERING AND BID.
8	CONTRACTOR SHALL FIELD VERIFY WHETHER THE RTU INCLUDES AN EXISTING ELECTRIC HEATER WITH A MINIMUM CAPACITY OF 18 kW. IF NOT PRESENT, NOTIFY THE ENGINEER OF RECORD AND PROVIDE A DUCT HEATER AS REQUIRED.
9	THE EQUIPMENT MUST BE HIGH EFFICIENT, MEETING OR EXCEEDING THE BRANDS MINIMUM REQUIREMENTS.
10	BOTTOM DISCHARGE & RETURN CONFIGURATION. ELECTRICAL CONNECTION TO BE SINGLE POINT AND TO BE THROUGH THE BOTTOM OF THE UNIT.
11	UNIT TO BE PROVIDED WITH LOW LEAKAGE VOLUME CONTROL DAMPER, NEMA 3R DISCONNECT, FAN WITH ECM, VIBRATION ISOLATION SPRING SUPPORTED BLOWER, INTAKE HOOD, SCREEN INTAKE & CURB ADAPTOR.
12	DISCHARGE CONDENSATE DRAIN TO APPROVED LOCATION.
13	CONTRACTOR TO BALANCE OUTSIDE AIR DAMPER ON RTU TO MATCH VALUE MENTIONED IN EQUIPMENT SCHEDULE.
14	PROVIDE 8-WIRE, 24 VAC, AUTOMATIC CHANGEOVER, 2-STAGE HEAT / COOL, REMOTELY PROGRAMMABLE THERMOSTAT.
15	REMOTE TEMPERATURE SENSORS SHALL BE PROVIDED IN RETURN DUCT & WIRED BACK TO PROGRAMMABLE, 24 HOUR, 7 DAY, THERMOSTATS.
16	ANTI SHORT CYCLE TIMER.
17	THROWAWAY 2" FILTERS (MERV 8).
18	PROVIDE ALL COMPRESSORS WITH 5 YEAR WARRANTY.
19	STAINLESS STEEL DRIP PAN.
20	PROVIDE FLEXIBLE CONNECTION AT DUCT CONNECTION TO UNIT.
21	PROVIDE ENTHALPY ECONOMIZER FOR NEW RTU WITH BAROMETRIC RELIEF & FDD.
22	PROVIDE SMOKE DETECTOR IN THE SUPPLY AIR DUCT.
23	RTU SHALL BE PROVIDED BY TENANT CONTRACTOR.
24	PROVIDE CONDENSER COIL HAIL GUARDS.
25	PROVIDE UNPOWERED CONVENIENCE OUTLET.
NOTE:	**PROVIDE THE (N) RTU-2 WITH R-454B REFRIGERANT.**

VENTILATION CALCULATION FBC 2023 - MC 2021

SL NO	ROOM NAME	AREA	OCCUPANCY AS PER FBC 2023 - MC 2021/1000SQ.FT.	OCCUPANY AS FBC 2023 - MC 2021	NO OF PEOPLE AS PER ARCH	FINAL OCCUPANCY	CFM/SQ.FT	CFM/PERSON	OA CFM	EFFECTIVENESS 0.8	REQUIRED OA CFM	PROVIDED OA CFM	EXHAUST RATE (CFM/SQ.FT)	PROVIDED EA CFM
1	RETAIL AREA	3770	15	57	68	68	0.12	7	928	0.8	1161	1165	0	0
2	STORAGE ROOM	481	0	0	0	0	0.12	0	58	0.8	72	75	0	0
3	RESTROOM	56	0	0	0	0	0	0	0	0.8	0	0	70	75
-	-	4307	-	-	-	68	-	-	-	-	1233	1240	-	75

FAN SCHEDULE

TAG	MANUFACTURER	MODEL	LOCATION	AREA SERVED	FAN PERFORMANCE				MOTOR DATA					WEIGHT	CONTROL
					CFM	ESP	FAN RPM	FLA(A)	MCA	MOP	VOLTS	PHASE	HZ	LBS	
(N) EF-1	GREENHECK	SP-LP0511-1	SEE PLAN	RESTROOM	75	0.5	773	0.29	0.4	15	115	1	60	20	LIGHT SWITCH

NOTES:

1.	PROVIDE FACTORY MOUNTED AND INSTALLED DISCONNECT.
2.	COORDINATE EXACT POWER REQUIREMENT WITH ELECTRICAL CONTRACTOR.
3.	PROVIDE FAN WITH A BACKDRAFT DAMPER, AND SPEED CONTROLLER FOR BALANCING PURPOSE.
4.	DIRECT DRIVE FAN TO HAVE ECM MOTOR.
5.	PROVIDE VIRATION ISOLATORS AND MOUNTING RODS AS PER MANUFACTURER RECOMMENDATIONS.
6.	MANUFACTURE TO PROVIDE WITH DECORATIVE GRILLE.

AIR TERMINAL SCHEDULE

TAG	MANUFACTURER	MODEL	TYPE	CFM RANGE	NECK SIZE	NOMINAL FACE SIZE	REMARKS	NOTES
SG-1	TITUS	300FS	SUPPLY GRILLE	200-360	14"X6"	16"X8"	DUCT/WALL MOUNT	1-4
RG-1		350RL	RETURN GRILLE	0-650	30"X12"	32"X14"	WALL MOUNTED	1-4

NOTES:

1.	BORDER TYPE TO BE COMPATIBLE WITH DUCT/WALL TYPE.
2.	COLOR AND FINISH TO BE REVIEWED AND APPROVED BY THE ARCHITECT.
3.	PROVIDE OPPOSED BLADE DAMPER AS ACCESSARY FOR ALL AIR TERMINAL FOR AIR BALANCING OR ELSE PROVIDE DAMPER IN DUCTS.WHERE LOCATED IN INACCESSIBLE AREAS, PROVIDE CABLE OPERATED DAMPER LOCATED IN THE BRANCH, OPERABLE THROUGH THE FACE OF THE DIFFUSER (KEY OPERATED).
4.	INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.

AIR BALANCE

UNIT	AREA SERVED	SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	RETURN AIR (CFM)	EXHAUST AIR(CFM)
(E) RTU-1	SEE PLAN	3000	620	2380	0
(N) RTU-2	SEE PLAN	3000	620	2380	0
(N) EF-1	SEE PLAN	0	0	0	75
TOTAL	-	6000	1240	4760	75
BUILDING PRESSURE:			1165	**POSITIVE**	

NOTES:

CONTRACTOR TO ADJUST DAMPER ON FRESH AIR TAP TO PROVIDE OUTSIDE AIR AS MENTIONED IN ABOVE TABLE.

Property of NY Engineers

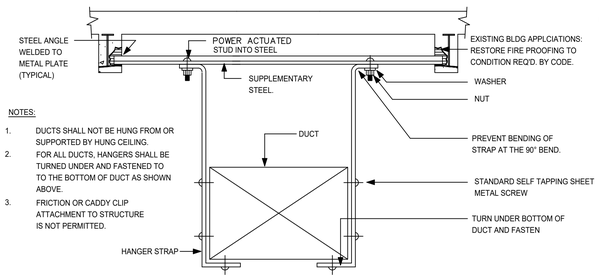
MATTRESS WAREHOUSE

Description

MECHANICAL SCHEDULES

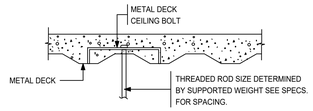
SHEET

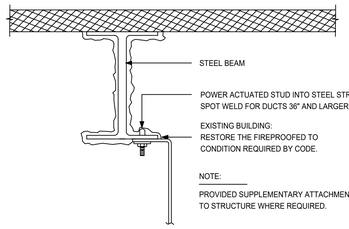
M2.0

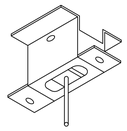


NOTES:

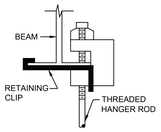
1. DUCTS SHALL NOT BE HUNG FROM OR SUPPORTED BY HUNG CEILING.
2. FOR ALL DUCTS, HANGERS SHALL BE TURNED UNDER AND FASTENED TO TO THE BOTTOM OF DUCT AS SHOWN ABOVE.
3. FRICTION OR CADDY CLIP ATTACHMENT TO STRUCTURE IS NOT PERMITTED.





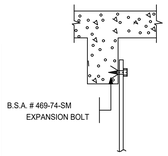


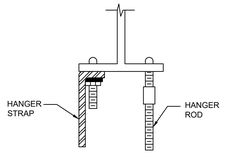
MANUFACTURED CONCRETE INSERT



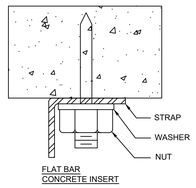
"C" CLAMP W/LOCK NUT

DUCT HANGER SCHEDULE		
DUCT CROSS SECTIONAL AREA	STRAP HANGER SIZE	MAX. SPACING
UNDER 2 SQ FT.	1" X 1/16"	6'-0" O.C.
2 TO 4 SQ FT.	1" X 1/8"	8'-0" O.C.
4 TO 8 SQ FT.	1" X 1/8"	6'-0" O.C.
OVER 8 SQ FT.	1" X 1/8"	4'-0" O.C.





POWER ACTUATED STUDS INTO STEEL (STRUCTURE OR DECK)



FLAT BAR CONCRETE INSERT

1 M3.0 DUCT HANGING DETAILS N.T.S

NOTES:
DUCTS TO BE ACOUSTICALLY LINED SHALL BE DESIGNATED BY THE SYMBOL IN FIG. "C" TO THE EXTENT OF LINING. THICKNESS SHALL BE AS SPECIFIED.
DUCTS LINED WITH ACOUSTICAL MATERIAL SHOULD BE FASTENED WITH CLIPS, ADHESIVE, OR PINS

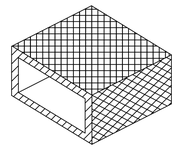


FIG. A

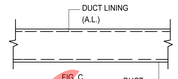


FIG. C

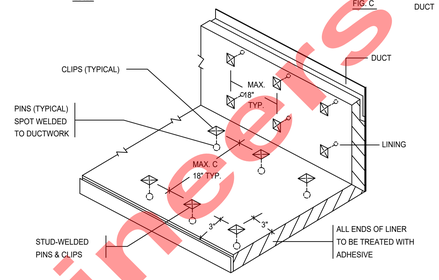
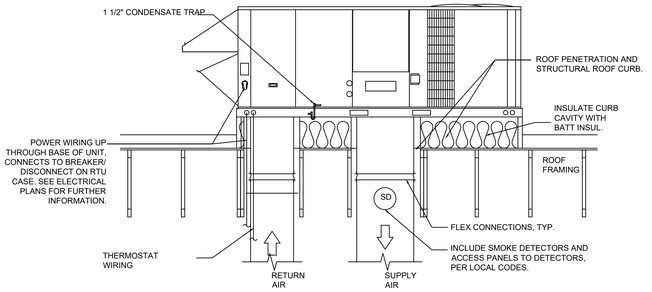


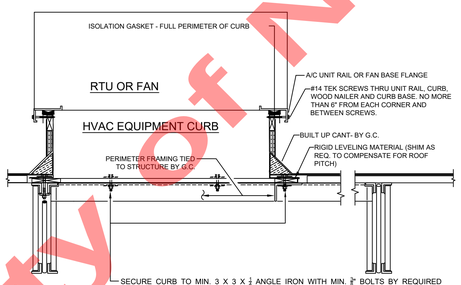
FIG. B

2 M3.0 ACOUSTICAL DUCT LINING DETAIL N.T.S



PER IPC AMENDMENT SEC. 314.2.1, CONDENSATE PIPING SHALL DRAIN TO AN APPROVED PLACE OF DISPOSAL AND NOT ON THE ROOF OR TO THE ROOF DRAIN.

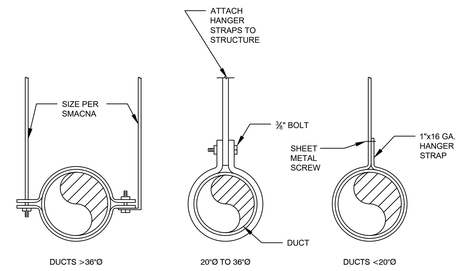
NOTES:
1. NO PENETRATIONS ARE ALLOWED ON THE SIDE OF CURBS. PENETRATIONS MUST FALL WITHIN MECHANICAL UNIT OR BY ROOF PENETRATION PERFORMED BY LL ROOFER.
2. GC TO CO-ORDINATE/CONFIRM WITH LL ROOFER DETAILS.



2023 FLORIDA BUILDING CODE, MECHANICAL, 8TH EDITION-
301.15 WIND RESISTANCE - MECHANICAL EQUIPMENT, APPLIANCES AND SUPPORTS THAT ARE EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE, BUILDING.

3 M3.0 TYPICAL ROOF TOP UNIT DETAILS N.T.S

HANGERS MUST NOT DEFORM DUCT SHAPE



4 M3.0 ROUND DUCT SUPPORT DETAIL N.T.S

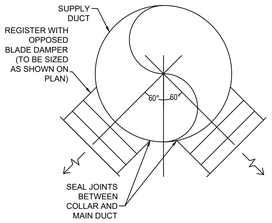
Property of NY Engineers

MATTRESS WAREHOUSE

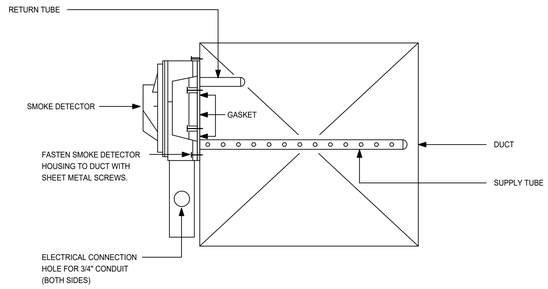
Description
MECHANICAL DETAILS (1 OF 2)

SHEET
M3.0

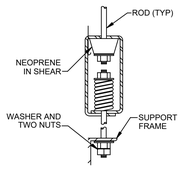
1 | SCALE N.T.S | MECHANICAL DETAILS (1 OF 2)



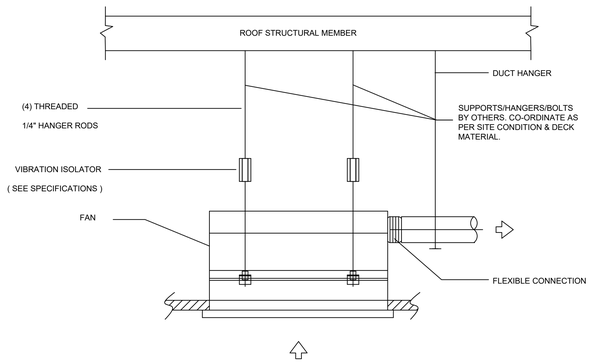
1 M3.1 ANGLED GRILLE DETAILS
N.T.S



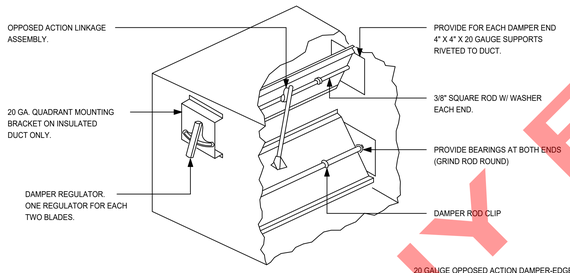
2 M3.1 SMOKE DETECTOR MOUNTING DETAIL
N.T.S



3 M3.1 VIBRATION ISOLATOR DETAIL
N.T.S

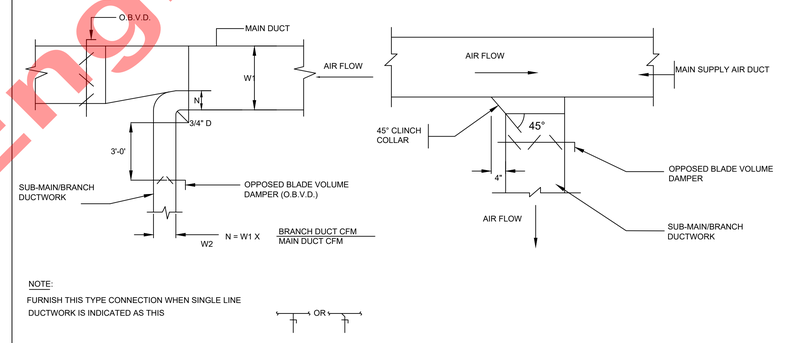


4 M3.1 CEILING FAN HANGING SUPPORT DETAIL
N.T.S



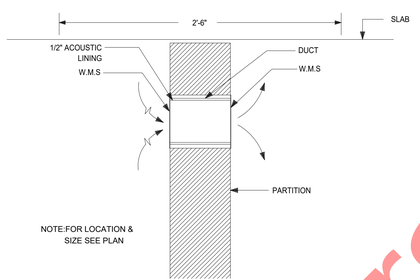
NOTE : 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.

5 M3.1 LOW PRESSURE BALANCING DAMPER
N.T.S

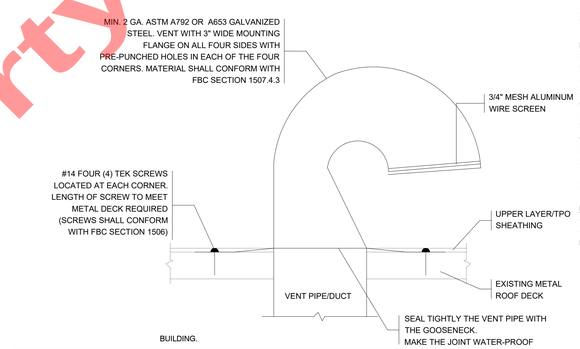


NOTE:
FURNISH THIS TYPE CONNECTION WHEN SINGLE LINE DUCTWORK IS INDICATED AS THIS OR

6 M3.1 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
N.T.S



7 M3.1 TRANSFER DUCT DETAIL
N.T.S



ATTACHMENT METHOD:
CUT OUT THE GOOSENECK VENT OPENING IN THE ROOF SHEATHING ACCORDING WITHIN MAXIMUM DIMENSIONS. DO NOT CUT INTO TRUSSES OR RAFTERS WHEN CUTTING OPENING IN THE ROOF.

REMOVE INTERFERING SHINGLE NAILS AROUND THE PERIMETER OF THE OPENING AND ANY DEBRIS SO THAT THE NAILING FLANGE OF THE VENT LAYS FLAT TO THE ROOF SHEATHING. SLIDE THE TOP AND SIDE FLANGES OF THE VENT UNDERNEATH THE SHINGLES AND ALLOW THE BOTTOM FLANGE TO LIE ON THE TOP OF THE SHINGLES. CARE SHOULD BE TAKEN IN KEEPING THE VENT PROPERLY ALIGNED. VENT PIPE IS SEALED IF UTILIZED. SCREW IN PLACE USING FOUR (4) TEK SCREWS LOCATED AT EACH CORNER (SCREWS SHALL CONFORM WITH FBC SECTION 1506). ROOFING CEMENT SHOULD BE APPLIED TO ALL SHINGLE EDGES NEAR THE OUTER EDGE AND AROUND THE ENTIRE PERIMETER.

ALLOWABLE ROOF COVERINGS: ASPHALT SHINGLES

MAXIMUM DESIGN PRESSURE:
-52.5 PSF FOR INSTALLATIONS OVER PLYWOOD DECK
-22.5 PSF FOR INSTALLATION OVER OSB DECK
PRESSURES CALCULATED USING 2.1 MARGIN OF SAFELY PER 1504.9.

2023 FLORIDA BUILDING CODE, MECHANICAL, 8TH EDITION:
301.15 WIND RESISTANCE - MECHANICAL EQUIPMENT, APPLIANCES AND SUPPORTS THAT ARE EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE,

PRODUCT MANUFACTURER - L.V. THOMPSON, INC.
DBA THOMPSON ARCHITECTURAL METALS COMPANY (TAMCO)
5015 E. HILLSBOROUGH AVE.
TAMPA, FL 33610
(813) 2487-3456
PRODUCT DESCRIPTION - TAMCO GOOSENECK VENT
PRODUCT APPROVAL NUMBER - FL 16918-R3

8 M3.1 TYPICAL DETAIL OF ROOF GOOSENECK
N.T.S

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MATTRESS WAREHOUSE

Description
MECHANICAL DETAILS (2 OF 2)

SHEET
M3.1

1 | SCALE N.T.S | MECHANICAL DETAILS (2 OF 2)

ELECTRICAL SYMBOLS LIST

SYMBOL	DESCRIPTION
	POWER AND TELECOMMUNICATION
	CIRCUIT HOMERUN TO PANEL
	SINGLE RECEPTACLE OUTLET - WALL MOUNTED
	DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
AC	ABOVE COUNTER DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
	G.F.C.I. DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
AC	ABOVE COUNTER G.F.C.I. DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
IG	ISOLATED GROUND DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
	WALL MOUNTED QUAD RECEPTACLE OUTLET
	SPECIAL PURPOSE RECEPTACLE - WALL MOUNTED (SEE EQUIPMENT SCHEDULE OR NOTES)
	125 / 250V NEMA RECEPTACLE - WALL MOUNTED (SEE EQUIPMENT SCHEDULE OR NOTES)
	DUPLEX RECEPTACLE - FLOOR MOUNTED
	QUAD RECEPTACLE - FLOOR MOUNTED
	DUPLEX RECEPTACLE - CEILING MOUNTED (SW INDICATES SHOW WINDOW)
J	JUNCTION BOX
	FLOOR BOX DEVICES / POKE-THRU DEVICES WITH POWER AND TELE/DATA PER PLANS (SEE DRAWINGS FOR MODEL)
	TELEPHONE / DATA COMBINATION OUTLET - WALL MOUNTED
	TELEPHONE OUTLET - WALL MOUNTED
	DATA OUTLET - WALL MOUNTED
	PANELBOARD WALL/RECESSED MOUNTED (277/480 VOLT, 120/208Y VOLT AS NOTED ON PLANS)
	TRANSFORMER (RATING AND CONFIGURATIONS AS NOTED ON PLANS)
	DISCONNECT SWITCH (FRAME/POLES/FUSE-IF REQUIRED)
M	MOTOR LOAD
S_M	MOTOR RATED TOGGLE SWITCH
	LIGHTING & CONTROLS
	LIGHT FIXTURE HALF SHADED FIXTURE OR"EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY (REFER LIGHTING FIXTURE SCHEDULE ON LIGHTING PLAN)
	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROWS AS INDICATED. SHADED AREA DENOTES FACE(S) (REFER LIGHTING FIXTURE SCHEDULE ON LIGHTING PLAN)
$S^{a,b,c,d,...}$	LIGHTING SWITCH U.O.N. "A" DENOTES LIGHTING FIXTURE CONTROLLED - WALL MOUNTED (48" AFF) UNO "a,b,c,d,..."- DENOTES NAME OF SWITCH '#' 'BLANK' - S.P.S.T. SWITCH '3' - THREE WAY SWITCH '4' - FOUR WAY SWITCH 'D' - DIMMER SWITCH 'T' - TIMER SWITCH 'OV' - OVERRIDE SWITCH 'M' - MOTOR WALL SWITCH
OS	MOTION DETECTOR SWITCH W/ MANUAL OVERRIDE WALL MOUNTED.
OS	MOTION DETECTOR - CEILING MOUNTED
TC	TIME CLOCK
C	LIGHTING CONTACTORS
	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
S	SMOKE DETECTOR- CEILING MOUNTED
D	DUCT MOUNTED SMOKE DETECTOR
F	FIRE ALARM MANUAL PULL STATION - WALL MOUNTED (48" AFF) UNO
	FIRE ALARM ADA APPROVED VISUAL ALARM - WALL MOUNTED (80" AFF) UNO
FA	FIRE ALARM AUDIO/VISUAL ALARM - WALL MOUNTED (80" AFF) UNO
FA	FIRE ALARM ADA APPROVED AUDIO/VISUAL ALARM CEILING MOUNTED
	FIRE ALARM ADA APPROVED VISUAL ALARM CEILING MOUNTED
M	MAGNETIC DOOR HOLD DEVICE TO INTERLOCK WITH FIRE ALARM SYSTEM

NOTES:

1. NOT ALL SYMBOLS MAY APPEAR ON DRAWINGS.
2. COORDINATE EXACT LOCATION AND SPECIFIC MOUNTING HEIGHT OF OUTLETS WITH ARCHITECT.
3. MOUNTING HEIGHTS SHALL BE 18" AFF FOR THE OUTLETS, 42" AFF FOR THE LIGHTING SWITCHES OR AS INDICATED IN THE LEGEND UNLESS, OTHERWISE NOTED ON THE PLANS.

VERIFY THE FOLLOWING PRIOR TO BID/ PRICING:

- EXISTING CONDUIT AND FEEDERS SIZE BETWEEN TENANT SPACE AND LANDLORD SWITCHBOARD.
- EXISTING MAIN SERVICE DISCONNECT RATING.
- EXISTING METER.

IF THE EXISTING SERVICE DISCONNECT AND FEEDERS ARE RATED FOR LESS THAN THE RATING SHOWN ON THIS RISER. NOTIFY THE PROJECT MANAGER AND ENGINEER IMMEDIATELY PRIOR TO SUBMITTING BID/ PRICING PACKAGE SO DRAWINGS CAN BE REVISED AND UPDATED ACCORDINGLY.

- THE ELECTRICAL CONTRACTOR HAS TO ENSURE THAT THE EXISTING SERVICE CAN CARRY THE NEW ADDED LOAD AND SHALL COORDINATE WITH LANDLORD ENGINEER FOR UPGRADING THE EXISTING ELECTRICAL SERVICE IF NECESSARY.

STOP AND READ:

THE CONTRACTOR AND SUB-CONTRACTORS **SHALL NOT INITIATE ANY WORK UNTIL EXISTING FIELD CONDITIONS ARE PROPERLY VERIFIED**.

APPLICABLE CODES:

ALL WORK SHALL COMPLY WITH THE PROVISIONS OF THE SPECIFICATIONS AND DRAWINGS, AND SHALL SATISFY ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS OF ALL GOVERNING BODIES INVOLVED. APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

1. BUILDING: FLORIDA BUILDING CODE 2023, 8TH EDITION ADOPTS WITH AMENDMENTS FROM IBC 2021.
2. FIRE PREVENTION: FLORIDA FIRE ALARM CODE 2019. (ADOPTS WITHOUT AMENDMENTS FROM NFPA 72, 2019) .
3. ELECTRICAL: FLORIDA ELECTRICAL CODE 2020 (ADOPTS WITHOUT AMENDMENTS FROM NFPA 70, 2020).
4. ENERGY: FLORIDA COMMERCIAL ENERGY CODE 2019 (ADOPTS WITH AMENDMENTS FROM ASHRAE 90.1, 2019)

ELECTRICAL SYSTEM AND EQUIPMENT

METHOD OF COMPLIANCE

PRESCRIPTIVE ____X____ PERFORMANCE _____

LIGHTING SCHEDULE

LAMP TYPE REQUIRED IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E1.0
NUMBER OF LAMPS IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E1.0
BALLAST TYPE USED IN THE FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E1.0
NUMBER OF BALLASTS IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E1.0
TOTAL WATTAGE PER FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E1.0

TOTAL INTERIOR WATTAGE SPECIFIED VS. ALLOWED

RETAIL (4461 SQ. FT.): GROSS AREA OF 0.84 W/SQ. FT.

PER FLORIDA COMMERCIAL ENERGY CODE 2019 (ASHRAE 90.1, 2019) STANDARD:

ALLOWABLE	SPECIFIED
	SEE COMCHECK COMPLIANCE FORM ON SHEET E0.1

TOTAL EXTERIOR WATTAGE SPECIFIED VS. ALLOWED
NOT APPLICABLE (TENANT FIT-UP)

EQUIPMENT SCHEDULES WITH MOTORS (NOT USED FOR MECHANICAL SYSTEMS)

MOTOR HORSEPOWER	NONE
NUMBER OF PHASES	N/A
MINIMUM EFFICIENCY	N/A
MOTOR TYPE	N/A
# OF POLES	N/A

PROVIDE A STANDARD RISER DIAGRAM WHICH INDICATES DESIGNATED POINTS FOR CHECK METERING.

PROVIDE A STANDARD PANEL SCHEDULE DESCRIPTION WHICH IDENTIFIES DIFFERENT END USE LOADS.

STANDARD RISER DIAGRAM IS ON SHEET - E0.3
STANDARD PANEL SCHEDULES ARE ON - E0.3

ELECTRICAL DESIGNER STATEMENT

I HEREBY CERTIFY THAT THE DESIGN OF THIS BUILDING COMPLIES WITH THE MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT REQUIREMENTS OF THE FLORIDA COMMERCIAL ENERGY CODE 2019 (ASHRAE 90.1, 2019)

SIGNED_____ DATE 11/07/2025

NAME: MICHAEL TOBIAS
TITLE: PROJECT ENGINEER

COMcheck Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code:	90.1 (2019) Standard
Project Title:	Mattress Warehouse, Naples, FL
Project Type:	Alteration

Construction Site: Owner/Agent: Designer/Contractor:

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Mattress Warehouse, Naples, FL (Retail)	4461	0.84	3747
		Total Allowed Watts =	3747

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Mattress Warehouse, Naples, FL (Retail, 4461 sq.ft.)				
LED: F1: Linear Suspended Light: Other:	1	23	47	1072
LED: F2: 2X4 Light Fixture: Other:	1	1	40	40
			Total Proposed Watts =	1112

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 90.1 (2019) Standard requirements in COMcheck Web and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

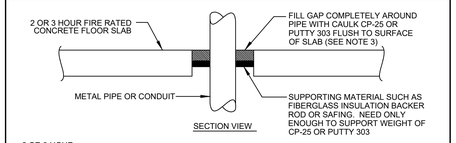
Michael Tobias — Signature — 11/06/25
Name - Title — Date

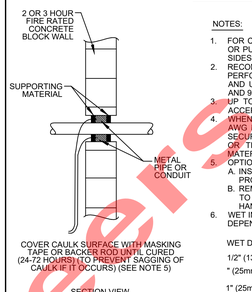
Project Title: Mattress Warehouse, Naples, FL Report date: 11/06/25

GENERAL ELECTRICAL NOTES:

1. ALL WORK THIS DIVISION SHALL COMPLY WITH ALL LOCAL BUILDING CODES, LAWS, REGULATIONS, ORDINANCES, AND THE REQUIREMENTS OF FLORIDA BUILDING CODE 8TH EDITION 2023 (FBC 2023) AND FLORIDA ELECTRICAL CODE 2020 (NFPA 70, 2020). ALL WORK SHALL COMPLY WITH BASE BUILDING SPECIFICATIONS. OBTAIN A COPY OF SPECIFICATIONS FROM BUILDING MANAGER IF NECESSARY.
2. PROVIDE REQUIRED WORKING SPACE, ADEQUATE ILLUMINATION, AND ACCESS TO ELECTRICAL EQUIPMENT IN ACCORDANCE WITH N.E.C. 110.26.
3. ALL EQUIPMENT, FIXTURES, MATERIALS, DEVICES, APPLIANCES, AND SYSTEMS SHALL BE U.L. LISTED OR LABELED BY AN APPROVED THIRD-PARTY TESTING AGENCY, OR CITY APPROVED.
4. EQUIPMENT AND DEVICES INSTALLED OUTDOORS OR EXPOSED TO MOISTURE SHALL BE RATED FOR WET OR DAMP LOCATIONS, AS APPROPRIATE.
5. OPERATING HANDLES OF FEEDER PROTECTIVE DEVICES, DISCONNECT SWITCHES, AND CONTROL DEVICES SHALL BE INSTALLED AT A MAXIMUM HEIGHT OF 6'-6" ABOVE FINISHED FLOOR. DEVICE MOUNTING HEIGHTS SHALL BE COORDINATED WITH THE ARCHITECT.
6. VERIFY LOCATIONS AND SEQUENCE OF OPERATION FOR TIME SWITCHES AND CONTROL DEVICES WITH OWNER. ALL DEVICES SHALL BE CLEARLY MARKED.
7. NO SUBSTITUTION OF SPECIFIED MATERIALS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.
8. ELECTRICAL CONTRACTOR SHALL USE THE LATEST ISSUED ELECTRICAL, MECHANICAL, ARCHITECTURAL, AND STRUCTURAL DRAWINGS FOR CONSTRUCTION. COORDINATE ALL WORK WITH OTHER TRADES.
9. COORDINATE WITH MECHANICAL ENGINEER FOR CONNECTIONS TO HVAC EQUIPMENT, TOILET EXHAUST FANS, FIRE/SMOKE DAMPERS, AND THERMOSTATS. PROVIDE REQUIRED RATED CONTROL SENSORS, SWITCHES, AND LOCAL DISCONNECT SWITCHES IN SIGHT OF EQUIPMENT. SEE MECHANICAL DRAWINGS FOR EXACT LOCATIONS.
10. CONDUIT SHALL BE CONCEALED IN WALLS OR ABOVE CEILINGS UNLESS OTHERWISE NOTED. MINIMUM CONDUIT SIZE SHALL BE 1/2". STANDARD BRANCH CIRCUIT CONDUIT SHALL BE 1/2" EMT WITH (2)#12, (1)#12 GND CONDUCTORS UNLESS OTHERWISE NOTED.
11. ALL CONDUCTORS SHALL BE COPPER, TYPE "THW" OR "THHN," WITH A MINIMUM SIZE OF #12 AWG. PROVIDE SEPARATE GREEN INSULATED #12 AWG EQUIPMENT GROUNDING CONDUCTOR ROUTED WITH ALL BRANCH CIRCUIT HOMERUNS.
12. PROVIDE GROUNDING AND BONDING IN ACCORDANCE WITH N.E.C. ARTICLE 250. PROVIDE #12 AWG GROUND FOR ALL MECHANICAL EQUIPMENT UNLESS OTHERWISE NOTED.
13. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW EVERY FITTING OR DETAIL. ALL JUNCTION BOXES AND COMPONENTS SHALL BE ACCESSIBLE FOR SERVICE.
14. ELECTRICAL CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS THROUGH FIRE-RATED WALLS, FLOORS, AND CEILINGS IN ACCORDANCE WITH N.E.C. 300.21 AND BUILDING CODE REQUIREMENTS.
15. ALL JUNCTION/DEVICE BOXES IN RATED WALLS SHALL BE INSTALLED IN ACCORDANCE WITH BUILDING CODE SECTION 706.4. OUTLET BOXES SHALL NOT BE MOUNTED BACK-TO-BACK.
16. PROVIDE NEW PANEL DIRECTORIES, CLEARLY LABELED PER N.E.C. 408.4(A), PROVIDE PLASTIC NAMEPLATES ON ALL PANELS (NEW AND EXISTING) INDICATING PANEL NAME AND SOURCE PER N.E.C. 408.4(B).
17. MULTIWIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH A MEANS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS PER N.E.C. 210.4(B). FOR PARTITIONS, COMPLY WITH N.E.C. 605.8.
18. PROVIDE GROUND-FAULT CIRCUIT INTERRUPTER (GFCI) PROTECTION FOR RECEPTACLE OUTLETS IN ACCORDANCE WITH N.E.C. 210.8. THIS INCLUDES:
    a. BATHROOMS, GARAGES, KITCHENS, OUTDOORS, AND WITHIN 6' OF SINKS.
    b. DWELLING UNITS: ACCESSORY BUILDINGS AT OR BELOW GRADE, CRAWL SPACES, UNFINISHED BASEMENTS, BOATHOUSES, LAUNDRY AREAS, AND WITHIN 6' OF SHOWER STALLS AND BATHTUBS.
    c. NON-DWELLINGS: ROOFTOPS, SERVICE BAYS, WET LOCATIONS, LOCKER ROOMS WITH SHOWERS, AND PUBLIC TIRE INFLATION/AUTOMATIC VACUUM STATIONS.
    d. KITCHEN/LAUNDRY EQUIPMENT LOCATIONS: IF A RECEPTACLE IS BEHIND LARGE EQUIPMENT (WASHER, DRYER, DISHWASHER), THE DEVICE MAY BE NON-GFCI, BUT THE BRANCH CIRCUIT BREAKER SHALL BE GFCI TYPE.
19. PROVIDE REJECTION-TYPE FUSE HOLDERS WHERE FUSES ARE USED.
20. PROVIDE A MINIMUM OF 8 DEDICATED CIRCUITS FOR ELEVATOR EQUIPMENT INCLUDING CONTROLLER, CAB LIGHTING, MACHINE ROOM LIGHTING, PIT LIGHTING, AND REQUIRED GFCI RECEPTACLES. ALL SHALL HAVE LOCKABLE DISCONNECTS IN THE ELEVATOR MACHINE ROOM.
21. NO PIPING, DUCTS, OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT SHALL BE LOCATED WITHIN THE DEDICATED SPACE ABOVE ELECTRICAL EQUIPMENT PER N.E.C. 110.26(E).
22. PROVIDE ARC-FLASH HAZARD WARNING LABELS ON ALL APPLICABLE EQUIPMENT PER N.E.C. 110.16.
23. ALL ELECTRICAL WORK SHALL BE PERFORMED IN A NEAT, WORKMANLIKE MANNER PER N.E.C. 110.12.
24. CONTRACTOR SHALL KEEP A RECORD OF ALL FIELD CHANGES. AT PROJECT COMPLETION, SUBMIT AS-BUILT DRAWINGS TO THE OWNER.
25. ALL SYSTEMS, EQUIPMENT, AND COMPONENTS SHALL BE COVERED BY A ONE-YEAR WARRANTY FROM THE DATE OF FINAL ACCEPTANCE. WARRANTY SHALL INCLUDE CORRECTION OF DEFECTS AND ALL REQUIRED CUTTING, PATCHING, AND REPAINTING.
26. ALL WORK SHALL BE PROPERLY COORDINATED WITH OTHER TRADES. WHERE GENERAL CONTRACTOR'S WORK (E.G., WALL REMOVAL OR RELOCATION) IMPACTS ELECTRICAL DEVICES OR CIRCUITS, ELECTRICAL CONTRACTOR SHALL DISCONNECT/RECONNECT ALL ACTIVE DEVICES AS REQUIRED.
27. PROVIDE VISUAL DESIGNATION FOR DEDICATED RECEPTACLES AND COORDINATE RECEPTACLE TYPE AND VOLTAGE WITH EQUIPMENT REQUIREMENTS.
28. BLANK FACEPLATES ARE NOT PERMITTED UNLESS OTHERWISE NOTED. ANY UNUSED DEVICE LOCATIONS SHALL BE REMOVED, PATCHED, AND REPAIRED TO MATCH ADJACENT FINISHES.
29. ALL WIRING TERMINATIONS ARE ASSUMED TO BE 75°C RATED UNLESS OTHERWISE NOTED. ALL WIRING UNDER 100A IS BASED ON 60°C TERMINATIONS.

FIRE STOP DETAILS:





NOTES:

1. FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
2. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91.
3. UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
4. WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm). A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.
5. OPTIONS TO MASKING TAPE TO PREVENT SAGGING:
   A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.
   B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
6. WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:

WET DEPTH	PIPE SIZE	FIRE RATING
1/2" (13mm)	MAX. 8" (203mm)	2 HRS.
" (25mm)	MAX. 6" (152mm)	3 HRS.

1" (25mm) DEPTH CAULK CP-25 OR PUTTY 303 WITHIN WALL

ABBREVIATION:

A	AMPERE	MCB	MAIN CIRCUIT BREAKER
AC	ABOVE COUNTER	MCC	MOTOR CONTROL CENTER
AFF	ABOVE FINISHED FLOOR	MCCB	MOLDED CASE CIRCUIT BREAKER
AFG	ABOVE FINISHED GRADE	MCP	MOTOR CIRCUIT PROTECTOR
AHJ	AUTHORITY HAVING JURISDICTION	MDP	MAIN DISTRIBUTION PANEL
AFC	AVAILABLE FAULT CURRENT	MFS	MAXIMUM FUSE SIZE
AIC	AMPERE INTERRUPTING CAPACITY	MLO	MAIN LUG ONLY
ATS	AUTOMATIC TRANSFER SWITCH	MOCP	MAXIMUM OVERCURRENT PROTECTION
BC	BELOW CEILING	MTD	MOUNTED
BLDG	BUILDING	MTS	MANUAL TRANSFER SWITCH
BRKR	BREAKER	N	NEW
C	CONDUIT (PROVIDE PULL STRING IN ALL EMPTY CONDUIT)	N.C.	NORMALLY CLOSED
		N.O.	NORMALLY OPEN
CL	CURRENT LIMITER	NTS	NOT TO SCALE
CKT	CIRCUIT	OCPD	OVERCURRENT PROTECTION DEVICE
CLG	CEILING.	OH	OVERHEAD
CT	CURRENT TRANSFORMER	P	POLE
CU	COPPER	PH	PHASE
CTR	CENTER	PNL	PANEL
E	EXISTING	PWR	POWER
EA	EACH	R	RELOCATED
EGC	EQUIPMENT GROUNDING CONDUCTOR	REC	RECEPTACLE
EOL	ELECTRONIC OVERLOAD	RM	ROOM
FBO	FURNISHED BY OTHERS	SW	SHOW WINDOW
FDR	FEEDER	SWBR	SWITCHBOARD
FLA	FULL LOAD AMPS	SWGR	SWITCHGEAR
FPMR	FUSE PER MANUFACTURER'S RECOMMENDATION	TBB	TELECOM BACKBOARD
		TELE	TELEPHONE
GEC	GROUNDING ELECTRODE CONDUCTOR	TYP	TYPICAL
GFI	GROUND FAULT INTERRUPTER	UG	UNDERGROUND
GND	GROUND	UNO	UNLESS NOTED OTHERWISE
GRS	GALVANIZED RIGID STEEL	UPS	UNINTERRUPTIBLE POWER SUPPLY
HOA	HAND-OFF-AUTO	V	VOLT
IG	ISOLATED GROUND	VIF	VERIFY IN FIELD
JB	JUNCTION BOX	W/	WITH
KVA	KILOVOLT-AMPERE	W	WIRE
KW	KILOWATT	WP	WEATHER PROOF
L.S.I.G.	LONG, SHORT, INSTANTANEOUS, GROUND FAULT TRIP	XFMR	TRANSFORMER
LTG	LIGHTING		
MCA	MINIMUM CIRCUIT AMPS		

ELECTRICAL DRAWING LIST

E0.1	ELECTRICAL SYMBOL LIST, ABBREVIATION & GENERAL NOTES
E0.2	ELECTRICAL SPECIFICATIONS
E0.3	ELECTRICAL RISER DIGRAM AND PANEL SCHEDULES
E1.0	LIGHTING PLAN
E2.0	ELECTRICAL POWER PLAN

HOME RUNS AND BRANCH WIRING FOR 120 VOLT 16 AMP CIRCUITS SHALL BE AS FOLLOWS TO ACCOUNT FOR VOLTAGE DROP:

LENGTH	HOME RUN WIRE SIZE	CIRCUIT WIRE SIZE
1' TO 65'	12	12
66' TO 104'	10	12
105' TO 156'	8	12
157' TO 263'	6	12
264' TO 419'	4	12

Property of Engineers

MATTRESS WAREHOUSE

Description
ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES

SHEET
E0.1

SUMMARY

A. GENERAL AND SUPPLEMENTARY CONDITIONS WITHIN THE SPECIFICATIONS ARE HEREBY INCORPORATED AND BECOME PART OF THESE SPECIFICATIONS AND AS SUCH SHALL BE APPLICABLE TO THE WORK OF THE ELECTRICAL CONTRACT.

B. PRIOR TO SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND LIMITATIONS THAT IMPACT THE WORK OF THIS CONTRACT. NO ADDITIONAL COSTS TO THE OWNER SHALL BE PERMITTED FOR CHANGES TO THE WORK AS A RESULT OF THE CONTRACTORS FAILURE TO VISIT THE SITE PRIOR TO BIDDING AND IDENTIFY ITEMS THAT WERE ABLE TO BE VERIFIED DURING A SITE VISIT PRIOR TO THE SUBMISSION OF A BID PROPOSAL.

C. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, RIGGING, AND MISCELLANEOUS ITEMS AS REQUIRED FOR A COMPLETE, OPERATIONAL, FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION AS SHOWN ON THE DRAWINGS AND AS SPECIFIED IN THESE SPECIFICATIONS.

LANDLORDS REQUIREMENTS

A. ALL WORK OF THIS CONTRACT SHALL BE COMPLETED IN STRICT ACCORDANCE WITH ALL APPLICABLE LANDLORD REQUIREMENTS INCLUDING BUT NOT NECESSARILY LIMITED TO; LANDLORD'S WORK LETTER, LANDLORD'S CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT. THIS CONTRACTOR SHALL EXAMINE THESE DOCUMENTS PRIOR TO THE SUBMISSION OF A BID PROPOSAL.

B. ALL APPLICABLE LANDLORD REQUIREMENTS INCLUDING BUT NOT NECESSARILY LIMITED TO THE LANDLORD'S WORK LETTER, LANDLORDS CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT DOCUMENTS SHALL BE CONSIDERED PART OF THESE SPECIFICATIONS.

EXISTING CONDITIONS

A. THE CONTRACT DOCUMENTS ARE BASED ON INFORMATION PROVIDED TO THE CONSULTANT AT THE TIME OF DESIGN. THIS CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING A BID PROPOSAL.

BIDS AND SUBSTITUTIONS

A. PRIOR TO SUBMISSION OF A BID PROPOSAL, CONTRACTOR SHALL THOROUGHLY REVIEW THE BID INSTRUCTIONS AND ALL CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE AND MEPFP AND TELECOMMUNICATION CONSTRUCTION DOCUMENTS.

B. SHOULD THE CONTRACTOR WISH TO SUBMIT AN ALTERNATE PRODUCT TO THE MANUFACTURERS NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS FOR ANY EQUIPMENT, THE CONTRACTOR SHALL SUBMIT A VOLUNTARY ALTERNATIVE A MINIMUM OF SEVEN (7) CALENDAR DAYS PRIOR TO BID, STATING THE MANUFACTURER'S NAME, MODEL NUMBER, WRITTEN, DETAILED PRODUCT DATA.

C. WORK PERFORMED OR CONSTRUCTED WITH UNAPPROVED EQUALS IS AT CONTRACTOR'S RISK AND ANY REQUIRED CORRECTION OF WORK INCORPORATING UNAPPROVED EQUALS SHALL BE AT CONTRACTOR'S SOLE COST AND EXPENSE.

D. D. NO SUBSTITUTIONS PERMITTED FOR LIGHTING FIXTURES.

QUALITY ASSURANCE

A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW.

B. PROVIDE PERMITS, INSPECTIONS, FINAL CERTIFICATES OF INSPECTION BY THE AUTHORITY HAVING JURISDICTION, PERMIT AND INSPECTION FEES AND ALL MATERIALS, EQUIPMENT AND LABOR AS REQUIRED FOR A COMPLETE, FUNCTIONAL, FULLY OPERATIONAL AND CODE COMPLIANT ELECTRICAL SYSTEM.

C. THIS CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND ACCESSORIES FOR A COMPLETE FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION, WHETHER OR NOT SHOWN ON THE DRAWINGS OR SPECIFIED IN THESE SPECIFICATIONS.

D. EC SHALL VERIFY THE VOLTAGE AND AMPERAGE REQUIREMENTS OF ALL EQUIPMENT DELIVERED TO THE SITE PRIOR TO CONNECTION. EC SHALL NOTIFY THE OWNER OF ANY DIFFERENCES

E. REQUIREMENTS OF REGULATORY AGENCIES:

1. PERMITS: ARRANGE AND PAY FOR ALL PERMITS, INSPECTIONS AND UTILITY CONNECTIONS REQUIRED.

2. PROVIDE ALL TESTS AND INSPECTIONS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.

3. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE COMPLETION OF THE PROJECT. INCLUDE IN OPERATION AND MAINTENANCE MANUALS.

F. CODES AND STANDARDS

1. COMPLY WITH SPECIFIED CODES AND STANDARDS. IF CONFLICT EXISTS BETWEEN CODES OR STANDARDS AND DRAWINGS, PROJECT MANUAL OR ADDENDA REQUIREMENTS, REQUEST CLARIFICATION FROM ARCHITECT/ENGINEER.

2. CONFORM TO THE INSTALLATION RULES AND REGULATIONS OF THE CODES AND STANDARDS LISTED INCLUDING ALL SUBSEQUENTLY PUBLISHED AMENDMENTS THERETO ISSUED PRIOR TO THE DATE OF THE BIDDING DOCUMENTS.

3. CONFORM TO THE REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL AGENCIES WHICH HAVE AUTHORITY OVER THIS PROJECT.

4. COMPLY WITH THE APPLICABLE EDITION OF THE FOLLOWING CODES AND STANDARDS THAT HAVE BEEN ADOPTED BY AND ARE ENFORCED BY THE AUTHORITY HAVING JURISDICTION:

a. INTERNATIONAL BUILDING CODE.
b. INTERNATIONAL ENERGY CONSERVATION CODE
c. INTERNATIONAL MECHANICAL CODE
d. NATIONAL ELECTRICAL CODE
e. INTERNATIONAL FIRE CODE
f. LIFE SAFETY CODE, NFPA 101
g. AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES
h. ALL LOCAL CODES AND ORDINANCES ADOPTED AND ENFORCED BY THE AUTHORITY HAVING JURISDICTION.

G. REFERENCED STANDARDS:

1. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE RATED, TESTED, FABRICATED AND INSTALLED IN ACCORDANCE WITH THE APPLICABLE INDUSTRY STANDARDS.

2. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (UL, ETL, ETC).

ELECTRICAL CONTRACT DOCUMENTS

A. THE ELECTRICAL DRAWINGS (DRAWINGS) AND THE SPECIFICATIONS SHALL TOGETHER FORM A SET OF CONTRACT DOCUMENTS FOR THE ELECTRICAL WORK. NEITHER THE DRAWINGS OR THE SPECIFICATIONS SHALL BE COMPLETE WITHOUT THE OTHER. ANY ITEM SHOWN ONLY ON THE DRAWINGS OR SPECIFIED ONLY IN THE SPECIFICATIONS SHALL BE CONSIDERED AS IF SHOWN AND SPECIFIED IN BOTH.

B. ELECTRICAL DRAWINGS AND SPECIFICATIONS: COMPLY WITH THE FOLLOWING REQUIREMENTS:

1. CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH ALL DRAWINGS AND SPECIFICATIONS WITHIN THE CONTRACT DOCUMENTS, INCLUDING, BUT NOT NECESSARILY LIMITED TO, GEOTECHNICAL, LANDSCAPE, CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE, MECHANICAL, PLUMBING, TELECOMMUNICATION AND FIRE PROTECTION DRAWINGS AND SPECIFICATIONS.
2. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO INDICATE APPROXIMATE LOCATION ONLY OF ELECTRICAL WORK. THE ACTUAL LOCATION OF ANY ELECTRICAL WORK SHALL NOT INTERFERE WITH THE LOCATION, CLEARANCES, ETC. REQUIRED BY THE WORK OF OTHER TRADES.
3. PRIOR TO ROUGH-IN, CONTRACTOR SHALL COORDINATE ALL DEVICE LOCATIONS WITH THE ARCHITECTURAL WALL ELEVATIONS, CASEWORK/CABINETRY ELEVATIONS AND DETAILS AND THE FINAL, APPROVED FOOD SERVICE SHOP DRAWINGS.

C. DEFINITIONS: THE FOLLOWING TERMS ARE USED ON THE ELECTRICAL DRAWINGS AND IN THE SPECIFICATIONS AND SHALL BE DEFINED AS FOLLOWS:

1. CONTRACTOR - THE ELECTRICAL CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS.

2. WORK ALL MATERIAL, LABOR, TRANSPORTATION OF THE ELECTRICAL CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS.

3. FURNISH PURCHASE, SUBMIT FOR REVIEW AND APPROVAL, COORDINATE WITH THE CONTRACT DOCUMENTS AND DELIVER TO THE PROJECT SITE IN NEW, UNDAMAGED CONDITION, STORE AS DIRECTED, PROTECT FROM DAMAGE DURING STORAGE.

4. INSTALL INSTALL IN PLACE, MAKE READY FOR CONNECTION TO THE REQUIRED SERVICE.

5. CONNECT CONNECT TO THE REQUIRED SERVICE AS REQUIRED FOR PROPER OPERATION, TEST FOR PROPER OPERATION AND FUNCTIONALITY IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND REQUIREMENTS SPECIFIED WITHIN THESE SPECIFICATIONS AND TURN OVER TO THE OWNER IN FULL OPERATING CONDITION.

6. PROVIDE FURNISH, INSTALL AND CONNECT AS DEFINED HEREIN FOR A COMPLETE, FUNCTIONAL AND CODE COMPLIANT INSTALLATION READY FOR INTENDED USE.

7. FINISHED SPACE SPACES HAVING WALLS PAINTED OR FINISHED WITH WALL COVERING, LAY-IN OR DRYWALL CEILINGS, AND FINISHED FLOORING MATERIALS. EXAMPLES OF FINISHED SPACES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ALL SPACES IN A DWELLING UNIT, OFFICES, LOBBIES, CORRIDORS, TOILET ROOMS, ETC.

8. UNFINISHED SPACES SPACES WITH UNFINISHED WALLS AND FLOORS AND TYPICALLY ARE NOT EQUIPPED WITH A CEILING. EXAMPLES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, MECHANICAL ROOMS, ELECTRICAL ROOMS, SERVICE AREAS, ETC.

9. SHALL-ACTION THAT IS REQUIRED WITHOUT OPTION OR QUALIFICATION.

10. REMOVE DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF SITE UNLESS INDICATED TO BE REMOVED AND SALVAGED OR REMOVED AND RE-INSTALLED.

11. REMOVE AND SALVAGE CAREFULLY DETACH FROM EXISTING CONSTRUCTION IN A MANNER TO PREVENT DAMAGE AND DELIVER TO OWNER READY FOR RE-USE.

12. REMOVE AND REINSTALL - DETACH ITEMS FROM EXISTING CONSTRUCTION, PREPARE FOR RE-USE, RE-INSTALL AND RECONNECT WHERE INDICATED SUCH THAT THE RE-INSTALLED ITEM IS FULLY OPERATIONAL.

13. EXISTING TO REMAIN EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE PERMANENTLY REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, REMOVED AND SALVAGED OR REMOVED AND RE-INSTALLED.

SUBMITTALS

A. REVIEW OF THE SHOP DRAWINGS IS RENDERED AS A SERVICE ONLY AND SHALL NOT BE CONSIDERED AS A GUARANTEE OF MEASUREMENTS OR OF BUILDING CONDITIONS; NOR SHALL IT BE CONSTRUED AS RELIEVING THE CONTRACTOR'S OF BASIC RESPONSIBILITIES UNDER HIS CONTRACT. ARCHITECT/ENGINEER WILL REVIEW SHOP DRAWINGS ONLY FOR CONFORMANCE WITH DESIGN CONCEPT OF THE PROJECT. REVIEW BY THE ARCHITECT/ENGINEER SHALL NOT BE CONSTRUED:

1. AS PERMITTING ANY DEPARTURE FROM THE CONTRACT REQUIREMENTS.

2. AS RELIEVING THE CONTRACTOR OF THE RESPONSIBILITY FOR ANY ERROR IN DETAILS, DIMENSIONS OR OTHERWISE THAT MAY EXIST.

3. AS APPROVED DEPARTURES FROM ADDITIONAL DETAILS OR INSTRUCTIONS PREVIOUSLY FURNISHED BY THE ARCHITECT/ENGINEER.

B. SHOP DRAWINGS:

1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESCRIPTIVE LITERATURE OF EQUIPMENT TO BE FURNISHED UNDER THIS CONTRACT. DRAWINGS SHALL STATE CAPACITIES, SIZES, ETC., OF ALL EQUIPMENT AND SHALL BE CERTIFIED. SEE GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS FOR ADDITIONAL REQUIREMENTS.

2. PROVIDE SUBMITTALS FOR LIGHTING FIXTURES, TRANSFORMERS, PANELBOARDS, LIGHTING CONTROL DEVICES, CONTACTORS, WIRING DEVICES, DISCONNECT SWITCHES, POWER SYSTEM STUDY.

C. THE CONTRACTOR SHALL PERFORM NO PORTION OF THE WORK REQUIRING SUBMITTAL AND REVIEW OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES OR SIMILAR SUBMITTALS UNTIL THE RESPECTIVE SUBMITTALS HAS BEEN APPROVED BY THE ENGINEER.

ELECTRICAL COORDINATION DRAWINGS

A. PREPARE ELECTRICAL COORDINATION DRAWINGS AS REQUIRED BY THE WORK AND AS DIRECTED BY THE GENERAL CONTRACTOR.

B. MEET WITH REPRESENTATIVES OF THE OTHER DISCIPLINES/TRADES TO COORDINATE THE ELECTRICAL WORK WITH THE WORK OF EACH DISCIPLINE AND TO OBTAIN INFORMATION REGARDING THEIR WORK THAT IS TO BE INDICATED ON THE COORDINATION DRAWINGS.

POWER SYSTEM STUDIES - GENERAL

A. PROVIDE COMPUTER-BASED, POWER SYSTEM STUDIES THAT INCLUDES:

1. A SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES;

2. AN ARC-FLASH STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR ELECTRICAL EQUIPMENT.

B. STUDIES SHALL BE PERFORMED UTILIZING COMPUTER PROGRAMS THAT ARE DISTRIBUTED NATIONALLY AND ARE IN WIDE USE. SOFTWARE ALGORITHMS SHALL COMPLY WITH REQUIREMENTS OF STANDARDS AND GUIDES SPECIFIED IN THIS SECTION. MANUAL CALCULATIONS ARE UNACCEPTABLE.

C. SOFTWARE DEVELOPERS: SUBJECT TO COMPLIANCE WITH SPECIFIED REQUIREMENTS, PERFORM STUDIES UTILIZING SOFTWARE PRODUCTS BY ONE OF THE FOLLOWING:

1. EASY POWER
2. POWER ANALYTICS CORPORATION
3. SKM SYSTEMS ANALYSIS

D. ALL STUDIES SHALL BE BASED ON THE DEVICE CHARACTERISTICS OF ACTUAL EXISTING COMPONENTS AND THE NEW COMPONENTS BEING INSTALLED..

E. PROVIDE ALL FIELD LABOR AS REQUIRED TO OBTAIN ALL DATA NECESSARY TO CONDUCT THE STUDIES SPECIFIED HEREIN.

F. SUBMIT STUDIES FOR REVIEW BEFORE SUBMITTING THE SYSTEM OVERCURRENT PROTECTIVE DEVICE AND POWER DISTRIBUTION EQUIPMENT SUBMITTALS. SUBMIT STUDY REPORT FOR REVIEW PRIOR TO RECEIVING FINAL APPROVAL OF THE OVERCURRENT PROTECTIVE DEVICE AND DISTRIBUTION EQUIPMENT SUBMITTALS.

G. WHERE FORMAL COMPLETION OF STUDIES WILL CAUSE A DELAY IN THE ORDERING AND MANUFACTURING OF OVERCURRENT PROTECTIVE DEVICES AND POWER DISTRIBUTION EQUIPMENT, OBTAIN APPROVAL FROM ENGINEER FOR PRELIMINARY SUBMITTAL OF SUFFICIENT STUDY DATA TO ENSURE THAT THE SELECTION OF DEVICES AND ASSOCIATED CHARACTERISTICS IS SATISFACTORY AND IN COMPLIANCE WITH THE RESULTS OF THE STUDIES BEING PERFORMED.

H. POWER SYSTEM STUDY SHALL BE SIGNED AND SEALED BY THE PROFESSIONAL ENGINEER RESPONSIBLE FOR PREPARING THE STUDY.

SHORT CIRCUIT STUDY

A. PROVIDE A COMPUTER-BASED, SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES.

B. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.

C. FOR EXISTING RELOCATED EQUIPMENT AND EXISTING EQUIPMENT THAT IS EXISTING TO REMAIN, OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS.THE QUALIFICATIONS OF TECHNICIANS AND ENGINEERS SHALL BE QUALIFIED AS DEFINED BY NFPA 70E.

D. GATHER AND TABULATE ALL REQUIRED DATA TO SUPPORT THE SHORT-CIRCUIT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 551 AS TO THE AMOUNT OF DETAIL THAT 15 REQUIRED TO BE ACQUIRED IN THE FIELD.

E. BEGIN SHORT-CIRCUIT CURRENT ANALYSIS AT THE SERVICE, EXTENDING DOWN TO THE SYSTEM OVERCURRENT PROTECTIVE DEVICES AS FOLLOWS:

1. TO NORMAL SYSTEM LOW-VOLTAGE LOAD BUSES WHERE FAULT CURRENT IS 10 KA OR LESS.

ARC FLASH HAZARD STUDY

A. PROVIDE A COMPUTER-BASED, ARC-FLASH HAZARD STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR EXISTING AND NEW ELECTRICAL EQUIPMENT.

B. ELECTRICAL SURVEY DATA: GATHER AND TABULATE ALL REQUIRED INPUT DATA TO SUPPORT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 1584 AND NFPA 70E AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED IN THE FIELD.

C. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.

D. FOR EXISTING EQUIPMENT, WHETHER OR NOT RELOCATED, OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS.

E. HAZARD LABELS SHALL HAVE AN ORANGE HEADER WITH THE WORDING, "WARNING, ARC-FLASH HAZARD," AND SHALL INCLUDE THE FOLLOWING INFORMATION TAKEN DIRECTLY FROM THE ARC-FLASH HAZARD ANALYSIS:

1. LOCATION DESIGNATION
2. NOMINAL VOLTAGE.
3. FLASH PROTECTION BOUNDARY.
4. HAZARD RISK CATEGORY.
5. INCIDENT ENERGY.
6. WORKING DISTANCE
7. ENGINEERING REPORT NUMBER, REVISION NUMBER, AND ISSUE DATE.

F. ARC FLASH HAZARD WARNING LABELS SHALL BE A 3.5-BY-5-INCH THERMAL TRANSFER LABEL OF HIGH-ADHESION POLYESTER FOR EACH WORK LOCATION INCLUDED IN THE ANALYSIS.
G. LABELS SHALL BE MACHINE PRINTED, WITH NO FIELD-APPLIED MARKINGS.

RECORD DOCUMENTS

A. DURING THE PROGRESS OF THE WORK, CONTRACTOR SHALL MAINTAIN A CURRENT (DAILY) AS-BUILT SET OF THE DRAWINGS AND SPECIFICATIONS, INDICATING THEREON ALL WORK INSTALLED AT VARIANCE WITH SUCH CONTRACT DOCUMENTS INCLUDING, WITHOUT LIMITATION, WORK COVERED BY ADDENDA, FIELD WORK ORDERS, CHANGE ORDERS, AND ENGINEERS

B. CONTRACTOR SHALL PROVIDE THE TENANT WITH THE FINAL AS-BUILT SET OF DRAWINGS AT THE COMPLETION OF THE WORK.

COORDINATION WITH LANDLORD AND UTILITY COMPANIES

A. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL COORDINATE THE WORK OF THIS CONTRACT WITH THE LANDLORD'S AUTHORIZED REPRESENTATIVE AND AUTHORIZED REPRESENTATIVES OF EACH SERVING UTILITY THAT WILL PROVIDE SERVICE TO THIS SITE, INCLUDING BUT NOT NECESSARILY LIMITED TO, ELECTRIC, TELEPHONE AND CABLE/SATELLITE TV SERVICE PROVIDERS.

B. CONTRACTOR SHALL MEET WITH AUTHORIZED REPRESENTATIVES OF THE LANDLORD AND EACH UTILITY TO DISCUSS LANDLORD UTILITY COMPANY SCOPE OF WORK, CONTRACTOR SCOPE OF WORK, POINT OF SERVICE PICK-UP, DETAILS REGARDING SYSTEM INTERFACE, UTILITY COMPANY STANDARDS TO BE COMPLIED WITH, ETC.

COORDINATION WITH OTHER TRADES

A. ELECTRICAL WORK SHALL BE INSTALLED SO AS TO NOT CONFLICT WITH THE WORK OF OTHER TRADES.

B. SET ALL SLEEVES AND CUT AND PATCH ALL MISCELLANEOUS HOLES NECESSARY FOR THE CONVENIENT AND PROPER INSTALLATION OF THE WORK.

C. CONFER WITH THE OTHER CONTRACTORS REGARDING THE LOCATION AND SIZE OF PIPES, EQUIPMENT, DUCTS, OPENINGS AND SPECIAL ARCHITECTURAL TREATMENTS IN ORDER THAT THERE MAY BE NO INTERFERENCES BETWEEN THE INSTALLATION OR THE PROGRESS OF THE WORK OF ANY CONTRACTOR ON THE PROJECT.

D. ALL LINE VOLTAGE WIRING AND FINAL CONNECTIONS TO COMPLETE MECHANICAL SYSTEMS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.

E. PROVIDE FINAL ELECTRICAL CONNECTIONS TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS, (HVAC EQUIPMENT, PLUMBING EQUIPMENT, COMMERCIAL KITCHEN EQUIPMENT, ETC.

F. COORDINATE THE NEMA CONFIGURATION OF THE RECEPTACLE TO BE PROVIDED WITH THE NEMA PLUG CONFIGURATION OF THE CORD/PLUG ASSEMBLY FURNISHED WITH THE EQUIPMENT TO BE INSTALLED. PROVIDE RECEPTACLES HAVING A NEMA CONFIGURATION THAT MATCHES THE NEMA CONFIGURATION OF THE PLUG ON THE EQUIPMENT.

G. PROVIDE FINAL COORDINATION OF AVAILABLE POWER (VOLTAGE/PHASE) WITH OTHER TRADES PRIOR TO THEIR ORDERING OF EQUIPMENT.

H. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION REGARDING ELECTRICAL WORK TO BE PROVIDED ASSOCIATED WITH MECHANICAL EQUIPMENT.

I. WHERE ELECTRICAL WORK (CONDUIT BOXES, RECEPTACLES, DISCONNECT SWITCHES, ETC.) ARE SECURED DIRECTLY TO THE HOUSING OF MECHANICAL EQUIPMENT, THEY SHALL BE INSTALLED ON A PORTION OF THE EQUIPMENT HOUSING NOT REQUIRED TO BE REMOVED FOR ROUTINE MAINTENANCE. PRIOR TO INSTALLATION, COORDINATE ALL ELECTRICAL WORK AT MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR.

TEMPORARY POWER

A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEMPORARY CONSTRUCTION POWER AND LIGHTING TO ALLOW ALL CONTRACTORS AND SUB-CONTRACTORS TO PERFORM THE WORK OF THEIR CONTRACTS.

B. PRIOR TO THE SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL CONTACT THE GENERAL CONTRACTOR TO COORDINATE THE TYPE OF EQUIPMENT TO BE UTILIZED DURING THE WORK OF THIS CONTRACT

SEQUENCING AND SCHEDULING

A. COORDINATE ELECTRICAL EQUIPMENT INSTALLATION WITH OTHER BUILDING COMPONENTS AND THE PROJECT PHASING PLAN.

UTILITY COMPANY METERING EQUIPMENT

A. PROVIDE ALL EQUIPMENT REQUIRED FOR ELECTRICITY METERING BY UTILITY COMPANY. ALL METERING EQUIPMENT AND THE INSTALLATION OF THE EQUIPMENT SHALL BE IN COMPLIANCE WITH ALL UTILITY COMPANY REQUIREMENTS.

B. ELECTRICAL SERVICE CONNECTIONS: COORDINATE WITH UTILITY COMPANIES AND COMPONENTS THEY FURNISH AS FOLLOWS:

1. COMPLY WITH REQUIREMENTS OF UTILITIES PROVIDING ELECTRICAL POWER SERVICES.

2. COORDINATE INSTALLATION AND CONNECTION OF UTILITIES AND SERVICES, INCLUDING PROVISION FOR ELECTRICITY-METERING COMPONENTS.

C. METERS SHALL BE FURNISHED BY UTILITY COMPANY; INSTALLED BY ELECTRICAL CONTRACTOR.

D. METER SOCKETS: COMPLY WITH REQUIREMENTS OF ELECTRICAL-POWER UTILITY COMPANY.

E. INSTALL ALL CONDUITS AND EQUIPMENT ACCORDING TO UTILITY COMPANY'S WRITTEN REQUIREMENTS. PROVIDE EMPTY CONDUITS FOR METERING LEADS AND EXTEND GROUNDING CONNECTIONS AS REQUIRED BY UTILITY COMPANY.

FIRE STOPPING

A. PROVIDE FIRE STOPPING FOR PENETRATIONS BY CONDUIT OR CABLES AND OTHER EQUIPMENT THROUGH FIRE-RATED VERTICAL BARRIERS (WALLS AND PARTITIONS), HORIZONTAL BARRIERS (FLOOR/CEILING ASSEMBLIES) AND VERTICAL SHAFT WALLS AND PARTITIONS.

B. FIRESTOP SYSTEM INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ASME E 814 OR UL 1479 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO OR GREATER THAN THAT OF THE CONSTRUCTION BEING PENETRATED.

SEISMIC RESTRAINT

A. PROVIDE SEISMIC RESTRAINT FOR ELECTRICAL WORK AND SYSTEMS AND EQUIPMENT IN STRICT ACCORDANCE WITH THE APPLICABLE BUILDING CODE AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

B. SUBMIT ALL REQUIRED DETAILS TO THE AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL.

CUTTING & PATCHING

A. PRIOR TO CORE DRILLING OR SAW CUTTING OPERATIONS, CONTRACTOR SHALL X-RAY OR GROUND PENETRATING RADAR (GPR) THE EXISTING SLAB TO DETERMINE THE LOCATION OF ANY EXISTING UTILITIES, STRUCTURAL MEMBERS. ETC. COORDINATE ALL SCANNING, CUTTING AND CORE DRILLING OPERATIONS WITH GC AND LANDLORD PRIOR TO COMMENCEMENT OF WORK.

B. CORE-DRILL OR SAW-CUT EXISTING FLOORS, WALLS, ROOF, ETC., AS REQUIRED FOR THE INSTALLATION OF THE ELECTRICAL WORK. EXISTING UTILITIES AND STRUCTURAL COMPONENTS, INCLUDING BUT NOT NECESSARILY LIMITED TO, COLUMNS, BEAMS, GIRDERS, PLATES OR JOISTS SHALL NOT BE CUT.

C. PATCH SURROUNDING AREAS FLUSH WITH ADJACENT SURFACES AND PREPARE TO RECEIVE SPECIFIED FINISHES.

D. PATCH AND REPAIR ROOF TO MATCH EXISTING ROOFING SYSTEM. ALL ROOF WORK SHALL BE PERFORMED TO MEET THE WARRANTY REQUIREMENTS OF THE EXISTING ROOFING SYSTEM.

GROUNDING

A. PROVIDE ELECTRICAL SYSTEM AND EQUIPMENT GROUNDING IN ACCORDANCE WITH APPLICABLE N.E.C. REQUIREMENTS.

B. THE METALLIC CONDUIT SYSTEM SHALL BE GROUNDED AND BONDED TO FORM AN EQUIPMENT GROUNDING CONDUCTOR.

C. PROVIDE AN INSULATED EQUIPMENT GROUND CONDUCTOR WITHIN ALL FEEDERS AND BRANCH CIRCUITS. THIS EQUIPMENT GROUND CONDUCTOR SHALL BE IN ADDITION TO THE EQUIPMENT GROUND CONDUCTOR FORMED BY THE METALLIC CONDUIT SYSTEM.

D. PROVIDE AN ISOLATED GROUND CONDUCTOR IN ADDITION TO THE EQUIPMENT GROUNDING CONDUCTOR IN SELECT BRANCH CIRCUITS AS NOTED ON THE DRAWINGS.

E. PROVIDE A #6 AWG GREEN INSULATED GROUNDING CONDUCTOR FROM THE GROUND BAR AT TELEPHONE TERMINAL BOARD TO THE ELECTRICAL SERVICE GROUND.

F. PROVIDE A COPPER GROUNDING BAR AT THE TELEPHONE TERMINAL BACKBOARD. GROUNDING BAR SHALL BE % INCH X 4 INCHES X 12 INCHES, PRE-DRILLED FOR CONDUCTOR TERMINATIONS, WITH NON-METALLIC STAND-OFF BRACKETS WITH INSULATORS. CHATSWORTH PRODUCTS 10622-012 OR APPROVED EQUAL.

EQUIPMENT IDENTIFICATION

A. PROVIDE EQUIPMENT LABELS ON PANELBOARDS, DISCONNECT SWITCHES, CONTACTORS, TRANSFORMERS, CONTROLS, ETC. EQUIPMENT LABELS SHALL BE ENGRAVED PHENOLIC RESIN NAMEPLATES ATTACHED TO ENCLOSURE WITH MECHANICAL FASTENERS. SELF-ADHESIVE NAMEPLATES ARE NOT ACCEPTABLE. LETTERING SHALL BE 1/2" HIGH, BLACK TEXT ON WHITE BACKGROUND.

B. ENGRAVED NAMEPLATES ATTACHED TO COMPONENTS SHALL IDENTIFY THE EQUIPMENT DESIGNATION, NAME OF THE "UPSTREAM POWER SOURCE (AS APPLICABLE), VOLTAGE AND PHASE.

C. THE COVERS OF ALL OUTLET AND JUNCTION BOXES INSTALLED ABOVE CEILINGS AND INSTALLED EXPOSED IN UNFINISHED SPACES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL, VOLTAGE, PHASE AND CIRCUIT NUMBERS CONTAINED WITHIN THE BOX. LABEL SHALL BE LEGIBLY HANDWRITTEN WITH BLACK, FELT TIP PERMANENT MARKER.

D. THE COVER PLATES OF ALL WIRING DEVICES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL AND THE CIRCUITS SERVING THE DEVICE, LABELS SHALL BE MACHINE PRINTED, BLACK TEXT ON A CLEAR, SELF ADHESIVE LABEL

CONDUIT AND FITTINGS

A. ALL INTERIOR AND EXTERIOR CONDUITS SHALL BE INSTALLED AND SUPPORTED IN ACCORDANCE WITH N.E.C. REQUIREMENTS.

B. MINIMUM CONDUIT SIZE SHALL BE N" TRADE SIZE. SWITCH LEGS SHALL BE ½" TRADE SIZE.

C. WITHIN INTERIOR FINISHED SPACES, ALL CONDUIT SHALL BE INSTALLED CONCEALED WITHIN NEW AND EXISTING WALLS AND ABOVE NEW AND EXISTING CEILINGS.

D. CONDUIT INSTALLED WITHIN THE INTERIOR OF THE BUILDING SHALL BE GALVANIZED ELECTRICAL METALLIC TUBING (EMT). CONDUIT FITTINGS FOR INDOOR EMT CONDUITS SHALL BE CAST METAL, COMPRESSION TYPE.

E. EMT SHALL BE USED FOR INTERIOR FEEDERS AND BRANCH CIRCUITS INSTALLED EXPOSED IN UNFINISHED SPACES, CONCEALED ABOVE NEW OR EXISTING CEILINGS OR CONCEALED WITHIN EXISTING AND NEW INTERIOR PARTITIONS.

F. CONDUITS INSTALLED EXPOSED ON THE EXTERIOR OF THE BUILDING SHALL BE GALVANIZED RIGID STEEL FITTINGS SHALL BE THREADED TYPE.

G. CONDUITS INSTALLED UNDER SLAB ON GRADE CONSTRUCTION SHALL BE RIGID NON-METALLIC (RNC), SCHEDULE 40 PVC. RNC COMPLYING WITH NEMA TC 2 AND UL 651 UNLESS OTHERWISE INDICATED. FITTINGS FOR RIGID NON-METALLIC CONDUIT SHALL COMPLY WITH NEMA TC 3; MATCH TO CONDUIT TYPE AND MATERIAL

H. PROVIDE CONDUIT EXPANSION FITTINGS IN ALL CONDUIT RUNS THAT EXTEND ACROSS BUILDING EXPANSION JOINTS AND WHERE MOVEMENT MAY BE ENCOUNTERED.

I. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE ONLY.

J. PVC CONDUIT SHALL ONLY BE USED BELOW GRADE

K. PROVIDE FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT WITHIN INTERIOR DRY LOCATIONS, MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES.

L. PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT IN WET OR OUTDOOR LOCATIONS. MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES.

M. PROVIDE FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO RECESSED LIGHT FIXTURES (FIXTURE WHIPS). MAXIMUM CONDUIT LENGTH SHALL BE 72 INCHES.

N. CONDUITS THAT EXTEND UP TO THE ROOF LEVEL TO SERVE ROOF MOUNTED MECHANICAL EQUIPMENT INSTALLED ON A CURB SHALL BE ROUTED WITHIN THE EQUIPMENT CURB. COORDINATE ELECTRICAL WORK WITH MECHANICAL EQUIPMENT INSTALLER.

O. PROVIDE CONDUIT SEALING FITTINGS IN ALL CONDUITS THAT EXTEND FROM NON-CONDITIONED SPACES TO CONDITIONED SPACES PER NEC 300.7(A). PROVIDE EXPANSION JOINTS FOR CONDUIT AS REQUIRED TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION.

P. ACCEPTABLE MANUFACTURERS FOR GALVANIZED RIGID CONDUIT, EMT, FLEXIBLE METAL-CONDUITS AND LIQUID-TIGHT FLEXIBLE METAL CONDUITS SHALL BE ALLIED, REPUBLIC,WHEATLAND, ELECTRI-FLEX AND ANACONDA.

Q. ACCEPTABLE MANUFACTURERS FOR CONDUIT FITTINGS SHALL BE THOMAS AND BETTS OR APPROVED EQUAL.

CONDUCTORS

A. ALL CONDUCTORS SHALL BE SOFT DRAWN, ANNEALED COPPER, #12 AWG MINIMUM.

B. CONDUCTORS #12 AND #10 AWG SHALL BE SOLID; #8 AWG AND LARGER SHALL BE STRANDED.

C. THE USE OF ALUMINUM CONDUCTORS IS NOT ACCEPTABLE.

D. EXPOSED, INTERIOR FEEDERS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

E. FEEDERS INSTALLED CONCEALED IN CEILINGS, WALLS, PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

F. FEEDERS INSTALLED CONCEALED IN CONCRETE, BELOW SLABS-ON-GRADE AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN PVC CONDUIT.

G. EXPOSED, INTERIOR, BRANCH CIRCUITS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

H. BRANCH CIRCUITS CONCEALED IN EXISTING AND NEW CEILINGS, WALLS, AND PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

I. BRANCH CIRCUITS CONCEALED BELOW SLABS-ON-GRADE, AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

J. ACCEPTABLE MANUFACTURERS FOR CONDUCTORS: GENERAL CABLE COMPANY, CAROL, ANACONDA, ROME, SOUTHWIRE.

K. CLASS 1 CONTROL CIRCUITS: TYPE THHN-THWN, IN CONDUIT.

L. CLASS 2 CONTROL CIRCUITS: POWER-LIMITED PLENUM RATED CABLE, CONCEALED IN BUILDING FINISHES.

M. THE USE OF NON-METALLIC-SHEATHED CABLE (TYPE NM) AND ARMORED CABLE (TYPE AC OR BX) IS NOT ACCEPTABLE.

N. WIRE CONNECTORS SHALL BE EQUAL TO SCOTCH LOCK FOR #8 AWG AND SMALLER, THOMAS AND BETTS LOCK-TITE FOR #6 AND LARGER.

O. PROVIDE #10 AWG CONDUCTORS FOR BRANCH CIRCUITS HAVING A CONDUCTOR LENGTH LONGER THAN 75 FEET.

P. SIZE OF CONDUCTORS AND CABLES INDICATED OR SPECIFIED ARE IN AMERICAN WIRE GAGE (AWG - BROWN AND SHARPE).

Q. INSTALL ALL WIRING IN APPROVED RACEWAY AND ENCLOSURES, EXCEPT WHERE SPECIFIED OR INDICATED, FOR LOW-VOLTAGE WIRING OR, WHERE TYPE MC CABLE IS INDICATED, SPECIFIED AS ACCEPTABLE, OR BOTH.

R. SUPPORT ALL CONDUCTORS AND CABLES IN VERTICAL INSTALLATIONS, AS REQUIRED BY NFPA-70, BY INSTALLING CABLE SUPPORTS OR PLUG-TYPE CONDUIT RISER SUPPORTS, OR WIRE-MESH SAFETY GRIPS.

S. INSTALL ALL CONDUCTORS AND CABLE IN RACEWAYS CONTINUOUS WITHOUT TAPS OR SPLICES. SPLICE OR TAP ONLY IN APPROVED BOXES AND ENCLOSURES WITH APPROVED SOLDERLESS CONNECTORS, OR CRIMP CONNECTORS AND TERMINAL BLOCKS FOR CONTROL WIRING, AND KEEP TO THE MINIMUM REQUIRED. INSULATE ALL SPLICES, TAPS, AND JOINTS AS REQUIRED BY CODE.

T. ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS: DESIGNED, PROPERLY SIZED, AND UL LISTED FOR THE SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.

U. WHERE WIRING IS INDICATED AS INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHER DIVISION, TRADES, OR CONTRACTS", LEAVE A MINIMUM OF 3' FOOT "PIGTAIL" AT THE BOX, TAPE THE ENDS OF CONDUCTORS, AND COVER THE BOX.

V. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 3 PERCENT.

W. WHEN NEW CONDUCTORS ARE CONNECTED TO EXISTING CONDUCTORS, THE NEW CONDUCTORS SHALL BE OF THE SAME AWG, CONDUCTOR MATERIAL, INSULATION TYPE TEMPERATURE RATING,. ETC. AS THE EXISTING CONDUCTORS TO WHICH BEING CONNECTED.

TYPE MC CABLE

A. A.TYPE MC CABLE: 600V, UNJACKETED: ANSI E119 AND E814, UL STANDARDS 44 OR 83 (AS APPLICABLE), AND 1569, NFPA 70 ARTICLE 330; ALUMINUM OR GALVANIZED STEEL INTERLOCKED ARMOR; THHM- OR XHHW-INSULATED CONDUCTORS; COLOR CODE: ICEA METHOD 1, WITH GREEN INSULATED GROUNDING CONDUCTOR.

B. USES PERMITTED

B.1. IN LIEU OF FLEXIBLE CONDUIT AND WIRING FROM LIGHT FIXTURES IN ACCESSIBLE CEILINGS TO JUNCTION BOXES (ATTACHED TO BUILDING STRUCTURE) ABOVE THE CEILING. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5' FOOT RADIUS OF ITS INSTALLED LOCATION, BUT NOT EXCEEDING 6' FEET IN UNSUPPORTED LENGTHS.

B.2. FOR VERTICAL DROPS IN STUD WALLS.

C. USES NOT PERMITTED:

C.1. HOMERUNS TO PANELSBOARDS.
C.2. WHERE EXPOSED TO VIEW.
C.3. WHERE EXPOSED TO DAMAGE.
C.4. HAZARDOUS LOCATIONS.
C.5. WET LOCATIONS.
C.6. INSTALLED HORIZONTALLY WITHIN STUD WALL.
C.7. WHEN RESTRICTED OTHERWISE ABOVE, AND WHEN SPECIFICALLY DISALLOWED BY THE LOCAL AHJ, OWNER OR BOTH.

D. PRIOR TO THE SUBMISSION OF A BID PROPOSAL, EC SHALL VERIFY THE PERMISSIBLE USE OF MC CABLE WITH THE AHJ.

CONDUCTOR COLOR CODING

A. PROVIDE COLOR CODING SYSTEM AS LISTED BELOW FOR ALL FEEDERS AND BRANCH CIRCUITS AND USED AS A BASIS FOR BALANCING LOAD ON PANELS, AND TO BE PHASE IDENTIFICATION.

B. COLOR CODING FOR CONDUCTOR #12 AWG THROUGH #6 AWG SHALL CONSIST OF COLOR CODED THERMOPLASTIC INSULATION OF THE COLORS SPECIFIED HEREIN.

C. COLOR CODING FOR CONDUCTORS #8 AWG AND LARGER SHALL BE FIELD APPLIED SELF ADHESIVE TAPE OF THE COLOR SPECIFIED HEREIN FOR THE PARTICULAR PHASE.

D. 120/208V: PHASE A--BLACK, PHASE B--RED, PHASE C--BLUE, NEUTRAL--WHITE, EQUIPMENT GROUND--GREEN, ISOLATED GROUND--GREEN WITH DISTINCTIVE WHITE OR YELLOW MARKINGS.

E. 277/480V: BROWN-A, ORANGE-B YELLOW-C, NEUTRAL WHITE OR GRAY, EQUIPMENT GROUND - GREEN.

BOXES AND FITTINGS

A. ALL OUTLET BOXES SHALL BE UL LISTED AND LABELED FOR USE IN THE SPACE THEY OCCUPY AND THE PURPOSE THEY SERVE.

B. SHEET METAL OUTLET AND DEVICE BOXES FOR DRY, INTERIOR APPLICATIONS: COMPLY WITH NEMA OS 1 AND UL 514A.

C. CAST-METAL OUTLET AND DEVICE BOXES FOR EXTERIOR APPLICATIONS: COMPLY WITH NEMA FB 1, FERROUS ALLOY, TYPE FS OR FD, WITH GASKETED COVER.

D. OUTLET BOXES INSTALLED WITHIN FIRE RATED ASSEMBLIES SHALL HAVE A FIRE RATING EQUAL TO OR GREATER THAN THE RATING OF THE WALL IN WHICH IT IS INSTALLED.

E. OUTLET BOXES SHALL BE 4 INCHES SQUARE BY 2 1/8 INCHES DEEP, EXCEPT FOR 2" PARTITIONS SHALL BE AT LEAST 1-1/2" DEEP.

F. OUTLET BOXES FOR VOICE AND DATA DEVICES SHALL BE 4 11/16 INCHES SQUARE BY 2 1/8 INCHES DEEP.

G. ALL PULLBOXES SHALL BE CONSTRUCTED OF GALVANIZED STEEL, OF METAL GAUGE AND PHYSICAL SIZE AS REQUIRED BY THE N.E.C. FOR THE NUMBER AND SIZE OF CONDUITS AND CONDUCTORS ASSOCIATED WITH THE PULLBOX.

H. FIXTURE OUTLET BOXES IN/OR ON CEILINGS SHALL NOT BE LESS THAN 1-1/2" DEEP OR LESS THAN 4" SQUARE. ALL OUTLET BOXES INTENDED TO SUPPORT FIXTURES SHALL BE EQUIPPED WITH 3/8" FIXTURE STUDS FASTENED THROUGH THE BOTTOM OF THE BOX WITH FOUR BOLTS.

I. PULLBOXES AND JUNCTION BOXES THAT ARE CUSTOM FABRICATED FOR THE APPLICATION SHALL BE FABRICATED BY A SHOP/FACILITY THAT IS CERTIFIED BY A NRTL FOR THE FABRICATION OF SUCH ENCLOSURES.

J. NEW OUTLET BOXES INSTALLED WITHIN NEW OR EXISTING STUD WALL CONSTRUCTION SHALL BE MOUNTED TO A STUD OR MOUNTED IN A BRACKET THAT SPANS STUD-TO-STUD, CADDY TSGB BRACKET OR APPROVED EQUAL. THE USE OF "OLD WORK" TYPE BOXES THAT. SECURE ONLY TO THE DRYWALL ARE NOT ACCEPTABLE.

K. ACCEPTABLE MANUFACTURERS FOR BOXES: APPLETON, STEEL CITY, RACO.

PANELBOARDS

A. CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON TYPE SUITABLE FOR VOLTAGE AND AMPERE RATINGS INDICATED ON DRAWINGS AND IN PANEL SCHEDULES. REFER TO THE PANEL SCHEDULES ON THE DRAWINGS FOR ADDITIONAL ACCESSORIES TO BE PROVIDED AT SELECT CIRCUIT BREAKERS.

B. CIRCUIT BREAKERS SHALL HAVE A MINIMUM AMPERE INTERRUPTING CAPACITY (AIC) OF 10,000 AMPERES FOR 120/208V SYSTEMS, 14,000 FOR 277/480V SYSTEMS.

C. WHERE THE POWER SYSTEM STUDY IDENTIFIES AVAILABLE FAULT CURRENT VALUES AT EXISTING THAT ARE HIGHER THAN THE MINIMUM AIC RATINGS SPECIFIED HEREIN, PROVIDE CIRCUIT BREAKERS IN THE PANELS THAT HAVE AIC RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY.

D. CIRCUIT BREAKERS SERVING LIGHTING CIRCUITS SHALL BE RATED FOR SWITCH DUTY.

E. CIRCUIT BREAKERS SERVING HVAC EQUIPMENT SHALL BE HACR RATED.

F. ALL LUGS SHALL BE OF THE SOLDERLESS TYPE AND RATED AT A MINIMUM OF 75°C.

G. PROVIDE NEW CIRCUIT DIRECTORIES WITHIN EXISTING PANELS TO REFLECT THE WORK OF THIS CONTRACT. DIRECTORY SHALL BE TYPEWRITTEN OR COMPUTER GENERATED. HANDWRITTEN CIRCUIT DIRECTORIES ARE NOT ACCEPTABLE.

H. UTILIZE FINAL, OWNER ASSIGNED ROOM NAMES AND NUMBERS TO IDENTIFY SPACES WITHIN THE CIRCUIT DIRECTORIES. COMPLY WITH NEC 408.4 WHEN IDENTIFYING CIRCUITS IN CIRCUIT DIRECTORIES.

I. PANEL CIRCUITS SHALL BE CONFIGURED SUCH THAT THE LOAD IS DISTRIBUTED EVENLY ACROSS ALL THREE PHASES TO WITHIN 10%.

J. EXISTING PANELBOARDS SHALL BE LABELED TO IDENTIFY THE AMOUNT OF FAULT CURRENT AVAILABLE AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED. LABEL SHALL BE MACHINE PRINTED, BLACK TEXT ON CLEAR, SELF ADHESIVE TAPE. INSTALL LABEL ADJACENT TO PANELBOARDS ENGRAVED NAMEPLATE.

K. ALL NEW AND EXISTING PANELBOARDS SHALL BE LABELED TO IDENTIFY THE ARC FLASH HAZARD CHARACTERISTICS AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED.

L. ALL "SPARE" CIRCUIT BREAKERS SHALL BE SET TO THE "OFF" POSITION.

M. PROVIDE HANDLE TIES ON ALL MULTI-WIRE BRANCH CIRCUITS IN ACCORDANCE WITH NEC 210.4(B).

N. WHEN NEW CIRCUIT BREAKERS ARE ADDED TO AN EXISTING PANEL, THE NEW CIRCUIT BREAKERS SHALL BE OF THE SAME MANUFACTURE AS THE EXISTING PANEL, SHALL BE OF A 'LETTER TYPE' COMPATIBLE WITH THE EXISTING PANEL SUCH THAT THE UL LISTING OF THE EXISTING PANEL IS MAINTAINED AND SHALL HAVE AN AIC RATING EQUAL TO OR GREATER THAN THE AIC RATING OF THE EXISTING OVERCURRENT PROTECTIVE DEVICES WITHIN THE EXISTING PANEL.

SWITCHES

A. TOGGLE SWITCHES SHALL BE SINGLE POLE, 3-WAY OR 4-WAY AS NOTED ON THE DRAWINGS, 20 AMPERES, 120/277 VOLT AC TYPE, SPECIFICATION GRADE WITH SCREW TERMINALS. HUBBELL 1221-X, 1223-X OR 1224-X OR APPROVED EQUIVALENT BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

B. TOGGLE SWITCHES SHALL BE MOUNTED AT DOORS, INSTALLED ADJACENT TO THE TRIM ON THE STRIKING SIDE OF THE DOOR, REGARDLESS OF THE LOCATION INDICATED ON THE DRAWINGS. VERIFY ALL DOOR SWINGS PRIOR TO INSTALLATION OF OUTLET BOXES FOR SWITCHES.

C. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

D. PROVIDE A NEUTRAL CONDUCTOR TO ALL SWITCH LOCATIONS.

E. SWITCHES SHALL BE INSTALLED SURFACE MOUNTED IN UNFINISHED AREA. FLUSH MOUNTED IN FINISHED SPACES.

F. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES: LEGRAND, LEVITON.

RECEPTACLES

A. RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL 5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

B. GFCI RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R FEED THROUGH TYPE CAPABLE OF PROTECTING DOWNSTREAM RECEPTACLES ON A SINGLE CIRCUIT, SOLID STATE GROUND FAULT SENSING AND SIGNALING, 5 MILLIAMP TRIP LEVEL, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL GF5362-X OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

C. ISOLATED GROUND RECEPTACLES SHALL BE ORANGE, 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL IG-5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

D. PROVIDE SPECIAL PURPOSE RECEPTACLES HAVING NEMA CONFIGURATIONS THAT MATE AND MATCH THE NEMA PLUG CONFIGURATION PROVIDED WITH THE EQUIPMENT TO BE CONNECTED.

E. COVER PLATES FOR EXTERIOR RECEPTACLES SHALL BE RATED FOR "WEATHERPROOF WHILE IN USE".

F. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

G. QUAD RECEPTACLES SHALL CONSIST OF (2) DUPLE3X RECEPTACLES INSTALLED IN A SINGLE BOX UNDER A SINGLE COVER PLATE.

H. RECEPTACLES SHALL BE INSTALLED SURFACE MOUNTED IN UNFINISHED SPACES, FLUSH MOUNTED IN FINISHED SPACES.

I. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES AND RECEPTACLES: LEGRAND, LEVITON.

GFCI PROTECTION:

A. ALL KITCHEN SINGLE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPS OR LESS AND THREE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPS OR LESS SHALL HAVE GROUND FAULT CIRCUIT INTERRUPTER PROTECTION FOR PERSONNEL IN ACCORDANCE WITH NEC 210.8, (B), (1) (10), OR THE EQUIVALENT REQUIREMENT WITHIN THE APPLICABLE ELECTRICAL CODE.

B. THE "GFCI" NOTATION AT A DEVICE OR CIRCUIT BREAKER INDICATES THAT GFCI PROTECTION SHALL BE PROVIDED FOR THE CIRCUIT OR CIRCUITS INDICATED. GFCI PROTECTION SHALL BE PROVIDED BY ONE OF THE FOLLOWING MEANS:

1. INTEGRAL GFCI PROTECTION WITHIN THE DEVICE (NEMA 5-20R RECEPTACLES), WHEN THE DEVICE IS ABLE TO BE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE APPLICABLE ELECTRICAL CODE.

2. GFCI CIRCUIT BREAKER INSTALLED WITHIN THE PANEL FOR SERVICE TO THE CIRCUIT OR CIRCUITS.

3. GFCI CIRCUIT BREAKER INSTALLED WITHIN AN INDIVIDUAL ENCLOSURE EXTERNAL TO THE PANEL FOR SERVICE TO THE CIRCUIT.

4. DEAD-FRONT GFCI DEVICE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE NEC (APPLICABLE TO 20 AMP, 120 VOLT CIRCUITS).

5. AN INDIVIDUALLY MOUNTED EXTERNAL SPECIAL PURPOSE GROUND FAULT CIRCUIT INTERRUPTER (SPGFCI) DEVICE SIMILAR TO "SHOCK BLOCK" PRODUCTS AS MANUFACTURED BY LITTLEFUSE, OR APPROVED EQUAL.

6. DEAD FRONT DEVICES SHALL BE BE LABELED TO IDENTIFY THE CIRCUIT AND THE LOAD SERVED BY THE DEVICE.

COVER PLATES FOR TOGGLE SWITCHES AND RECEPTACLES

A. COVER PLATES SHALL BE NYLON, OF CONFIGURATION TO MATCH THE WIRING DEVICE.

B. CONFIGURATION AND COLOR OF COVER PLATE SHALL MATCH THAT OF THE WIRING DEVICE THAT THE PLATE WILL BE INSTALLED ON.

C. COVER PLATE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

D. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR COVER PLATES: LEGRAND, LEVITON.

MOUNTING HEIGHTS FOR ELECTRICAL DEVICES AND EQUIPMENT

A. DEVICES AND EQUIPMENT SHALL BE INSTALLED AT THE MOUNTING HEIGHTS NOTED BELOW UNLESS NOTED OTHERWISE ON THE DRAWINGS OR REQUIRED BY APPLICABLE CODES AND STANDARDS:

1. TOGGLE SWITCHES, WALL SWITCH OCCUPANCY SENSORS, VACANCY SENSORS AND DIMMERS FOR LIGHTING CONTROL-TOP OF DEVICE 48" AFF.

2. CONVENIENCE RECEPTACLES TOP OF DEVICE 18" AFF.

3. CONVENIENCE RECEPTACLES AT COUNTERTOPS-BOTTOM OF DEVICE 44" AFF OR AS NOTED ON THE DRAWINGS .

4. RECEPTACLES AT FACILITY EQUIPMENT AS INDICATED ON THE FINAL, APPROVED FOOD SERVICE SHOP DRAWINGS.

5. TELEPHONE AND DATA OUTLETS-TOP OF DEVICE 18" AFF, 44" AFF WHEN INSTALLED AT COUNTER TOPS.

6. DISCONNECT SWITCHES - TOP OF ENCLOSURE 66" AFF .

DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, UL LISTED AND LABELED, EQUIPPED WITH A LUG FOR TERMINATION OF THE EQUIPMENT GROUNDING CONDUCTOR.

B. DISCONNECT SWITCHES SHALL BE LOCKABLE WITH NEMA 1 ENCLOSURES FOR DRY, INDOOR APPLICATIONS; NEMA 3R ENCLOSURES FOR OUTDOOR OR WET LOCATION APPLICATIONS.

C. TOGGLE DISCONNECTS SHALL BE 20A OR 30A AS REQUIRED. SINGLE POLE, 2-POLE OR 3-POLE AS REQUIRED, SINGLE THROW, MOTOR RATED SWITCH WITHOUT OVERLOAD PROTECTION. NEMA 1, 3R OR 4X STAINLESS STEEL ENCLOSURE AS REQUIRED BY APPLICATION, PADLOCK ATTACHMENT.

D. ALL DISCONNECT SWITCHES SHALL BE EQUIPPED WITH AN ENGRAVED NAMEPLATE TO IDENTIFY THE SERVING PANEL, CIRCUIT NUMBERS AND THE LOAD SERVED BY THE SWITCH.

E. ACCEPTABLE MANUFACTURERS FOR DISCONNECT SWITCHES: SCHNEIDER, ABB, SIEMENS OR EATON.

MOTOR CONTROLLERS

A. PROVIDE ENCLOSED MOTOR CONTROLLERS AS SPECIFIED HEREIN FOR CONTROL OF MOTORS RATED FOR 600 VOLTS AND LESS.

B. FRACTIONAL HORSEPOWER MANUAL CONTROLLERS: "QUICK-MAKE, QUICK-BREAK" TOGGLE OR PUSH-BUTTON ACTION; PILOT LIGHT TO INDICATE "MOTOR RUNNING", MARKED TO SHOW WHETHER UNIT IS OFF, ON, OR TRIPPED.

1. CONFIGURATION: NON-REVERSING.
2. OVERLOAD RELAYS: INVERSE-TIME-CURRENT CHARACTERISTICS; NEMA ICS 2, CLASS 10 TRIPPING CHARACTERISTICS; HEATERS MATCHED TO NAMEPLATE FULL-LOAD CURRENT OF ACTUAL PROTECTED MOTOR; EXTERNAL RESET PUSH BUTTON.
3. FLUSH MOUNTED WITHIN FINISHED SPACES; SURFACE MOUNTED WITHIN UNFINISHED SPACES.
4. ACCEPTABLE MANUFACTURERS: SCHNEIDER, ABB, SIEMENS, EATON.

FUSES

A. PROVIDE CARTRIDGE FUSES RATED FOR 250 VAC AND 600 VAC AND LESS FOR USE AS SPECIFIED HEREIN.

B. COORDINATE FUSE RATINGS WITH UTILIZATION EQUIPMENT NAMEPLATE LIMITATIONS OF MAXIMUM FUSE SIZE AND WITH SYSTEM SHORT-CIRCUIT CURRENT LEVELS.

C. CARTRIDGE FUSE APPLICATIONS:

1. CIRCUITS, UP TO AND INCLUDING 600 AMPS: CLASS J, BUSSMANN LPJ.
2. CONTROL POWER TRANSFORMER (CPT) CIRCUITS: CLASS CC, TIME DELAY, CONTROL TRANSFORMER DUTY.
3. BASIS OF DESIGN FOR FUSES SHALL BE BUSSMANN. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SPECIFIED FUSES SHALL BE LITTLEFUSE AND MERSEN.

LIGHTING FIXTURES AND LIGHTING CONTROLS

A. MATTRESS WAREHOUSE TO SUPPLY ALL LIGHT FIXTURES.

B. E.C. TO INSTALL AND CONNECT ALL LIGHT FIXTURES.

C. E.C. TO FURNISH, INSTALL, AND CONNECT ALL LIGHTING CONTROLS/SWITCHES/SENSORS.

ROUGH-IN SYSTEM FOR VOICE AND DATA

A. PROVIDE A ROUGH-IN SYSTEM AS SPECIFIED HEREIN FOR SERVICE TO THE OWNER'S VOICE AND DATA NETWORK.

B. PROVIDE A PLYWOOD BACKBOARD FOR TERMINATION OF TELEPHONE SERVICE AND DISTRIBUTION COMPONENTS. PLYWOOD BACKBOARD SHALL BE 2' X 3' X 3/4", FIRE RATED, PAINTED WITH TWO (2) COATS OF LIGHT GRAY ENAMEL PAINT. MASK FIRE RATED LABEL TO PREVENT THE LABEL FROM BEING PAINTED OVER.

C. OUTLET BOXES FOR TELEPHONE AND DATA DEVICES SHALL CONSIST OF 4 11/16 IN SQUARE BY 2 1/8 INCH DEEP OUTLET BOXES WITH SINGLE DEVICE COVER.

D. PROVIDE A 3" EMPTY CONDUIT WITH PULLSTRING FROM THE WALL MOUNTED PLYWOOD TELEPHONE TERMINAL BOARD IN THE TENANT SPACE TO THE LANDLORDS TELEPHONE DISTRIBUTION OR POINT OF SERVICE DELIVERY. PROVIDE A NYLON BUSHING ON EACH END OF CONDUIT FOR CABLE PROTECTION.

E. ROUGH-IN FOR WIRING DROPS TO WALL MOUNTED VOICE AND DATA DEVICES SHALL BE INSTALLED WITHIN EMT CONDUIT, 1". PROVIDE A CONDUIT STUB FROM THE DEVICE BOX TO ABOVE ACCESSIBLE CEILING. PROVIDE A PLENUM RATED NYLON BUSHING ON THE END OF THE CONDUIT STUB FOR PROTECTION OF THE WIRING.

F. PRIOR TO BEGINNING WORK, THIS CONTRACTOR SHALL FULLY COORDINATE HIS CONSTRUCTION OPERATIONS AND ALL TERMINATION LOCATIONS WITH AUTHORIZED REPRESENTATIVE OF THE TELEPHONE UTILITY COMPANY AND THE OWNER'S DATA NETWORK PROVIDER BY TIMELY NOTICE OR SCHEDULING OF SERVICE EQUIPMENT DATES, SERVICE MODIFICATION DATES AND NOTIFICATION OF REQUIRED OWNER AUTHORIZATIONS INVOLVING THE UTILITY COMPANY.

DUCT MOUNTED SMOKE DETECTORS

A. PROVIDE A 120 VOLT POWER SOURCE TO ALL DUCT MOUNTED SMOKE DETECTORS INSTALLED WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT.

B. PROVIDE A DUCT MOUNTED SMOKE DETECTORS WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT AS REQUIRED BY APPLICABLE CODES. FINAL ELECTRICAL CONNECTION AND ALL INTERLOCK WIRING BY THE ELECTRICAL CONTRACTOR.

C. PROVIDE ALL INTERLOCK WIRING IN CONDUIT BETWEEN ALL DUCT DETECTORS SUCH THAT UPON DETECTING SMOKE IN ANY ONE DETECTOR, ALL ROOF TOP UNITS SHALL BE SHUT DOWN.

D. PROVIDE TEST/RESET SWITCH AND PIEZO ALERT SOUNDER AND REMOTE ANNUNCIATOR ALARM LED MOUNTED AS DIRECTED BY LOCAL AHJ. EC TO PROVIDE ALL REQUIRED INTERLOCK WIRING BETWEEN DUCT DETECTOR AND REMOTE SWITCH.

E. REFER TO DETAILS ON MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

TESTING

A. PROVIDE ALL TESTS AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.

B. PROVIDE THE TESTS AS OUTLINED HEREINAFTER AND OTHER TESTS REQUIRED TO ESTABLISH THE ADEQUACY, QUALITY, SAFETY, COMPLETED STATUS AND SUITABLE OPERATION OF EACH SYSTEM.
C. PROMPTLY CORRECT ANY FAILURES, DEFICIENCIES AND/OR DEFECTS REVEALED BY THESE TESTS. AFTER CORRECTING FAILURES, DEFICIENCIES OF DEFECTS, CONDUCT NEW TESTING TO VERIFY THAT THE DEFICIENCY HAS BEEN RECTIFIED AND THE SYSTEM IS FUNCTIONING PROPERLY.

D. NEW AND EXISTING PANELBOARDS SHALL HAVE PHASE CURRENTS BALANCED TO WITHIN +/- 10% VARIATION BETWEEN AVERAGE PHASE CURRENT AND MEASURED INDIVIDUAL PHASE.

E. AN OPERATIONAL TEST OF THE EMERGENCY LIGHTING/EXIT SIGNAGE SYSTEM SHALL BE PERFORMED IN THE PRESENCE OF THE OWNER AND THE AUTHORITY HAVING JURISDICTION TO DEMONSTRATE PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND SPECIFIED REQUIREMENTS.

OPERATION AND MAINTENANCE MANUALS

A. THIRTY (30) DAYS PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT OPERATING AND MAINTENANCE MANUALS FOR EQUIPMENT TO ENGINEER FOR APPROVAL. INCLUDE ONE COPY OF EACH FINAL APPROVED SUBMITTAL FOR RECORD PURPOSES, INDICATING THE ACTUAL PRODUCT INSTALLED. INCLUDE SIGNIFICANT CHANGES IN THE PRODUCT DELIVERED TO PROJECT SITE AND CHANGES IN MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION.

B. PROVIDE COMPREHENSIVE CONTACT LIST INCLUDING CONTRACTOR AND SUBCONTRACTOR'S NAMES, ADDRESSES, TELEPHONE AND CONTACT PERSON FOR OWNER'S USE.

TRAINING OF OWNER'S DESIGNATED PERSONNEL

A. PREPARE AND SUBMIT OPERATING INSTRUCTIONS AND PROVIDE ON-SITE TRAINING OF OWNER'S PERSONNEL IN USE AND MAINTENANCE OF OPERATING EQUIPMENT.

WARRANTY

A. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIP JALS, EQUIPMENT AND THE INSTALLATION TO BE FREE OF DEFECTS THAT MAY DEVELOP IN ANY PART OF THEIR WORK CAUSED BY FAULTY WORKMANSHIP, MATERIAL OR EQUIPMENT FAILURES, FOR A MINIMUM OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OR FOR AS LONG AS NORMAL EQUIPMENT MANUFACTURER WARRANTIES ARE IN EFFECT FROM THE DATE OF OWNER ACCEPTANCE OF THE PROJECT, WHICHEVER IS LATER.

B. DURING THE ONE (1) YEAR WARRANTY PERIOD, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR DEFECTS IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED UNDER THE WORK OF THE ELECTRICAL CONTRACT.

TRANSFORMERS

A. BRANCH CIRCUIT AND DISTRIBUTION TRANSFORMERS SHALL BE THE DRY TYPE AND SHALL HAVE THE RATINGS INDICATED.

B. SINGLE PHASE TRANSFORMERS SHALL BE 480 VOLT PRIMARY AND 120/208 VOLT SECONDARY. THREE PHASE TRANSFORMERS SHALL BE 480 VOLT DELTA PRIMARY AND 120/208 VOLT GROUNDED TYPE SECONDARY. TRANSFORMERS 25 KVA AND LARGER SHALL HAVE A MINIMUM OF 4 1/2% CAPACITY PRIMARY TAPS.

C. TRANSFORMERS SHALL HAVE A U.L. RECOGNIZED 220 DEGREE INSULATION SYSTEM AND SHALL BE DESIGNED SO THAT UNDER FULL LOAD, THE AVERAGE CONDUCTOR TEMPERATURE RISE DOES NOT EXCEED 115 DEGREE C. RISE ABOVE A 40 DEGREE C. AMBIENT AND THE ENCLOSURE DOES NOT EXCEED A 50 DEGREE C. RISE AT ANY POINT.

D. TRANSFORMER COILS SHALL BE OF THE CONTINUOUS WOUND CONSTRUCTION AND SHALL BE IMPREGNATED WITH NON—HYGROSCOPIC, THERMOSETTING VARNISH. ALL CORES TO BE CONSTRUCTED OF HIGH GRADE, NON—AGING SILICON STEEL WITH HIGH MAGNETIC PERMEABILITY, AND LOW HYSTERESIS AND EDDY CURRENT LOSSES. MAGNETIC FLUX DENSITIES SHALL BE KEPT WELL BELOW THE SATURATION POINT. THE CORE LAMINATIONS SHALL BE CLAMPED TOGETHER WITH STRUCTURAL STEEL ANGLES. THE COMPLETED CORE AND COIL SHALL THEN BE BOLTED TO THE BASE OF THE ENCLOSURE BUT ISOLATED THEREFROM BY MEANS OF RUBBER, VIBRATION-ABSORBING MOUNTS. THERE SHALL BE NO METAL-TO-METAL CONTACT BETWEEN THE CORE AND COIL AND THE ENCLOSURE. ON TRANSFORMERS 500 KVA AND SMALLER, THE VIBRATION ISOLATING SYSTEM SHALL BE DESIGNED TO PROVIDE A PERMANENT FASTENING OF THE CORE AND COIL TO THE ENCLOSURE. SOUND ISOLATING SYSTEMS REQUIRING THE COMPLETE REMOVAL OF ALL FASTENING DEVICES WILL NOT BE ACCEPTABLE. SOUND LEVELS SHALL BE GUARANTEED BY THE MANUFACTURER NOT TO EXCEED THE FOLLOWING: 25 TO 50 KVA - 45 DB; 51 TO 150 KVA - 50 U. BALLASTS FOR HIGH INTENSITY DISCHARGE (HID) LAMPS SHALL BE CONSTANT WATTAGE DB; 151 TO 300 KVA - 55 DB; 301 TO 500 KVA — 60 DB.

E. TRANSFORMERS SHALL BE COMPLIANT WITH THE 2016 DOE EFFICIENCY STANDARDS.

F. TRANSFORMERS THAT ARE OF THE FLOOR-MOUNTED TYPE SHALL BE MOUNTED ON KORFUND VIBRATION ELIMINATORS OF THE PAD TYPE.

G. TRANSFORMERS SHALL BE AS MANUFACTURED BY SAME MANUFACTURER INSTALLED IN THE BASE BUILDING.

1	SCALE N.T.S.	ELECTRICAL SPECIFICATIONS

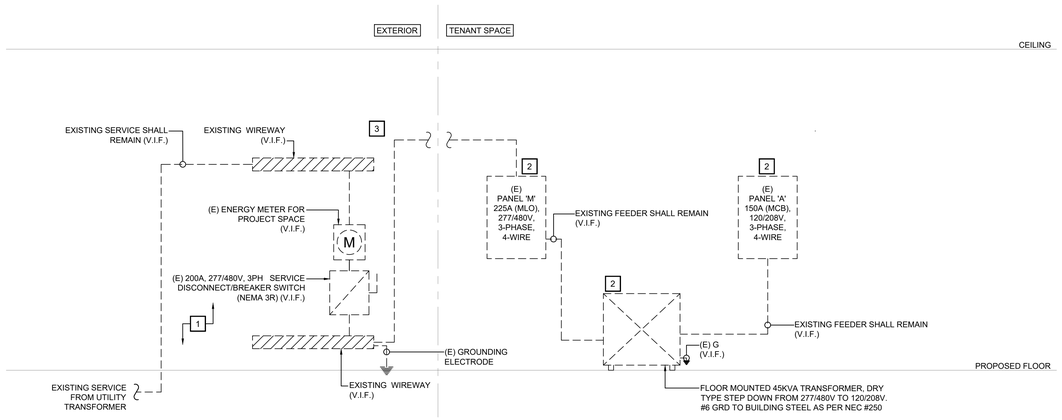
MATTRESS WAREHOUSE

Description

ELECTRICAL SPECIFICATIONS

SHEET

E0.2



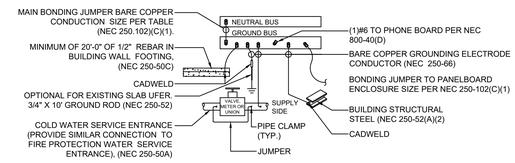
LEGEND:
——— NEW
– – – – EXISTING

GENERAL NOTES:

1. PROPER CLEARANCE MUST BE MAINTAINED ABOUT ELECTRICAL EQUIPMENT PER N.E.C. FIELD VERIFY EXACT MOUNTING SPACE AVAILABLE IN ELECTRICAL ROOM/AREA PRIOR TO INSTALLATION OF ELECTRICAL EQUIPMENT.
2. MAKE ALL FINAL ELECTRICAL CONNECTIONS FOR A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM. ALL CONNECTIONS/DISCONNECTIONS TO LANDLORDS/UTILITIES SERVICE EQUIPMENT SHALL BE AS DIRECTED BY LANDLORDS/UTILITIES SITE REPRESENTATIVE. TENANT GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TERMINATION/DETERMINATION EXPENSES.
3. SYSTEM SHALL BE GROUNDED TO THE MAIN BUILDING'S GROUNDING SYSTEM.
4. DISCONNECT SWITCHES AND PANELS SHALL BE INSTALLED ON PLYWOOD BACKBOARDS.
5. TENANT CONTRACTOR MUST VERIFY ELECTRICAL SERVICE, SUB-FEED WIRING AND PANELS PRIOR TO START OF TENANT'S ELECTRICAL WORK. TENANT GENERAL CONTRACTOR SHALL MAKE APPLICATION TO THE LOCAL UTILITY FOR CONTINUED METERED ELECTRIC SERVICE IN THE TENANT'S NAME. TENANT GENERAL CONTRACTOR SHALL CONFIRM ALL LOCAL UTILITY GUIDELINES AND REQUIREMENTS PRIOR TO BID, SHALL INCLUDE THE COSTS OF THESE REQUIREMENTS IN THE BID, AND SHALL COMPLY WITH THEM DURING CONSTRUCTION. AVAILABLE FAULT CURRENT AT SERVICE EQUIPMENT SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT PER NATIONAL ELECTRICAL CODE (NEC) OF ARTICLE 110.24.
6. CONTRACTOR SHALL COORDINATE SHORT CIRCUIT RATING (Isc) WITH UTILITY & AHJ, PRIOR TO COMMENCING ANY WORK, TYPICAL FOR ALL ELECTRICAL EQUIPMENT
7. CONTRACTOR SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.
8. CONTRACTOR SHALL COORDINATE WITH BASE BUILDING FOR THE EXACT LOCATION OF THE EXISTING SWITCH GEAR AND EXACT POWER DISTRIBUTION.
9. CONTRACTOR SHALL VERIFY OPERABLE CONDITION INFIELD OF ALL EXISTING TO REMAIN ELECTRICAL DEVICES/EQUIPMENTS AND REPLACE WITH NEW IF FOUND INOPERABLE.
10. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. ALL CONDUIT ROUTING AND OFFSETS, DROPS AND RISES OF RUNS ARE NOT SHOWN ON THE PLANS AND ARE SHOWN DIAGRAMMATICALLY IN THE RISERS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
11. ALL TERMINATIONS SHALL BE RATED FOR 75°C CONNECTIONS FOR COPPER CONDUCTORS. ALL METALLIC CONDUIT SHALL BE GROUNDED. SYSTEM SHALL BE BONDED TO THE MAIN BUILDING GROUNDING SYSTEM.

VERIFY ALL WIRES SHOWN TO MEET LOCAL CODES. ADJUST AS REQUIRED, PER LOCAL CODES.

NOTE: ALL GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE 250-50 OF THE NATIONAL ELECTRICAL CODE.



2 | SCALE N.T.S. | GROUNDING ELECTRODE SYSTEM DETAILS.

VERIFY THE FOLLOWING PRIOR TO BID/ PRICING:

- EXISTING CONDUIT AND FEEDERS SIZE BETWEEN TENANT SPACE AND LANDLORD SWITCHBOARD.
- EXISTING MAIN SERVICE DISCONNECT RATING.
- EXISTING METER.

IF THE EXISTING SERVICE DISCONNECT AND FEEDERS ARE RATED FOR LESS THAN THE RATING SHOWN ON THIS RISER. NOTIFY THE PROJECT MANAGER AND ENGINEER IMMEDIATELY PRIOR TO SUBMITTING BID/ PRICING PACKAGE SO DRAWINGS CAN BE REVISED AND UPDATED ACCORDINGLY.

- THE ELECTRICAL CONTRACTOR HAS TO ENSURE THAT THE EXISTING SERVICE CAN CARRY THE NEW ADDED LOAD AND SHALL COORDINATE WITH LANDLORD ENGINEER FOR UPGRADING THE EXISTING ELECTRICAL SERVICE IF NECESSARY.

RISER KEYED NOTES: [#]

1. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH BASE BUILDING/LANDLORD/OWNER FOR EXACT POWER DISTRIBUTION, LOCATION PRIOR TO COMMENCING ANY WORK. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES. BASE BID ACCORDINGLY.
2. EXISTING ELECTRICAL PANELS AND TRANSFORMER SHALL REMAIN. ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION, RATING, AND OPERABLE CONDITION IN THE FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
3. ELECTRICAL CONTRACTOR TO VERIFY IN FIELD IF THE EXISTING FEEDER/CONDUIT IS RATED FOR 200AMP, 277/480V, 3PHASE AND CONFIRM IF IT CAN BE REUSED. REUSE IF POSSIBLE OTHERWISE PROVIDE NEW. BASE BID ACCORDINGLY

PANEL SCHEDULE KEYED NOTES: [#]

A. NEW BREAKERS MAY BE REQUIRED FOR USE IN THE EXISTING PANELBOARD TO MATCH RATING INDICATED IN THE PANEL SCHEDULE. PRIOR TO BID/PRICING, THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL EXISTING-TO-REMAIN PANELBOARD MANUFACTURER AND MODEL NUMBER TO ENSURE THAT REPLACEMENT BREAKERS ARE AVAILABLE. WHERE BREAKER AVAILABILITY ISSUES ARISE, NOTIFY THE PROJECT MANAGER PRIOR TO BID/PRICING.

B. DESIGNATED CIRCUIT NUMBER SHOWN ON THE PANEL SCHEDULE FOR A CERTAIN LOAD, MAY BE DIFFERENT THAN THE ACTUAL CIRCUIT NUMBER IN THE EXISTING PANELBOARD. ALL EXISTING-TO-REMAIN ELECTRICAL LOADS SHALL REMAIN CONNECTED TO THE SAME BREAKER AND CIRCUIT DESIGNATION. AVAILABLE SPARES AND SPACES SHALL BE UTILIZED TO FEED THE NEW LOADS.

C. ELECTRICAL CONTRACTOR SHALL VERIFY THE CIRCUITS OF EACH PANEL. REUSE THE CIRCUITS THOSE ARE REQUIRED & MAKE OTHER AS SPARES WHICH ARE NOT IN USE. COORDINATE EXACT REQUIREMENTS WITH ARCHITECT/OWNER.

ELECTRICAL PANEL SCHEDULE

PANELBOARD: M | VOLTAGE: 277 / 480 V | PHASE: 3 | WIRE: 4
PANEL TYPE: MLO | MAINS: NA | BUS RATING: 226A | AIC RATING: V.I.F.
NEMA TYPE ENCLOSURE: 1 | MOUNTING: FLUSHED | OPTIONS: | NOTE: EXISTING PANEL

CKT. NO.	EQT TAG	CKT TAG	DESCRIPTION	POLE	WIRE SIZE	BKR. SIZE	TOTAL WATTS	PHASE	TOTAL WATTS	BKR. SIZE	WIRE SIZE	POLE	DESCRIPTION	CKT TAG	EQT TAG	CKT. NO.
1							8,620	A		20		1	SPARE			2
3		(E)	PANEL 'A' VIA 45KVA TRANSFORMER	3	6	60	8,890	B		20		1	SPARE			4
5							8,490	C		20		1	SPARE			6
7							8,120	A		20		1	SPARE			8
9		(E)	EXISTING RTU-1	3	10	30	8,120	B		20		1	SPARE			10
11							8,120	C		20		1	SPARE			12
13							7,483	A		20		1	SPARE			14
15		(N)	NEW RTU-2	3	10	30	7,483	B		20		1	SPARE			16
17							7,483	C					SPACE			18
19			SPACE					A					SPACE			20
21			SPACE					B					SPACE			22
23			SPACE					C					SPACE			24
25			SPACE					A					SPACE			26
27			SPACE					B					SPACE			28
29			SPACE					C					SPACE			30
31			SPACE					A					SPACE			32
33			SPACE					B					SPACE			34
35			SPACE					C					SPACE			36
37			SPACE					A					SPACE			38
39			SPACE					B					SPACE			40
41			SPACE					C					SPACE			42

ALL PHASES TO BE BALANCED TO WITHIN 7%
A= 24,223 WATTS
B= 24,493 WATTS
C= 24,093 WATTS

TOTAL CONNECTED LOAD 72,809 WATTS 88 AMPS
TOTAL DEMAND LOAD 74,859 WATTS 91 AMPS

(E) EXISTING TO REMAIN
(N) NEW CIRCUIT
GFCI GFI BREAKER CKT
IG CIRCUITS WITH ISOLATED GROUND
TC CIRCUITS ON TIMECLOCK
EMS ROUTING TO THE EMS PANEL
C1/C2 LIGHTING CONTACTOR
a,b,c SWITCHES CONTROLLING LIGHTS

ELECTRICAL LOAD SUMMARY

DESCRIPTION	NEC CONNECTED kW	VOLT	PHASE	NEC DEMAND FACTOR	NEC DEMAND kW
LIGHTING- 120V	2.5	120	1	1.25	3.1
RECEPTACLES	11.1	120	1	>10kW=10+[0.5*(kW-10)]	10.6
STOREFRONT SIGN	1.5	120	1	1.25	1.9
S/W OUTLETS	6.4	120	1	1.25	8.0
ROOFTOP UNITS	46.8	480	3	1.00	46.8
HOT WATER HEATER	4.5	208	1	1.00	4.5
TOTALS	72.8				74.9

NOTES:
* USE GREATER VALUE OF THE TWO CATEGORIES.
** 125% OF THE LARGEST MOTOR OR COMPRESSOR IN SYSTEM APPLIED ONLY ON ONE UNIT.
*** N.E.C. ARTICLE 220-12 REQUIREMENT (200 VA PER FOOT OF SHOW WINDOW) MINUS ACTUAL SHOW WINDOW LIGHTING kVA.

N.E.C. DEMAND kVA x 1,000 = MINIMUM FEEDER AMPERAGE
SYSTEM VOLTAGE x 1.732

74.9 x 1000 = 74,859
480 x 1.732 = 831

90.0 AMPS USE (EXISTING) 200AMP SERVICE FROM UTILITY.

ELECTRICAL PANEL SCHEDULE

PANELBOARD: A | VOLTAGE: 120 / 208 V | PHASE: 3 | WIRE: 4
PANEL TYPE: MCB | MAINS: 150A | BUS RATING: 225A | AIC RATING: V.I.F.
NEMA TYPE ENCLOSURE: 1 | MOUNTING: FLUSHED | OPTIONS: | NOTE: EXISTING PANEL

CKT. NO.	EQT TAG	CKT TAG	DESCRIPTION	POLE	WIRE SIZE	BKR. SIZE	TOTAL WATTS	PHASE	TOTAL WATTS	BKR. SIZE	WIRE SIZE	POLE	DESCRIPTION	CKT TAG	EQT TAG	CKT. NO.
1	TC	(N)	SHOW WINDOW REC	1	12	20	1,600	A	720	20	12	1	EXTERIOR GEN. OUTLET	(N)		2
3	TC	(N)	SHOW WINDOW REC	1	12	20	1,600	B	720	20	12	1	OFFICE DESK OUTLETS	(N)		4
5	TC	(N)	SHOW WINDOW REC	1	12	20	1,600	C	720	20	12	1	OFFICE DESK OUTLETS	(N)		6
7	TC	(N)	SHOW WINDOW REC	1	12	20	1,600	A	1,500	20	12	1	HAND DRYER	(N)		8
9	TC	(N)	STOREFRONT SIGNAGE	1	12	20	1,500	B	180	20	12	1	RESTROOM REC	(N)		10
11		(N)	TIME CLOCK	1	12	20	200	C	900	20	12	1	GENERAL REC. SALES AREA	(N)		12
13		(N)	GFI ROOF REC.	1	12	20	360	A	720	20	12	1	GENERAL REC. SALES AREA	(N)		14
15	C2/a	(N)	SALES AREA LIGHTS	1	12	20	1,000	B	720	20	12	1	GENERAL REC. SALES AREA	(N)		16
17	C2/b	(N)	SALES AREA LIGHTS	1	12	20	800	C	540	20	12	1	GENERAL REC. SALES AREA	(N)		18
19		(N)	STOCK AREA LIGHTS	1	12	20	500	A	720	20	12	1	GENERAL REC. SALES AREA	(N)		20
21		(N)	RESTROOM LIGHT AND EF-1	1	12	20	200	B	720	20	12	1	GENERAL REC. SALES AREA	(N)		22
23		(N)	DRINKING FOUNTAIN	1	12	20	400	C	1,080	20	12	1	GENERAL REC. SALES AREA	(N)		24
25			SPARE	1		20		A	900	20	12	1	STOCK AREA GENERAL REC	(N)		26
27			SPARE	1		20		B	2,250	30	10	2	WATER HEATER (WH-1)	(N)		28
29			SPARE	1		20		C	2,250							30
31			SPARE	1		20		A		20		1	SPARE			32
33			SPARE	1		20		B		20		1	SPARE			34
35			SPARE	1		20		C		20		1	SPARE			36
37			SPARE	1		20		A		20		1	SPARE			38
39			SPARE	1		20		B		20		1	SPARE			40
41			SPARE	1		20		C		20		1	SPARE			42

ALL PHASES TO BE BALANCED TO WITHIN 7%
A= 8,620 WATTS
B= 8,890 WATTS
C= 8,490 WATTS

TOTAL CONNECTED LOAD 26,000 WATTS 73 AMPS
TOTAL DEMAND LOAD 28,050 WATTS 78 AMPS

(E) EXISTING TO REMAIN
(N) NEW CIRCUIT
GFCI GFI BREAKER CKT
IG CIRCUITS WITH ISOLATED GROUND
TC CIRCUITS ON TIMECLOCK
EMS ROUTING TO THE EMS PANEL
C1/C2 LIGHTING CONTACTOR
a,b,c SWITCHES CONTROLLING LIGHTS

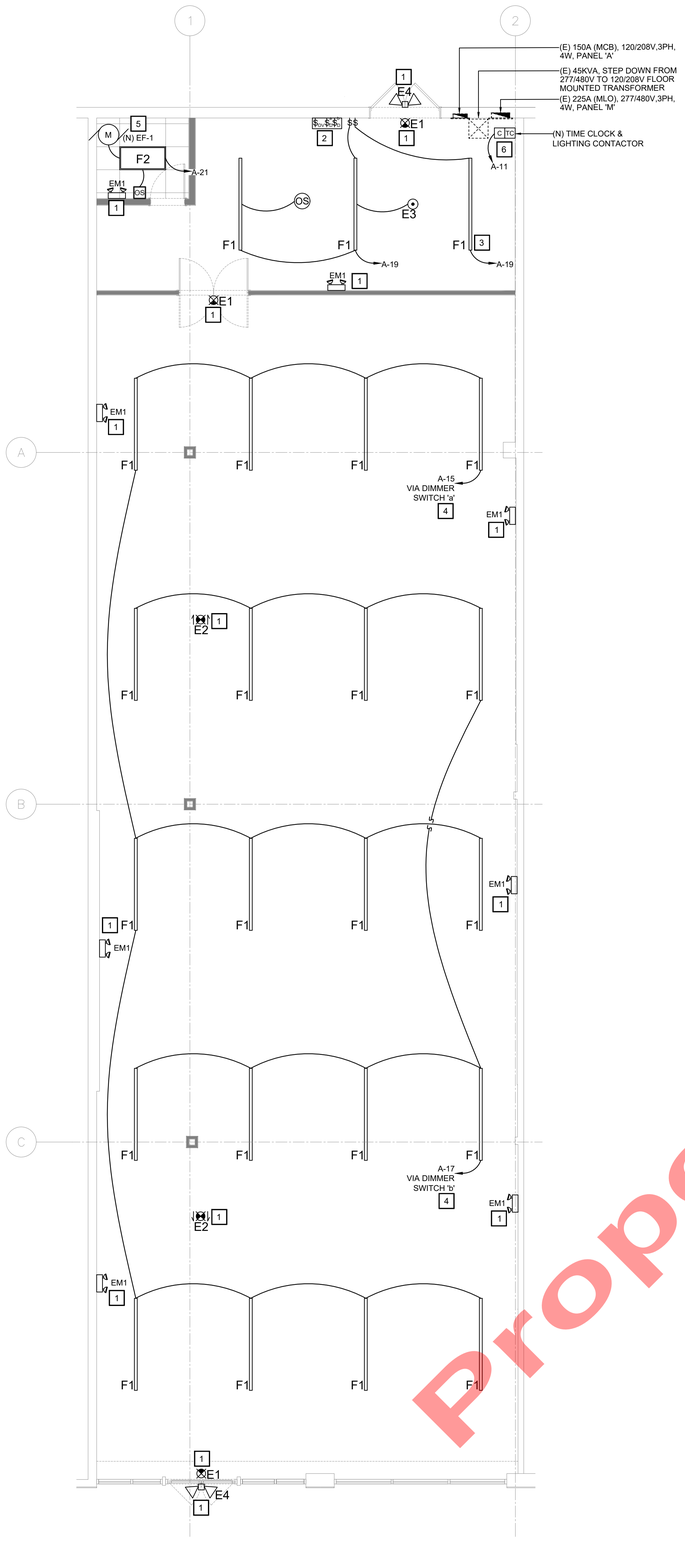
Property of NV Engineering

1 | SCALE N.T.S. | ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES

MATTRESS WAREHOUSE

Description
ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES

SHEET
E0.3



Property of NYC Engineers

LEGEND:
NEW
EXISTING

GENERAL NOTES:

1. ALL ELECTRICAL WORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE OR LOCAL CODE AND/OR OTHER AUTHORITIES HAVING JURISDICTION.
2. THE CONTRACTOR SHALL VISIT THE PROJECT SITE, REVIEW EXISTING CONDITIONS AGAINST THE PLANS, AND FAMILIARIZE HIMSELF WITH THE WORK PRIOR TO BIDDING AND START OF WORK.
3. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION AND QUANTITY OF LIGHTING FIXTURES.
4. EMERGENCY AND EXIT LIGHTS SHALL BE INSTALLED AND CIRCUITED PER LATEST NATIONAL ELECTRICAL CODE AND ALL LOCAL CODES. ALL EMERGENCY AND EXIT FIXTURES SHALL HAVE A MINIMUM 90-MINUTE BATTERY BACK-UP.
5. ELECTRICAL CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS AS REQUIRED FOR A FULLY COMPLETE AND OPERABLE SYSTEM.
6. ALL EQUIPMENT SHALL HAVE UL OR CSA LABELS.
7. G.C. IS RESPONSIBLE FOR ALL FINAL CONNECTIONS, TERMINATIONS, AND COORDINATION IN ALL MILLWORK FIXTURES.
8. ELECTRICAL CONTRACTOR'S BID SHALL INCLUDE INSTALLATION OF ALL LIGHT FIXTURES AND ASSOCIATED LAMPS. SOME FIXTURES REQUIRE ASSEMBLY, E.C. IS RESPONSIBLE TO ENSURE THE ADJUSTABILITY OF ALL DIRECTIONAL FIXTURES AFTER INSTALLATION AND SHALL AIM FIXTURES PER DIRECTION FROM OWNER. IF THE CEILING SYSTEMS ARE FIRE RATED, E.C. SHALL CLOSELY COORDINATE RECESSED FIXTURE REQUIREMENT WITH OWNER AND SUPPLIER TO MAINTAIN THE FIRE RATING OF THE CEILING.
9. G.C. SHALL PROVIDE TIME CLOCK PROGRAMMING TRAINING SESSION FOR THE STORE MANAGER AND AT LEAST ONE OTHER EMPLOYEE PRIOR TO PROJECT CLOSEOUT.
10. ALL FIXTURES INSTALLED OUTDOORS SHALL BE RATED FOR DAMP/WET LOCATIONS AS REQUIRED. THE CONTRACTOR SHALL COORDINATE DAMP/WET LOCATION RATING PER NEC ARTICLE 410.10 (A). ALL INSTALLATIONS SHALL CONFORM TO NEC ARTICLE 410, ALL SUB ARTICLES. ALL FLUORESCENT FIXTURES THAT UTILIZE DOUBLE ENDED LAMPS AND CONTAIN BALLAST(S) THAT CAN BE SERVICED IN PLACE SHALL BE CODE COMPLIANT WITH N.E.C. 410.130(G).
11. THE ELECTRICAL LIGHTING INSTALLATIONS SHALL CONFORM TO ALL STATE AND LOCAL SEISMIC AND CODE REQUIREMENTS REGARDING LIGHT FIXTURE SUPPORT. ALL ELECTRICAL METALLIC TUBING (EMT), RIGID NON-METALLIC CONDUITS, "SEAL TIGHT" TYPE CONDUITS AND ALL OTHER CONDUITS THAT DO NOT CONTAIN A CODE SIZED GROUND WIRE SHALL HAVE A CODE SIZED BOND WIRE INSTALLED WITH THE CIRCUIT CONDUCTORS.
12. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC. EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD BASED ON INTENT, MANUFACTURER RECOMMENDATIONS, AND BEST INDUSTRY PRACTICES.

KEYED NOTES:

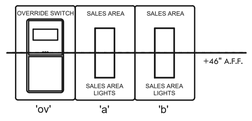
1. ALL NEW EXIT SIGNS & EMERGENCY LIGHTS TO BE CONNECTED TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING.
2. NEW MASTER SWITCH BANK WITH INBUILT OVERRIDE SWITCH LOCATION. DIMMER SWITCHES SHALL BE RATED FOR A TOTAL LOAD OF SWITCHED CIRCUIT AND LAMP TYPE AS REQUIRED. DIMMERS SHALL BE PROVIDED WITH AN ON/OFF SWITCH. VERIFY/CONFIRM LOCATION WITH OWNER PRIOR TO INSTALLATION AND ROUGH-IN.
3. LIGHTING NEAR ELECTRICAL PANELS SHALL NOT BE CONTROLLED BY ANY AUTOMATIC MEANS AND SHALL BE COMPLY AS PER NEC 110.26(D).
4. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE LIGHTING VENDOR/ARCHITECT TO CONFIRM DIMMING COMPATIBILITY OF ALL SPECIFIED LIGHT FIXTURES. VERIFY LIGHT FIXTURES REQUIRING (0-10V) DIMMING AND OR ELV/MLV/TRIAC DIMMING. PROVIDE APPROPRIATE DIMMER SWITCHES AND DEDICATED CIRCUITING AS REQUIRED.
5. NEW EXHAUST FAN INTERLOCKED WITH LIGHT SWITCH. SEE MECHANICAL DRAWINGS FOR MORE INFORMATION AND SPECIFICATIONS.
6. ELECTRICAL CONTRACTOR TO VERIFY THE OPERABLE CONDITION OF EXISTING TIME CLOCK. REUSE IF POSSIBLE OTHERWISE PROVIDE NEW TIME CLOCK AND LIGHTING CONTACTORS AS SHOWN. BASE BID ACCORDINGLY.

LIGHT FIXTURE SCHEDULE

SYMBOL	TAG	MANUF.	DESCRIPTION	MODEL	VOLTAGE	TOTAL WATTS
	F1	TRUGROOVE	LINEAR SUSPENDED LIGHT	290-6-L-B-QQ-08-G-D-E-T-A6-3-144	120V	46.6W
F2	F2	TBD	2X4 LIGHT FIXTURE	TBD	120V	40W
	E1	TBD	LED EXIT SIGN	TBD	120V	-
	E2	TBD	LED EXIT SIGN WITH BUGEYE	TBD	120V	-
	E3	TBD	-	TBD	120V	-
	E4	TBD	WET LOCATION EMERGENCY LIGHT	TBD	120V	-
	EM1	TBD	WALL MOUNTED EMERGENCY LIGHT	TBD	120V	-

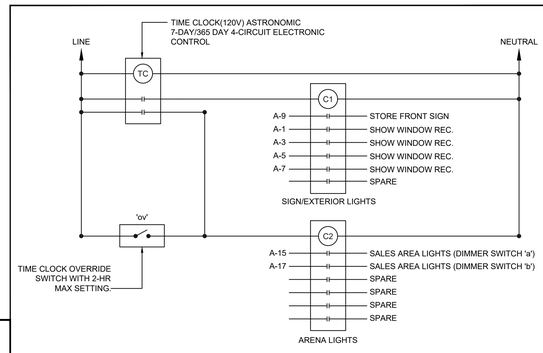
NOTE:
PRIOR TO BID, CONTRACTOR SHALL COORDINATE COMPLETE LIGHTING FIXTURE PACKAGE WITH ARCHITECT/OWNER FOR FINAL COLOR TEMPERATURE (KELVIN), LENGTHS, AND FINISH COLOR.

SWITCH BANK DETAILS



'a,b' - SINGLE POLE DIMMER SWITCHES FOR CONTROL OF LIGHTING.

'ov' - 2-HR OVERRIDE BYPASS SWITCH. ADJUST TO ON/OFF SCHEDULE DIRECTED BY TENANT REPRESENTATIVE.



TIME CLOCK SCHEDULE:

CONTRACTOR TO SET TIME CLOCK SETTINGS AND VERIFY WITH OWNER:

1. DURING SET "OFF" TIME LIGHTING TO BE CONTROLLED BY A 2-HR MANUAL OVERRIDE SWITCH.

2	SCALE	TIME CLOCK AND LIGHTING CONTACTOR DETAILS.
	N.T.S.	

1	SCALE	LIGHTING PLAN
	3 / 16" = 1' - 0"	

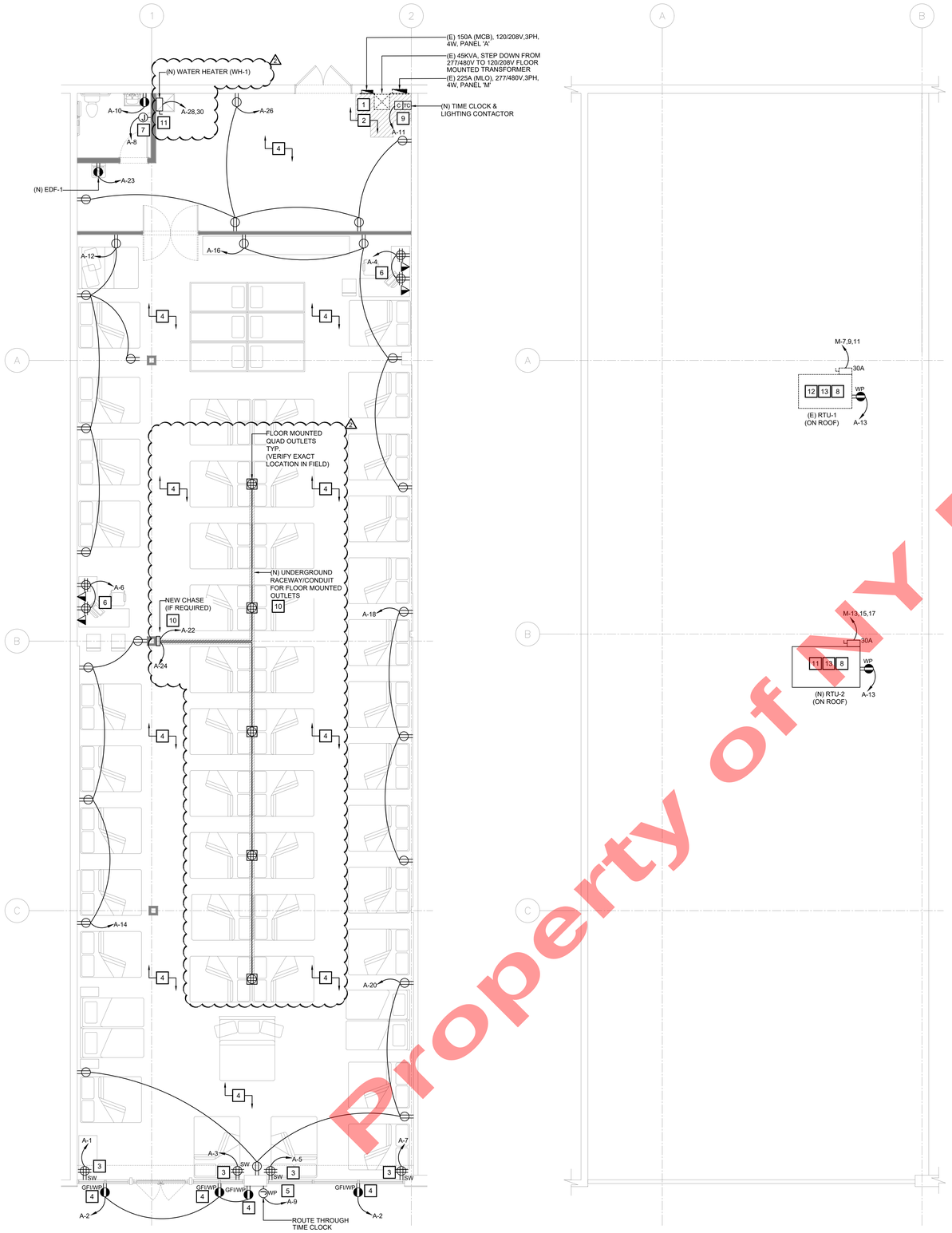
MATTRESS WAREHOUSE

Description

LIGHTING PLAN

SHEET

E1.0



LEGEND:
NEW
EXISTING

GENERAL NOTES:

1. COORDINATE WITH ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL OUTLETS, JUNCTION BOXES, SWITCHES, FUSE DISCONNECTS, AND EQUIPMENT IN MILLWORK.
2. ELECTRICAL CONTRACTOR SHALL VERIFY ALL CONNECTION REQUIREMENTS FOR ALL EQUIPMENT SUPPLIED BY OTHERS PRIOR TO ROUGH-IN. COORDINATE NEMA PLUG CONFIGURATIONS WITH EQUIPMENT AND PROVIDE MATCHING RECEPTACLES WHERE APPLICABLE.
3. CONNECT COMPLETE POWER AND CONTROL SYSTEMS OF ALL HVAC/MECHANICAL EQUIPMENT PER MECHANICAL PLANS. COORDINATE WITH HVAC AND PLUMBING CONTRACTORS FOR EXACT LOCATIONS AND REQUIREMENTS.
4. ALL 125-VOLT RECEPTACLES INSTALLED WITHIN 6 FEET OF SINKS AND IN RESTROOMS SHALL HAVE GFCI PROTECTION PER NEC 210.8. WHERE RECEPTACLES ARE NOT READILY ACCESSIBLE (E.G., BEHIND EQUIPMENT), PROVIDE GFCI BREAKER AT THE PANELBOARD.
5. PROVIDE GROUNDING IN ACCORDANCE WITH NEC ARTICLE 250 FOR ALL SYSTEMS INCLUDING EQUIPMENT FRAMES, CONDUITS, SWITCHES, CONTROLLERS, WIREWAYS, AND NEUTRAL CONDUCTORS. PROVIDE AN INSULATED GROUND WIRE IN ALL CIRCUITS, SIZED PER NEC BUT NOT SMALLER THAN #12 AWG. PROVIDE #6 CU GROUND TO NEW METAL GAS PIPING SYSTEMS.
6. PROVIDE FINAL CONNECTIONS TO ALL HARD-WIRED EQUIPMENT USING LIQUID-TITE FLEXIBLE CONDUIT. ALL MOTORS AND EQUIPMENT SHALL HAVE DISCONNECTING MEANS. ALL EXTERIOR DISCONNECTS SHALL BE WEATHERPROOF.
7. INSTALL PULL AND JUNCTION BOXES WHERE REQUIRED BY NEC OR JOB CONDITIONS. ALL NEW WIRING SHALL BE TAGGED AT PULL BOXES, JUNCTION BOXES, EQUIPMENT BOXES, AND CABINETS WITH APPROVED TAGS.
8. ALL DATA, TELEPHONE, CABLE TV, AUDIO/VIDEO, CAMERA, SECURITY, AND LOW VOLTAGE OUTLETS SHALL BE PROVIDED WITH 1" CONDUIT AND PULL STRING, AND COORDINATED WITH LOW VOLTAGE CONTRACTORS AND VENDORS.
9. POS COMPUTERS, POS PRINTERS, AUDIO/VIDEO EQUIPMENT, MANAGER'S OFFICE COMPUTERS, NETWORK RACKS, AND TELECOM EQUIPMENT SHALL BE SERVED BY DEDICATED ORANGE RECEPTACLES. ORANGE RECEPTACLES SHALL NOT BE USED FOR GENERAL OUTLETS.
10. PROVIDE SEAL-OFFS FOR ALL CONDUITS ENTERING OR LEAVING WALK-IN BOXES. ALL SLAB AND WALL PENETRATIONS SHALL BE SEALED WITH FM APPROVED FIRE CAULK.
11. ALL CIRCUITS WITHIN ELECTRICAL ROOMS, MECHANICAL ROOMS, AND CORE AREAS SHALL BE INSTALLED IN HARD CONDUIT. ALL TENANT SLAB-UNDERGROUND RUNS SHALL BE IN HARD CONDUIT TIGHT TO DECK.
12. ALL ELECTRICAL OUTLETS SHALL BE LABELED TO REFLECT PANEL AND BREAKER NUMBERS.
13. FIELD VERIFY AND COORDINATE EQUIPMENT DISCONNECT LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION. LOCATIONS SHALL COMPLY WITH NEC REQUIREMENTS.
14. ELECTRICAL CONTRACTOR SHALL CLEAN ALL BUILDING CORE ELECTRIC ROOMS AND PANELBOARDS OF DUST AND DEBRIS UPON COMPLETION OF WORK.
15. ELECTRICAL CONTRACTOR SHALL PROVIDE CORRECT NUMBER OF WIRES, WHETHER SHOWN OR NOT, TO FACILITATE PROPER OPERATION OF ALL EQUIPMENT AT NO ADDITIONAL COST.
16. PROVIDE COMPLETE ELECTRICAL PATHWAYS AND ROUGH-IN FOR WIRELESS ACCESS POINTS, SPEAKERS, CAMERAS, AND OTHER TENANT-PROVIDED LOW VOLTAGE DEVICES.
17. ALL SWITCHES AND DEVICES SHALL MATCH FINISH REQUIREMENTS. ALL NEMA 5-15, NEMA 5-20, NEMA 6-15, NEMA 6-20 RECEPTACLES, WITH THE EXCEPTIONS OF RECEPTACLES THAT ARE NOT ACCESSIBLE, INSTALLED IN DEDICATED SPACE, OR INSTALLED OVER 5'-6" AFF, SHALL BE TAMPER-RESISTANT IN COMPLIANCE WITH NEC 406.12(5) AND 518.2

KEYED NOTES:

1. EXISTING ELECTRICAL PANELS SHALL REMAIN. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE LANDLORD IN FIELD & VERIFY EXACT LOCATION, RATING, VOLTAGE, PHASE & OPERABLE CONDITION IN THE FIELD. REPLACE WITH NEW IF FOUND INOPERABLE. BASE BID ACCORDINGLY. ELECTRICAL CONTRACTOR SHALL MAINTAIN CLEARANCE FOR ELECTRICAL PANEL PER NEC 110.26 (A) (1). BASE BID ACCORDINGLY.
2. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH BASE BUILDING /LANDLORD/OWNER FOR EXACT POWER DISTRIBUTION, LOCATION PRIOR TO COMMENCING ANY WORK. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES. BASE BID ACCORDINGLY.
3. PROVIDE A NEW SHOW WINDOW RECEPTACLE ABOVE THE WINDOW ON THE WALL OR CEILING FOR EVERY 8 FEET AS REQUIRED AS PER MATTRESS WAREHOUSE REQUIREMENTS. IT SHALL MEET NEC 210.62 SHOW WINDOW REQUIREMENTS AS WELL. COORDINATE THE EXACT LOCATION WITH THE ARCHITECT. CONTRACTOR TO FIELD VERIFY THE EXISTING SHOW WINDOW RECEPTACLE AVAILABILITY & OPERABLE CONDITION. REUSE IF POSSIBLE; OTHERWISE PROVIDE NEW AS SHOWN ON PLAN.
4. COORDINATE EXACT QUANTITY, MOUNTING HEIGHT AND LOCATION OF EXTERIOR/INTERIOR GENERAL OUTLETS WITH ARCHITECT/OWNER IN FIELD. PRIOR TO ROUGH IN.
5. JUNCTION BOX FOR EXTERIOR SIGNAGE WITH TOGGLE DISCONNECT PER NEC FOR CONNECTION TO BUILDING-MOUNTED SIGNAGE. JUNCTION BOX SHOULD BE LOCATED WITHIN THE 5' OF THE CENTER OF EACH OF THE MATTRESS WAREHOUSE BUILDING SIGN. VERIFY EXACT LOCATION AND CONNECT TO SIGN PER MANUFACTURER'S INSTRUCTION. ROUTE CIRCUIT TO PANEL VIA TIME CLOCK.
6. PROVIDE TWO LOW-VOLTAGE WALL BOXES WITH MUD RINGS AND PULL STRINGS IN CONDUIT FOR LOW-VOLTAGE CABLING AND DEVICE INSTALLATION. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE ARCHITECT FOR THE EXACT LOCATION AND MOUNTING HEIGHT, PRIOR TO ROUGH-IN AND PROVIDE AS REQUIRED.
7. FOR HAND DRYER. CONTRACTOR TO COORDINATE EXACT LOCATION, HEIGHT & POWER REQUIREMENT WITH VENDOR PRIOR TO COMMENCING ANY WORK. PROVIDE POWER AS REQUIRED PER EQUIPMENT CUTSHEET. BASE BID ACCORDINGLY.
8. ELECTRICAL CONTRACTOR SHALL PROVIDE DUCT SMOKE DETECTORS AS REQUIRED IN COORDINATION WITH MECHANICAL CONTRACTOR. BASE BID ACCORDINGLY.
9. ELECTRICAL CONTRACTOR TO VERIFY THE OPERABLE CONDITION OF EXISTING TIME CLOCK. REUSE IF POSSIBLE OTHERWISE PROVIDE NEW TIME CLOCK AND LIGHTING CONTACTORS AS SHOWN/AS PER SOW. BASE BID ACCORDINGLY.
10. NEW UNDERGROUND RACEWAY/CONDUIT FOR FLOOR-MOUNTED OUTLETS; COORDINATE EXACT LOCATIONS AND ROUTING WITH ARCHITECT/OWNER IN FIELD; CONDUIT ROUTING SHOWN IS DIAGRAMMATIC, PROVIDE DROP FROM CEILING ALIGNING WITH STRUCTURAL COLUMN TO UNDERGROUND RACEWAY AS REQUIRED; ENSURE CLEARANCE FROM STRUCTURAL AND MECHANICAL ELEMENTS. USE CHASE AS REQUIRED. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES PRIOR TO ROUGH IN. BASE BID ACCORDINGLY.
11. ALL MECHANICAL AND PLUMBING EQUIPMENT SHALL BE PROVIDED WITH THE REQUIRED ROUGH-INS, MOCP, AND WIRE SIZES. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE EXACT TYPE OF ROUGH-INS AND WIRE SIZE AT THE COMMENCEMENT OF WORK.
12. EXISTING MECHANICAL EQUIPMENT, INCLUDING ASSOCIATED BRANCH CIRCUITS, SHALL REMAIN. CONTRACTOR SHALL FIELD VERIFY AND UTILIZE EXISTING BRANCH CIRCUIT & DISCONNECT IF IT'S IN OPERABLE CONDITION; PROVIDE NEW IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
13. IF A FACTORY-MOUNTED POWERED CONVENIENCE OUTLET IS NOT PROVIDED, A 120V, 20A GFI WEATHERPROOF RECEPTACLE SHALL BE PROVIDED WITHIN 25 FT OF ALL HVAC EQUIPMENT AS SHOWN. FIELD COORDINATE EXACT LOCATION OF THE HVAC EQUIPMENT AND ADD ADDITIONAL RECEPTACLES IF REQUIRED.

Property of IVY Engineers

1 | SCALE 3/16" = 1' - 0" | ELECTRICAL POWER PLAN

MATTRESS WAREHOUSE

Description

ELECTRICAL POWER PLAN

SHEET

E2.0

PLUMBING LEGEND

SYMBOL	DESCRIPTION
— — SAN — —	SANITARY SEWER
— — EX.SAN — —	EXISTING SANITARY SEWER
- - - - - - - - -	VENT PIPING
—— - —— - ——	COLD WATER
—— - - ——	HOT WATER
———————◯	PIPE DOWN
———————○	PIPE UP
⊙ FCO	FLOOR CLEANOUT
	ISOLATION VALVE
	POINT OF NEW CONNECTION
	HUB / FLOOR DRAIN

PLUMBING ABBREVIATIONS

CW	COLD WATER
EX.	EXISTING
EDF	ELECTRIC DRINKING FOUNTAIN
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
HW	HOT WATER
WH	WATER HEATER
LAV	LAVATORY
LL	LANLORD
MS	MOP SINK
RE	RELOCATED
SAN	SANITARY
TMV	THERMOSTATIC MIXING VALVE
TYP	TYPICAL
V	VENT
VIF	VERIFY IN FIELD
VTR	VENT THROUGH ROOF
ET	EXPANSION TANK
WC	WATER CLOSET

PLUMBING DRAWING LIST

P0.1	PLUMBING SPECIFICATIONS, SYMBOLS AND ABBREVIATIONS
P1.0	PLUMBING PLANS, RISERS AND SCHEDULE
P2.0	PLUMBING DETAILS

CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

A. 2023 FLORIDA BUILDING CODE, BUILDING, 8TH EDITION (ADOPTS WITH AMENDMENTS FROM IBC 2021).

B. 2019 FLORIDA COMMERCIAL ENERGY CODE (ADOPTS WITH AMENDMENTS FROM ASHRAE 90.1, 2019).

C. 2023 FLORIDA BUILDING CODE, PLUMBING, 8TH EDITION (ADOPTS WITH AMENDMENTS FROM IPC 2021).

D. 2023 FLORIDA BUILDING CODE, MECHANICAL, 8TH EDITION (ADOPTS WITH AMENDMENTS FROM IMC 2021).

E. 2023 FLORIDA BUILDING CODE, FUEL GAS, 8TH EDITION (ADOPTS WITH AMENDMENTS FROM IFGC 2021).

F. 2020 FLORIDA ELECTRICAL CODE (ADOPTS WITHOUT AMENDMENTS FROM NFPA 70, 2020).

PLUMBING SPECIFICATIONS

1. GENERAL

THE "ARCHITECTURAL GENERAL CONDITIONS" GOVERN WORK UNDER THIS SECTION.

BEFORE SUBMITTING A PROPOSAL, THIS CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS. IT IS EXPRESSLY UNDERSTOOD THAT THIS PROPOSAL IS BASED ON THE ABOVE REQUIREMENTS AND THAT IT COVERS EVERYTHING NECESSARY TO DO AND COMPLETE THE WORK.

2. INSPECTION AND COOPERATION

NO DEVIATION FROM THE DRAWINGS AND /OR SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF ARCHITECT OR ENGINEER. THIS CONTRACTOR SHALL COOPERATE WITH THE OTHER CONTRACTORS TO ALLOW FOR THE INSTALLATION OF THEIR WORK AS WELL AS HIS OWN.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK FITTING IN PLACE WITHOUT CONFLICT WITH THE OTHER TRADES, WHERE PROPER PLANNING COULD AVOID INTERFERENCE.

3. CODES AND PERMITS

NOTHING IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL BE INTERPRETED TO CONFLICT WITH ANY CITY OR PROVINCIAL LAW, REGULATION, CODE, ORDINANCE, RULING, OR FIRE UNDERWRITER'S REQUIREMENT APPLICABLE TO THIS CLASS OF WORK.

SHOULD THE DRAWINGS AND/OR SPECIFICATIONS CONFLICT WITH SUCH LAWS OR ORDINANCES, THE CONFLICTING PORTION OF THE WORK SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH SUCH LAWS AND ORDINANCES WITHOUT EXTRA COST.

THIS CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS AND INSPECTIONS REQUIRED FOR THIS INSTALLATION OF HIS WORK.

4. ACCURACY OF DATA

THE INFORMATION GIVEN HEREIN AND ON THE DRAWINGS IS AS EXACT AS COULD BE SECURED, BUT ITS EXTREME ACCURACY IS NOT GUARANTEED.

THIS CONTRACTOR SHALL EXAMINE THE LOCATIONS AND VERIFY ALL MEASUREMENTS, DISTANCES, ELEVATIONS AND EXISTING PIPE SIZES BEFORE STARTING THE WORK AS ALL PIPING SYSTEMS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC ONLY. THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY OFFSETS, RAISED AND DROPS IN PIPING AND DUCTWORK AS REQUIRED BY BUILDING CONDITIONS AT NO ADDITIONAL COST.

PLUMBING DRAWINGS SHALL NOT BE USED FOR GENERAL CONSTRUCTION DIMENSIONS OR FOR TYPE OF MATERIAL USED. FOR EXACT BUILDING LAYOUT, DIMENSIONS AND BUILDING MATERIAL USED, THIS CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DRAWINGS.

5. SHOP DRAWINGS

SHOP OR INSTALLATION DRAWINGS, FOUNDATION PLANS, EQUIPMENT OR APPARATUS DRAWINGS SHALL BE FURNISHED BY THIS CONTRACTOR. THESE DRAWINGS SHALL BE CLEARLY MARKED INDICATING WHICH ITEMS ARE TO BE SUPPLIED AND SHALL STATE CAPACITIES, SIZES AND GENERAL DESCRIPTION OF ALL EQUIPMENT. ANY CHANGES FROM THE SPECIFIED ITEMS SHALL BE NOTED ON THE SUBMITTALS.

SHOP DRAWINGS OF SPECIAL APPARATUS OR EQUIPMENT WHICH IS TO BE FABRICATED INDIVIDUALLY FOR THIS PROJECT AND IS NOT DESCRIBED BY STANDARD MANUFACTURER'S DRAWINGS OR BULLETINS SHALL BE SUBMITTED FOR PROCESSING BEFORE FABRICATION.

THESE DRAWINGS SHALL BE SUBMITTED IN A TIMELY MANNER.

IT SHALL BE THIS CONTRACTORS RESPONSIBILITY TO MAINTAIN LIAISON WITH ALL PARTIES CONCERNED WITH THE MATERIAL SUBMITTED. THIS CONTRACTOR SHALL NOT PURCHASE ANY EQUIPMENT UNTIL SHOP DRAWINGS HAVE BEEN PROCESSED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY FEES ACCRUED FROM THE RETURN OF FIXTURES PURCHASED PRIOR TO THE REVIEW OF SHOP DRAWINGS AND THAT ARE NOT APPROVED.

THIS CONTRACTOR SHALL SUBMIT NO DRAWINGS WITHOUT NOTATION INDICATING DATE OF CONTRACTOR'S REVIEW AND SIGNATURE OF CHECK FOR CONTRACTOR TOGETHER WITH CONTRACTOR'S NAME AND PROJECT IDENTIFICATION.

ARCHITECT'S PROCESSING WILL NOT CONSTITUTE A COMPLETE CHECK BUT WILL INDICATE ONLY THAT GENERAL METHOD OF CONSTRUCTION AND DETAILING IS SATISFACTORY.

ARCHITECT'S PROCESSING WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS SINCE THIS CONTRACTOR IS SOLELY RESPONSIBLE FOR DIMENSIONS AND DESIGNS OF ADEQUATE CONNECTIONS, DETAILS AND SATISFACTORY CONSTRUCTION OF ALL WORK, AS WELL AS FURNISHING MATERIALS AND WORKMANSHIP REQUIRED BY DRAWINGS AND SPECIFICATIONS WHICH MAY NOT BE INDICATED ON THE SUBMITTALS WHEN APPROVED.

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING ENGINEER REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. REVIEW OF A SPECIFIC ITEM SHALL NOT INCLUDE REVIEW OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. THE CONTRACTOR IS RESPONSIBLE FOR: EQUIPMENT VOLTAGES AND DIMENSIONS TO BE CONFIRMED AND CORRELATED WITH ALL DISCIPLINES PRIOR TO PURCHASE; INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION; COORDINATION OF THE WORK WITH THAT OF ALL OTHER TRADES AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

6. SUBSTITUTIONS OF EQUIPMENT OR MATERIAL

THE BRAND NAMES OF EQUIPMENT OR MATERIALS SPECIFIED HEREIN SHALL ESTABLISH QUALITY, CAPACITY, TYPE AND DIMENSIONS TO BE INCLUDED IN THE BASE BID.

APPROVAL OF SUBSTITUTED ITEMS WILL BE BASED ON ABILITY AND CAPACITY TO PERFORM FUNCTION SERVED, QUALITY AND AVAILABILITY OF PARTS AND SERVICE, QUALITY OF EQUIPMENT, DELIVERY SCHEDULE, ETC. THE ARCHITECT SHALL REVIEW ALL SUCH REQUESTS BUT RESERVES THE SOLE RIGHT OF JUDGEMENT TO APPROVE OR REJECT THE PROPOSED SUBSTITUTIONS.

ACCEPTANCE OR REJECTION OF PROPOSED SUBSTITUTIONS SHALL NOT CAUSE ADDITIONAL COST. ANY CHANGES OF PIPING, DUCTWORK, ELECTRICAL CONTROLS OR INSTALLATION REQUIRED BECAUSE OF THE SUBSTITUTION OR EQUIPMENT SHALL BE PAID FOR BY THIS CONTRACTOR PROPOSING THE SUBSTITUTION.

7. ERECTION OF APPARATUS

ALL WORK SHALL BE DONE UNDER THE PERSONAL SUPERVISION OF THIS CONTRACTOR WHO SHALL PROVIDE A COMPETENT FOREMAN TO LAY OUT ALL WORK. ALL WORK SHALL BE LAID OUT WITH DUE REGARD FOR THE SPACE REQUIREMENTS OF THE OTHER CONTRACTORS. THIS CONTRACTOR SHALL REPORT ANY CONFLICTS OR DIFFICULTIES IN REGARD TO THE INSTALLATION IMMEDIATELY.

WHERE CROWDED LOCATIONS EXIST OR WHERE THERE IS A POSSIBILITY OF CONFLICT BETWEEN TRADES, THIS CONTRACTOR SHALL MAKE COMPOSITE DRAWINGS SHOWING THE EXACT LOCATIONS OF PIPES, DUCT, CONDUIT AND EQUIPMENT. DRAWINGS SHALL BE BASED ON FIELD MEASUREMENTS AND AFTER CONSULTATION AND AGREEMENT BETWEEN THE TRADES, SHALL BE APPROVED BY ARCHITECT AND ENGINEER BEFORE INSTALLATION OF THE WORK.

EQUIPMENT OF A TYPE TO REQUIRE REPLACEMENT, SERVICING, ADJUSTING OR MAINTENANCE SHALL BE LOCATED TO ALLOW EASY ACCESS AND SPACE FOR REMOVAL OF INTERNAL ASSEMBLIES, IT REQUIRED.

8. EXCAVATION AND BACKFILL

THIS CONTRACTOR SHALL DO ALL EXCAVATION REQUIRED TO INSTALL PIPES AND EQUIPMENT SHOWN ON THE PLANS OR REQUIRED FOR PROPER OPERATION. EXCESS EXCAVATION BELOW THE REQUIRED LEVEL SHALL BE BACKFILLED WITH EARTH AND THOROUGHLY TAMPED. UTILITIES SERVICES LINES SHALL BE INSPECTED AND APPROVED BY THE PROPER INSPECTION AUTHORITY BEFORE BACKFILLING.

INSTALL PLASTIC PIPE AND FITTINGS IN STRICT ACCORDANCE WITH THE INSTALLATION RECOMMENDATIONS OF THE PIPE AND FITTINGS MANUFACTURER, APPENDIX X1 OF ASTM D2265 (STORAGE AND INSTALLATION PROCEDURES FOR PLASTIC DRAIN, WASTE, AND VENT PIPING) AND FOR BURIED PIPE ASTM D2321 (STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS). SUCH INSTRUCTIONS SHALL INCLUDE BUT ARE NOT LIMITED TO CUTTING, SOLVENT CEMENTING AND PRIMING, JOINTS, CONNECTIONS, TRANSITIONS, ALIGNMENT AND GRADE, TRENCHING, BEDDING, BACKFILL AND COMPACTION, SUPPORTS AND SPACING AND ALLOWANCE FOR THERMAL EXPANSION.

CAST IRON PIPING TRENCHING SHALL BE IN ACCORDANCE TO THE CAST IRON SOIL PIPE AND FITTINGS HANDBOOK ISSUED BY THE CAST IRON SOIL PIPE INSTITUTE.

THE BOTTOM OF TRENCHES SHALL BE TAMPED HARD AN GRADED TO SECURE THE REQUIRED FALL. ROCK, WHERE ENCOUNTERED SHALL BE EXCAVATED TO A DEPTH OF SIX INCHES (6") BELOW THE BOTTOM OF THE PIPE, AND BEFORE THE PIPE IS LAID, THE SPACE BETWEEN BOTTOM PIPE AND ROCK SURFACE SHALL BE FILLED WITH GRAVEL. IF TRENCHES ARE DEEPER THAN BOTTOM OF FLOORING OR CLOSER THAN THREE FEET (3'0") TO FOOTING THEY MUST BE FILLED WITH COHESIVE SOIL AND COMPACTED TO 95% OF MAXIMUM DENSITY, STANDARD PROCTOR, ASTM D- 698. ALL OTHER EXCAVATIONS UNDER FLOOR SLABS COMPACTED TO 95% STANDARD PROCTOR.

WHEN EXCESS DIRT HAS BEEN REMOVED, THE TRENCH SHALL BE BROUGHT TO THE REQUIRED LEVEL WITH SAND AND GRAVEL FIRMLY COMPACTED.

TRENCHES AND EXCAVATION SHALL BE BACKFILLED IN 6" LAYERS OF EARTH, FREE FROM CLODS, AND STONES THOROUGHLY TAMPED TO A DEPTH OF 12" ABOVE THE PIPE. AFTER THAT DEPTH HAS BEEN REACHED, BACKFILLING SHALL BE DONE IN 12" LAYERS, THOROUGHLY TAMPED.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO ANY DAMAGES OR SAGS TO THE PIPING SYSTEMS THAT OCCUR FROM THE IMPROPER EXCAVATION AND BACKFILL METHODS.

9. EQUIPMENT SUPPORTS

ANY STRUCTURAL STEEL MEMBERS REQUIRED TO ADAPT THE EQUIPMENT AND PIPING AS FURNISHED BY THIS CONTRACTOR, TO THE BUILDING STEEL OR STRUCTURE, SHALL BE INCLUDED IN THE BID OF THE CONTRACTOR FURNISHING THE EQUIPMENT OR PIPING. HANGING OF ALL EQUIPMENT AND REQUIRED SUPPORTING STEEL AND BRACING SHALL BE FURNISHED BY THE CONTRACTOR WHO SUPPLIES THE EQUIPMENT.

10. CUTTING AND PATCHING

THIS CONTRACTOR SHALL INCLUDE ALL CUTTING, PATCHING AND PAINTING OF PATCHED AREAS REQUIRED FOR AND RESULTING FROM THE INSTALLATION OF ALL OF THIS CONTRACTOR'S WORK, EXCEPT WHERE NOTED OTHERWISE.

ALL OPENINGS AROUND PIPE PENETRATIONS THROUGH SMOKE OR FIRE-RATED FLOORS, CEILINGS OR WALLS SHALL BE SEALED AIRTIGHT WITH MATERIAL HAVING A RATING EQUAL TO THE MATERIAL OF THE WALL, CEILING AND/OR FLOOR PENETRATED.

ALL PATCHING SHALL BE NEATLY FINISHED TO THE SATISFACTION OF THE ARCHITECT.

11. ACCESS PANELS

THIS CONTRACTOR SHALL LOCATE AND FURNISH FOR INSTALLATION BY THE GENERAL CONTRACTOR, ALL ACCESS PANELS AS REQUIRED FOR ACCESS TO VALVES, AND THE PROPER SERVICING OF EQUIPMENT AND LINES INSTALLED UNDER THE CONTRACT.

ALL PANELS SHALL BE MILCOR, STYLE "M" FOR MASONRY, "A" FOR ACOUSTICAL TILE AND "K" FOR PLASTER; EXCEPT FOR FIRE-RATED UL 1-1/2 HOUR AND "B" LABEL ACCESS PANELS SHALL BE FURNISHED IN FIRE-RATED WALLS AND CEILINGS AS INDICATED ON THE DRAWINGS. ACCESS DOORS SHALL BE 12" X 12" MINIMUM SIZE FOR VALVES.

12. DIELECTRIC UNIONS

FOR THE PREVENTION OF ELECTROLYTIC CORROSION AT CONNECTIONS BETWEEN PIPE OF DISSIMILAR METALS OR BETWEEN PIPE AND EQUIPMENT CONNECTIONS OF DISSIMILAR METALS, PROVIDE DIELECTRIC UNIONS OR FLANGES.

13. MOTORS, STARTERS AND DISCONNECTS

UNLESS SPECIFIED TO BE FURNISHED WITH EQUIPMENT, ALL MOTOR STARTERS AND DISCONNECT SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

14. JOINTS AND FITTINGS

THREADS ON SCREWED PIPE SHALL BE STANDARD, CLEAN BUTT AND TAPERED. PIPE SHALL BE REAMED OF BURRS AND KEPT CLEAN OF SCALE, DIRT AND SHAVINGS. TREADS SHALL BE MADE WITH FLAKED GRAPHITE AND LUBRICATING OIL OR APPROVED PIPE COMPOUND ON THE MALE THREAD ONLY.

COPPER-TO-STEEL AND COPPER-TO-BRASS JOINTS SHALL BE MADE WITH SILVER SOLDER. ALL OTHER COPPER-TO-COPPER JOINTS ABOVE GROUND SHALL BE MADE WITH LEAD FREE SOLDER. COPPER PIPE SHALL BE CUT SQUARE, BURRS REMOVED AND CARE SHALL BE GIVEN TO KEEP THE LINES FREE OF DIRT AND MOISTURE. ALL TUBING AND FITTINGS SHALL BE THOROUGHLY CLEANED.

WELDED PIPE SHALL HAVE BUTT WELDED SINGLE "V" TYPE JOINTS FOR WHICH PIPE HAS BEEN BEVELED TO 45 DEGREES. WELD SHALL BE ONE-FOURTH GREATER THICKNESS THAN THE PIPE. CONNECTIONS TO EQUIPMENT, ACCESSORIES, ETC. SHALL BE MADE BY MEANS OF FLANGES AND/OR ADAPTERS.

UNIONS SHALL BE PROVIDED AT EACH SCREWED VALVE AND UNIONS OR FLANGES AT EACH EQUIPMENT CONNECTION.

15. EXPANSION JOINTS

FURNISH AND INSTALL FLEXONICS EXPANSION JOINTS IN PIPING SYSTEM WHERE SHOWN OR NECESSARY FOR EXPANSION AND CONTRACTION.

EXPANSION JOINTS IN PIPE 4" AND GREATER SHALL BE THE PACKLESS TYPE WITH STAINLESS STEEL BELLOWS AND HAVE WELDED OR FLANGED END. JOINTS SHALL HAVE TRAVERSE AS INDICATED ON THE PLANS. EXPANSION JOINTS SHALL BE OF THE CONTROLLED FLEXING TYPE.

EXPANSION JOINTS IN COPPER PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL BELLOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES.

EXPANSION JOINTS IN STEEL PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL ELBOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES.

PROVIDE GUIDES ON EACH SIDE OF EXPANSION JOINT, AT 4 PIPE DIAMETERS, 14 PIPE DIAMETERS, AND A THIRD GUIDE AS RECOMMENDED BY THE MANUFACTURER.

16. PIPE FLEXIBLE CONNECTIONS

FLEXIBLE PIPE CONNECTIONS SHALL BE RESISTOFLEX #R6904 OR APPROVED EQUAL FLEXIBLE CONNECTIONS MADE FROM TEFLON. PROVIDE FOR MOVEMENT IN PIPING BY USE OF SWING JOINTS AT CONNECTION OF ALL BRANCHES TO MAINS AND RISERS. ALL BRANCHES FROM MAINS AND RISERS SHALL HAVE 1/4" CLEARANCE BETWEEN PIPE INSULATION AND SLEEVE TO PERMIT PIPE MOVEMENT.

17. VALVES

THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL VALVES OF ONE MANUFACTURER, FIGURE NUMBER AND TYPE THROUGHOUT THE ENTIRE INSTALLATION OF THE WORK, UNLESS OTHERWISE SPECIFIED. THE FOLLOWING NUMBERS ARE FROM THE CRANE CATALOG. EQUAL VALVES OF REPUTABLE MANUFACTURERS, SUCH AS HAMMOND, NIBCO-SCOTT AND/OR JENKINS WILL BE CONSIDERED EQUIVALENT.

ALL VALVES SHALL BE BUILT FOR A MINIMUM OF 125 PSIG WORKING PRESSURE.

ISOLATION VALVES SHALL BE PROVIDED ON ALL INDIVIDUAL FIXTURES AND FIXTURE GROUPS.

CHECK VALVES 2-1/2" AND SMALLER SHALL BE #36 (SCREWED ENDS) OR #1342 (SOLDER-JOINT ENDS) SWING-TYPE WITH BRONZE BODY AND BRONZE TRIM.

BUTTERFLY VALVES 2" AND LARGER SHALL BE #12F, IRON BODY, CAST-IRON WAFER W/LOCK LEVER.

BALL VALVE UP TO 3" IN SIZE SHALL BE APOLLO SERIES #70 BRONZE VALVE WITH CHROME-PLATED BALL AND TEFLON SEAT.

GAS LINE COCKS UP TO 4" SHALL BE #320. 1/2 PSI FOR INDOOR APPLIANCE CONNECTIONS SHALL CONFORM TO ANSI Z21.15 AND CSA 9.1, 5 PSI FOR INDOOR SHUTOFF SHALL CONFORM TO CGA 91-002 AND ASME B16.44.

HOSE END VALVES SHALL BE #438 GATE VALVES WITH HOSE END NIPPLES.

18. PIPE SLEEVES AND COLLARS

THIS CONTRACTOR SHALL LAY OUT ALL HIS WORK AND SET SLEEVES IN NEW CONSTRUCTION AS CONCRETE FORMS AND WALL ARE ERECTED SO AS TO BE ABLE TO INSTALL HIS WORK WITHOUT CUTTING OR BREAKING OF FLOORS OR WALLS. ALL SLEEVES FOR INSULATED PIPING SHALL BE LARGE ENOUGH TO ALLOW INSULATION TO PASS THROUGH SLEEVE.

ALL SLEEVES PASSING THROUGH FLOORS WHICH ARE WATERPROOFED SHALL BE COPPER TUBING SLEEVES EXTENDING 1" ABOVE FINISHED FLOOR. ALL OTHER SLEEVES SHALL BE 24 GAUGE GALVANIZED PIPES AND SLEEVES TO BE THOROUGHLY PACKED WITH WATERPROOF SEALANT AND THE REMAINING SPACE FILLED WITH MASTIC AND MUST BE WATERTIGHT.

ALL SLEEVES PASSING THROUGH INNER WALLS SHALL BE STANDARD PIPE THIMBLES EQUAL TO THE THICKNESS OF THE WALL.

SPACES BETWEEN PIPES AND SLEEVES THROUGH OUTSIDE WALLS, ABOVE GRADE, SHALL BE CAULKED WITH CAULKING COMPOUND; THOSE BELOW GRADE SHALL BE MADE WATERTIGHT.

SPACE AROUND ALL PIPING THROUGH FIRE OR SMOKE RATED PARTITIONS OR FLOORS SHALL BE SEALED AIRTIGHT WITH MATERIALS OR EQUIPMENT AS SPECIFIED UNDER FIRESTOPPING.

ALL PIPE PENETRATIONS OF SLABS ON GRADE SHALL BE WRAPPED WITH #15 BUILDING FELTS OR FOAM WRAP.

19. HANGERS

A. PIPE HANGER AND SUPPORT PRODUCTS INSTALLATION
   a. VERTICAL PIPING: MSS TYPE 8 OR 42 CLAMPS.
   b. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS. LONGER THAN 100 FEET IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
   c. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER:MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
   d. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

B. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
C. ROD DIAMETER MAY BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH.
D. INSTALL HANGERS FOR ALL PIPING PER MSS SP-69, MANUFACTURERS MANUALS AND AS PER HANGER SUPPORT DETAIL ON DRAWINGS
E. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
F. INSTALL SUPPORTS FOR VERTICAL STEEL PIPING EVERY 15 FEET.
G. SUPPORT PIPING AND TUBING NOT LISTED IN THIS ARTICLE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.

20. DAMAGE BY LEAKS

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO THE GROUNDS, WALKS, ROADS, ALL BUILDING COMPONENTS AND FINISHES, PIPING SYSTEMS, ELECTRICAL SYSTEMS AND THEIR EQUIPMENT AND CONTENT, CAUSED BY LEAKS IN THE PIPING SYSTEMS BEING INSTALLED OR HAVING BEEN INSTALLED HEREIN. ALL REPAIRS WILL BE MADE AT THIS CONTRACTOR'S EXPENSE.

21. PIPE MARKERS

FURNISH AND INSTALL BRADY #B-350 THIN FILM OR APPROVED EQUAL PIPE MARKERS. MARKERS SHALL BE 1-1/8" HIGH FOR PIPES 3" AND UNDER AND 2-1/4" HIGH FOR PIPES OVER 3". MARKERS SHALL INDICATE TYPE OF SERVICE AND DIRECTION OF FLOW.

PIPE MARKERS SHALL BE LOCATED:
- AT EQUIPMENT CONNECTIONS
- AT ACCESS DOORS, AT BRANCH MAINS
- ON ALL ACCESSIBLE PIPE A MAXIMUM OF 75' BETWEEN MARKERS.
- AT ALL PENETRATIONS ON EITHER SIDE OF PENETRATION

22. FLOOR, WALL AND CEILING PLATES

PIPES PASSING THROUGH FLOORS AND FINISHED CEILINGS, FITTED WITH CHROME- PLATED PLATES OR ESCUTCHEONS LARGE ENOUGH TO COMPLETELY CLOSE OPENING AROUND PIPE OR PIPE COVERING AND FLOOR SUPPORT IN THE CASE OF VERTICAL PIPING, SECURELY HELD IN PLACE; CAULK WATERTIGHT AROUND PIPE IN UNFINISHED ROOMS.

23. FIRE STOPPING

THE PENETRATIONS OF FIRE AND/OR SMOKE RATED WALLS OR FLOORS SHALL BE PROTECTED BY A UL APPROVED MATERIAL TO RETAIN THE INTEGRITY OF THE TIME-RATED CONSTRUCTION BY MAINTAINING AS EFFECTIVE BARRIER AGAINST THE SPREAD OF FLAME, SMOKE AND GASES. IT SHALL BE USED IN ALL DUCT CABLE, CONDUIT AND PIPING PENETRATIONS THROUGH FLOOR SLABS AND TIME-RATED WALLS, AND/OR FLOORS. THE RATING OF THE FIRESTOPPING SHALL EQUAL THE RATING OF THE TIME-RATED ASSEMBLY.

FIRESTOPPING MATERIAL SHALL BE 3M FIRE BARRIER SEALING SYSTEM OF APPROVED EQUAL. FIRESTOPPING MATERIAL SHALL CONSTITUTE ONE OR MORE OF THE FOLLOWING PRODUCTS:
- CAULK: CP-25
- PUTTY: #303
- WRAP/STRIP: FS195
- COMPOSITE SHEET: CS195
- PENETRATING SEALING SYSTEMS: 7900 SERIES

INSTALLATION OF FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH AND IN STRICT CONFORMITY WITH MANUFACTURER'S PRINTED INSTRUCTIONS AS TO SURFACE PREPARATION, INSTALLATION AND QUALITY CONTROL. AREAS OF WORK SHALL REMAIN ACCESSIBLE UNTIL INSPECTION AND APPROVAL BY THE APPLICABLE CODE AUTHORITIES.

ON INSULATED PIPES, THE FIRE-RATING CLASSIFICATION SHALL NOT REQUIRE REMOVAL OF THE INSULATION.

QUALITY ASSURANCE:
SUBMIT MANUFACTURER'S PRODUCT DATA, LETTER OF CERTIFICATION OR CERTIFIED LABORATORY TEST REPORT THAT THE MATERIAL OR COMBINATION OF MATERIALS MEET THE REQUIREMENTS SPECIFIED IN ASTM E814 AND ARE SO CLASSIFIED IN UL'S BUILDING MATERIALS DIRECTORY. MATERIALS SHALL MEET AND BE ACCEPTABLE FOR USE BY ALL MODEL BUILDING CODES. MATERIALS SHALL MEET THE REQUIREMENTS OF NFPME61- LIFE SAFETY CODE AND NFPA 70 NATIONAL ELECTRICAL CODE.

SUBMITTALS:
SUBMIT SHOP DRAWINGS, PRODUCT DATA, CERTIFICATES AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUBMIT MANUFACTURER'S PRODUCT DATA FOR ALL MATERIALS AND PREFABRICATED DEVICES, PROVIDING DESCRIPTIONS SUFFICIENT FOR IDENTIFICATION AT THE JOB SITE. INCLUDE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.

SUBMIT SHOP DRAWINGS SHOWING PROPOSED MATERIAL, REINFORCEMENT, ANCHORAGE, FASTENINGS, AND METHOD OF INSTALLATION. CONSTRUCTION DETAILS SHALL ACCURATELY REFLECT ACTUAL JOB CONDITIONS.

24. CLEANUP AND ADJUSTMENT

ALL PARTS WORK LEFT CLEAN: EQUIPMENT, FIXTURES, VALVES, PIPES AND FITTINGS CLEANED OF GREASE AND METAL CUTTINGS. ANY DISCOLORATION OR OTHER DAMAGE TO PORTIONS OF BUILDING, ITS FINISH OR FURNISHING DUE TO THIS CONTRACTORS FAILURE TO PROPERLY CLEAN INTERIOR OF PIPING, REPAIRED AT THIS CONTRACTOR'S EXPENSE. ALL AUTOMATIC CONTROL DEVISES ADJUSTED FOR PROPER OPERATION. ALL SURPLUS MATERIALS AND ANY RUBBISH REMOVED AS IT ACCUMULATES. ALL EQUIPMENT LEFT IN SAFE, PROPER OPERATING CONDITION.

DAMAGE TO ANY PORTIONS MUST BE REPAIRED OF THE PART REPLACED BY THIS CONTRACTOR AND ALL PARTS LEFT WITHOUT DENTS, SCRATCHES, THROUGH THE FINISH PAINT, LOOSE PLASTER, STAINS OR OTHER BLEMISHES.

25. PIPE TESTING AND START-UP

ALL PIPING TO BE TESTED IN ACCORDANCE WITH THE FOLLOWING:
- WATER - 100 PSI WATER PRESSURE

ALL TESTING MUST HOLD FOR AT LEAST 24 HOURS WITHOUT LOSS OF PRESSURE OR VACUUM. ALL CONCEALED PIPING SHALL BE TESTED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE PRIOR TO COVERING. BEFORE STARTING ANY SYSTEM, ALL EQUIPMENT SHALL BE LUBRICATED PER MANUFACTURERS REQUIREMENTS BY THIS CONTRACTOR. TEST ENTIRE BUILDING SYSTEMS UNDER FULL LOAD CONDITIONS FOR A PERIOD OF NOT LESS THAT ONE (1) WEEK DURING WHICH TIME THE OPERATING PERSONNEL SHALL BE FULLY INSTRUCTED IN THE OPERATION AND MAINTENANCE OF THE PLANT. AFTER THE PLANT IS IN FULL OPERATION, THIS CONTRACTOR IS TO FURNISH WHATEVER ADDITIONAL SERVICE IS REQUIRED TO RECALIBRATE AND RESET CONTROLS, VALVES, BALANCING COCKS, ETC. TO ENSURE PROPER OPERATION OF THIS SYSTEM.

26. TESTING AND BALANCING

THIS CONTRACTOR SHALL AT THE TIME OF INSTALLATION ENSURE THAT ALL DEVICES TO COMPLETE TESTING AND BALANCING AS DIRECTED HEREIN ARE FURNISHED AND INSTALLED DURING FABRICATION AND INSTALLATION OF WORK. THIS WORK SHALL BE PERFORMED PRIOR TO TURNOVER TO BUILDING OCCUPANT AND WITH AMPLE TIME TO MAKE ANY NECESSARY REPAIRS OR CHANGES TO ACHIEVE A PROPERLY OPERATING SYSTEM.

27. SEISMIC RESTRAINTS ON PLUMBING EQUIPMENT

ALL PLUMBING EQUIPMENT SHALL BE PROVIDED WITH SEISMIC RESTRAINING SERVICES AS REQUIRED BY LOCAL BUILDING CODES. CONTRACTOR SHALL HAVE LOCAL BUILDING OFFICE REVIEW EACH PIECE OF EQUIPMENT WHEN INSTALLED AND THE CONTRACTOR SHALL INSTALL ALL REQUIRED TIE DOWN, ANCHORS, STRAPS OR OTHER DEVICES REQUIRED.

28. GUARANTEE

THIS CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, MATERIALS, AND LABOR FURNISHED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION AND SHALL REPAIR OR REPLACE ANY EQUIPMENT OR MATERIAL WHICH IS DEFECTIVE OR IMPROPERLY INSTALLED. IN ADDITION, THIS CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO THE BUILDINGS AND ITS CONTENTS OR OTHER EQUIPMENT, CAUSED BY DEFECTS OR IMPROPER INSTALLATION OF EQUIPMENT OR MATERIALS INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS.

29. TEMPORARY WATER

TEMPORARY WATER SERVICE (IF REQUIRED) TO THE BUILDING SHALL BE PROVIDED BY THIS CONTRACTOR TO THE BUILDING FOR CONSTRUCTION PURPOSES. THIS CONTRACTOR TO MAINTAIN WATER SERVICE AS REQUIRED DURING CONSTRUCTION.

30. DOMESTIC WATER SERVICE

THIS CONTRACTOR SHALL COORDINATE EXACT AVAILABLE DELIVERY PRESSURE AND PROVIDE ALTERNATE FEE FOR A PRESSURE BOOSTING SYSTEM IF PRESSURE IS LESS THAN REQUIRED PRESSURE. PROVIDE PRESSURE REDUCING VALVE WITH STRAINER IN SERVICE LINE IF REQUIRED BY LOCAL CODES OR PRESSURE IS ABOVE 80 PSI.

JOINTS SHALL BE CLEANED AND DEBURRED AS RECOMMENDED BY THE MANUFACTURER AND FEDERAL, STATE, AND LOCAL CODES AND PRESS FITTINGS ARE AN ACCEPTABLE IF ALLOWED BY LOCAL AHJ. WHERE PRESS FITTING S ARE NOT ALLOWED SOLDERED AS LISTED BELOW. FLUX SHALL BE NON-CORROSIVE. VICTAULIC GROUVED COUPLINGS ARE ACCEPTABLE ALTERNATE IF ALLOWED BY LOCAL AHJ.

ABOVE GRADE - WHERE FITTINGS ARE SOLDERED BOTH FITTINGS AND TUBING SHALL BE CLEANED AS DESCRIBED ABOVE. UNDER NO CIRCUMSTANCES SHALL DISSIMILAR METALS COME INTO DIRECT CONTACT WITH COPPER TUBING; E.G., GALVANIZED STRAPPING, HANGERS, OR CLAMPS TO SECURE THE TUBING. BELOW GRADE, OR FLOOR SLAB ON EARTH OR STONE FILL - HIGH TEMPERATURE, SOLDER, 1200 DEG. F OR GREATER MELTING POINT.

NOTE: WATER PIPE TO BE PROPERLY SECURED AND ALIGNED SO AS NOT TO EXERT VERTICAL OR HORIZONTAL STRESSES ON THE SEATING OF THE MATING (MALE AND FEMALE) SURFACES OF THE UNIONS.

MATERIALS - UNDERGROUND: TYPE "K" COPPER TUBE, SOFT TEMPER
MATERIALS - ABOVEGROUND: TYPE "L" COPPER TUBE, HARD DRAWN.
ALTERNATE MATERIALS - PEX-A PIPING IS AN ACCEPTABLE ALTERNATE IF NOT INSTALLED IN A PLENUM AND APPROVED BY LOCAL CODE OFFICIALS. VIEGA, PROPRESS COPPER ½-INCH THROUGH 4-INCH WITH EPDM SEALING ELEMENT AND/OR VIEGA, PROPRESS 304 OR 316 STAINLESS ½-INCH THROUGH 4-INCH WITH EPDM OR FKM SEALING ELEMENT IS ACCEPTABLE IF ALLOWED BY LOCAL CODE.

31. STERILIZATION OF DOMESTIC WATER SYSTEM

THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE FLUSHED CLEAR OF ANY DEBRIS AND THOROUGHLY STERILIZED WITH A SOLUTION CONTAINING NOT LESS THAN 100 PARTS PER MILLION OF AVAILABLE CHLORINE. THE SOLUTION SHALL REMAIN IN THE SYSTEM FOR TWO (2) HOURS DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, THE SOLUTION SHALL BE FLUSHED FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUE CHLORINE CONTENT IS NOT GREATER THAN THE CHLORINE LEVEL OF THE AVAILABLE WATER SUPPLY.

STERILIZATION SHALL BE PERFORMED PRIOR TO TURNOVER TO OCCUPANT AS TO NOT ALLOW FOR THE WATER SYSTEM TO REMAIN STAGNANT FOR LONGER THAN 24 HOURS.

THIS CONTRACTOR SHALL HAVE THE WATER TESTED AND APPROVED BY THE HEALTH DEPARTMENT.

32. SANITARY SEWERS

THIS CONTRACTOR SHALL CONNECT SANITARY SEWER AS INDICATED ON THE DRAWINGS. VERIFY DIRECTION OF FLOW PRIOR TO ANY ROUGH-IN WORK.

EACH PIPE SHALL BE LAID TO THE LINE AND GRADE INDICATED ON THE PLANS AND SUCH A MANNER AS TO FORM A CLOSE CONCENTRIC JOINT WITH THE ADJOINING PIPE AND TO PRESENT OFFSETS IN FLOW LINE. ALL PIPE SHALL BE LAID WITH THE BELLS UPHILL.

THE SUB-GRADES SHALL BE KEPT FREE FROM WATER WHILE PIPES ARE BEING LAID. ALL PIPE SHALL BE LAID WITH ENDS ABUTTING AND TRUE TO LINE AND GRADE. THEY SHALL BE FITTED AND MATCHED SO THAT THEY WILL FORM A SEWER WITH A SMOOTH AND UNIFORM INVERT.

EACH JOINT SHALL BE CLEANED AS IT IS LAID AND ALL BELLS SHALL BE CLEANED BEFORE PIPES ARE JOINED.

DWV PVC / PVC SEWER PIPE MAY BE USED IN LIEU OF THAT SPECIFIED ABOVE IF ALLOWED BY LOCAL CODES.

SDR 35 IS NOT ACCEPTABLE FOR UNDER BUILDING USE.

33. WASTE, SOIL, DRAIN AND VENT PIPING

THE DRAINS, SOIL, WASTE AND VENT PIPE AND FITTINGS INCLUDING EXTENSIONS TO SEWERS SHALL BE OF THE SIZES INDICATED ON THE DRAWINGS. PIPE AND FITTINGS TO BE, CYLINDRICAL AND FREE FROM CRACKS OR OTHER DEFECTS.

ALL TRENCHES TO BE DUG WITH GRADUAL FALL, THE PIPING TO BE STRAIGHT AND FREE FROM ANY SAGS.

THE ARRANGEMENT OF THE SYSTEM SHALL BE AS SHOWN ON THE DRAWINGS AND AS DIRECT AS POSSIBLE, AVOIDING ALL UNNECESSARY OFFSETS. THE STACKS SHALL BE FIRMLY SECURED IN POSITION WITH WROUGHT IRON CLAMPS AT EACH FLOOR.

ALL CHANGES IN DIRECTION OF SOIL OR WASTE PIPE SHALL BE MADE BY MEANS OF "Y" BRANCHES AND 1/8 BENDS. NINETY DEGREE SHORT TURN FITTINGS WILL NOT BE PERMITTED EXCEPT TO INDIVIDUAL FIXTURE CONNECTIONS OR WHERE THE FLOW IS FROM THE HORIZONTAL TO THE VERTICAL.

SANITARY WASTE CLEANOUTS ARE TO BE PROVIDED AT EVERY TURN GREATER THAN 45°, AT INTERVALS OF NO GREATER THAN 50', AT ANY STACK ROUTING BELOW GRADE. NOT ALL CLEANOUTS LOCATIONS MAY BE SHOWN ON THE DRAWING.

ALL TRAP SCREWS MUST BE OF FULL SIZE OF PIPE UP TO 4" AND 4" FOR ALL OVER THIS SIZE. CONNECTIONS BETWEEN OUTLETS OF FIXTURES AND SOIL OR WASTE PIPE SHALL BE MADE WITH "Y" BRANCHES TO "TY" BRANCHES WHEREVER POSSIBLE. ALL HORIZONTAL SOIL WASTE AND VENT PIPE SHALL BE GRADED TOWARD OUTLETS AND PIPE NOT BURIED SHALL BE INSTALLED ABOVE THE CEILING OR CLOSE AS POSSIBLE TO THE CONSTRUCTION ABOVE WHERE THERE IS NO CEILING.

THE STACKS SHALL BE EXTENDED THROUGH ROOF OF BUILDING TO POINTS NOT LESS THAT 12" ABOVE ROOF. EXTENSIONS THROUGH ROOF SHALL BE MADE WATER- TIGHT BY MEANS OF A LEAD FLASHING OF FOUR POINTS SHEET LEAD SPREAD OVER A DISTANCE OF NOT LESS THAN TWELVE INCHES (12") AROUND PIPE. THIMBLE TO BE SOLDERED TO BASE AND EXTENDED OVER AND TURNED DOWN INTO END OF PIPE IN AN APPROVED MANNER.

ALL CLEANOUTS IN FLOORS TO BE JOSAM #8360 OR EQUAL. ADJUSTABLE CLEANOUT WITH BODY TO MATCH THE PIPING MATERIAL, CAST BRASS SCORIATED COVER WITH LETTERS C.O. CAST IN TOP AND CONCEALED BRASS PLUG.

CLEANOUTS SHALL BE INSTALLED IN BASE OF EACH STACK. CONCEALED CLEANOUTS SHALL HAVE JOSAM #8600 OR EQUAL. CAST BRASS CHROMIUM PLATED FLAT ACCESS COVER PLATES.

ALL JOINTS OF CAST IRON PIPE SHALL BE MADE WITH MANUFACTURERS RECOMMENDED JOINING MATERIAL. AT THE CONTRACTOR'S OPTION HE MAY USE NO-HUB PIPE, FITTINGS, COUPLING AND GASKETS IN LIEU OF CAULKED JOINTS IF APPROVED BY THE LOCAL CODES AND ORDINANCES.

IF APPROVED BY THE LOCAL CODES, SCHEDULE 40 PVC PIPE WITH DWV FITTINGS MAY BE USED FOR THE WASTE AND VENT SYSTEM. PVC PIPE AND FITTINGS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL CODES. ENCASEMENT OF PVC PIPES WITHIN RATED SHAFTS SHALL BE THE COST OF THIS CONTRACTOR. SCHEDULE 40 PVC SHALL NOT BE INSTALLED WITHIN A PLENUM.

SDR 35 IS NOT ACCEPTABLE FOR UNDER BUILDING USE.

34. VENT FLASHING

EACH VENT FLASHING SHALL BE MADE WATER-TIGHT WITH THE ROOF BY PROPER WATER PROOF FLASHING.

35. SANITARY WASTE, VENT AND WATER CONNECTIONS

THE MINIMUM SIZE OF WASTE, VENT, AND WATER CONNECTION TO THE INDIVIDUAL FIXTURES SHALL BE AS SHOWN ON DRAWINGS.

WHERE FIXTURES ARE GROUPED PIPES SHALL BE INCREASED IN PROPORTION: IN ALL CASES THE SIZE ARRANGEMENTS AND CONNECTIONS OF WATER AND VENT PIPING SHALL NOT BE LESS THAN SIZE OF OPENINGS SPECIFIED FOR FIXTURES AND APPEARING IN FIXTURE LIST. NO WATER PIPE LESS THAN 1/2" SHALL BE INSTALLED IN CONCEALED PLACES SUCH AS IN PARTITIONS OR WALLS ETC.

36. PLUMBING FIXTURES AND TRIM

PLUMBING FIXTURES SHALL BE FURNISHED AND INSTALLED IN A NEAT AND WORKMANLIKE MANNER WITH PROPER CONNECTIONS TO SUPPLY AND DRAINAGE PIPING. ALL FIXTURES SHALL BE FREE OF FLAWS AND DEFECTS OF ANY SORT IN MATERIAL AND WORKMANSHIP AND SHALL OPERATE PERFECTLY WHEN INSTALLED IN ACCORDANCE WITH MANUFACTURER'S DIRECTION.

MATERIALS: FIXTURES SHALL BE THE STANDARD PRODUCT OF ONE OF THE MANUFACTURER'S LISTED IN THE PLUMBING FIXTURE SCHEDULE, OR ANY EQUAL UNIT APPROVED BY THE ENGINEER.

INSTALLATION: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE PLUMBING FIXTURES AND ACCESSORIES DURING CONSTRUCTION. HE SHALL REPLACE AT HIS EXPENSE ANY MATERIAL THAT IS MARRED, SCRATCHED, DEFACED AND/OR BROKEN. FIXTURES SHALL BE COVERED WITH BUILDING PAPER AND WOODEN CRATES DURING CONSTRUCTION.

CONTRACTOR SHALL COORDINATE EXACT AND PROVIDE ROUGH-IN LOCATIONS WITH FIELD CONDITIONS AND PLANS PRIOR TO ANY WORK. CONTRACTOR SHALL CONNECT ALL FIXTURES TO THE PLUMBING SYSTEM.

ALL FIXTURES TO BE INSTALLED TO DIMENSIONS WITH CHROME-PLATED SUPPLIES WITH STOPS. ALL FIXTURES INSTALLED TO DIMENSIONS SHOWN ON THE DRAWINGS. ALL WATER CLOSETS SHALL HAVE CAULKING BETWEEN THE FLOOR AND UNDERSIDE OF THE WATER CLOSET.

PLUMBING EQUIPMENT: (REFER TO SCHEDULE ON THE DRAWINGS).

2

37. WATER HEATER ** STORAGE TANK TYPE ELECTRICAL COMMERCIAL USE WATER HEATER **

PROVIDE 40 GALLONS ELECTRICAL STORAGE TANK TYPE WATER HEATER ABOVE MOP SINK. REFER TO THE PLUMBING FIXTURE SCHEDULE ON SHEET #P1.0 FOR WATER HEATER SPECIFICATIONS AND TO THE INSTALLATION DETAILS #8 ON SHEET #P2.0.

1	SCALE N.T.S.	PLUMBING SPECIFICATIONS, SYMBOLS AND ABBREVIATIONS

MATTRESS WAREHOUSE

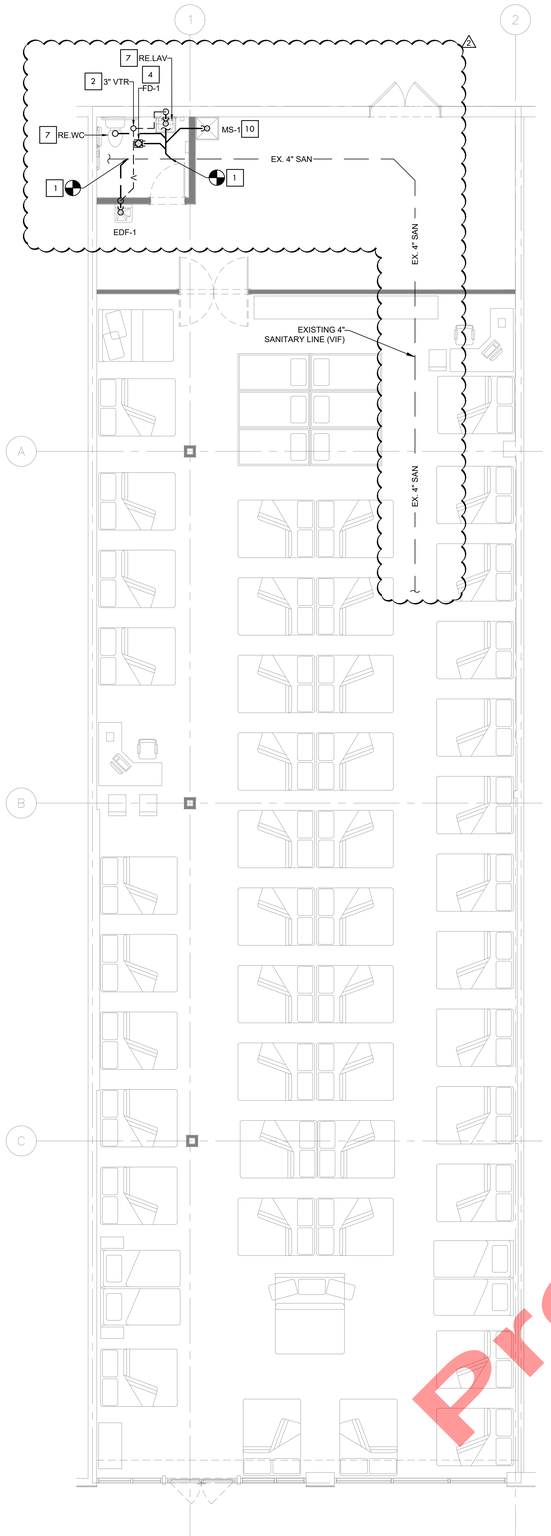
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PLUMBING SPECIFICATIONS, SYMBOLS AND ABBREVIATIONS

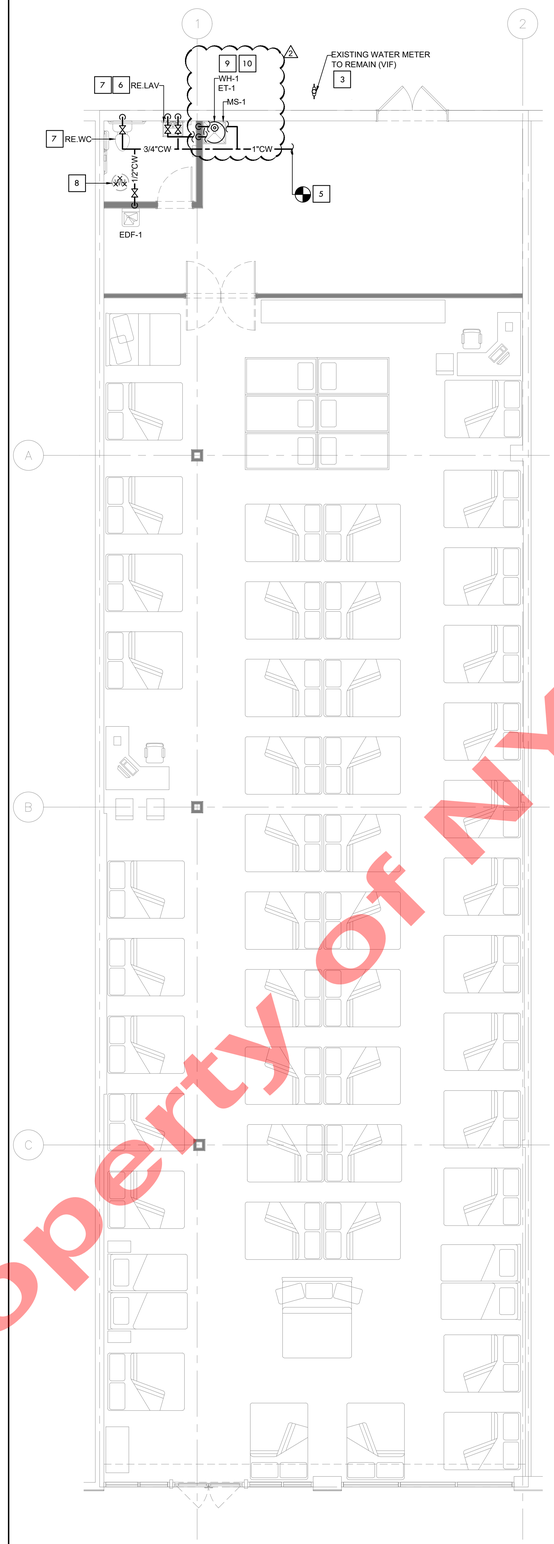
SHEET

P0.1

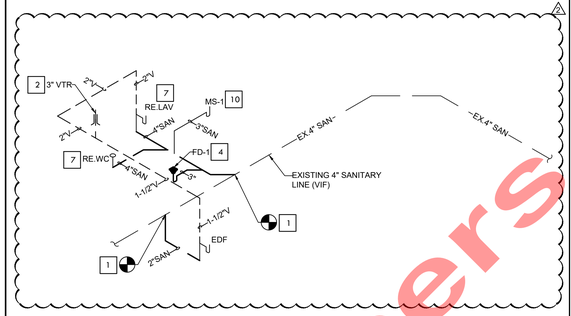
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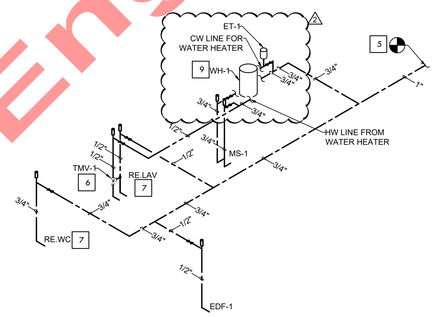
1 | SCALE 3/16" = 1' - 0" | PLUMBING SANITARY AND VENT PIPING PLAN



2 | SCALE 3/16" = 1' - 0" | PLUMBING WATER PIPING PLAN



3 | SCALE N.T.S. | SANITARY AND VENT ISOMETRIC DIAGRAM



4 | SCALE N.T.S. | DOMESTIC WATER ISOMETRIC DIAGRAM

GENERAL NOTES:

1. ANY CHANGES AND/ OR UPGRADES TO TENANT'S EXISTING PLUMBING SYSTEMS SHALL COMPLY WITH ALL CODES AND MALL CRITERIA. EXISTING SYSTEMS SHALL POSSESS THE CAPACITY TO HANDLE ANY AND ALL CHANGES IN LOAD.
2. ALL WATER LINES SHALL BE COPPER, TYPE-L. THERE SHALL BE NO PIPING JOINTS OF FITTINGS INSTALLED IN WATER PIPING BELOW THE FLOOR SLAB.
3. PLUMBING IS NOT PERMITTED IN ANY DEMISING PARTITIONS. FURROUT THE WALL AS\ NECESSARY.
4. EXHAUST AND PLUMBING VENTS SHALL BE LOCATED A MINIMUM OF 10'-0" AWAY FROM ANY OUTSIDE AIR INTAKE, AND 5'-0" FROM ANY DEMISING WALL VERTICAL PLANE.
5. ALL FLOOR DRAINS ARE REQUIRED TO HAVE TRAP PRIMERS.
6. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.
7. ALL FLOOR PENETRATIONS MUST BE CORE BORED, SLEEVED, GROUTED, SEALED AND MADE WATERPROOF. SLEEVES MUST EXTEND A MINIMUM OF 4" AFF.
8. IF NOT ALREADY EXISTING, INSTALL A SHUT OFF VALVE ON DOMESTIC WATER LINE INSIDE SPACE.
9. TENANT IS REQUIRED TO INSTALL A WATERPROOF MEMBRANE IN ALL WET AREAS OF THE SPACE. TENANT SHALL USE A 30 MIL POLYETHYLENE CLEAVAGE MEMBRANE (EQUAL TO NOBLESEAL TS) INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND ANSI A108. MEMBRANE MUST BE EXTENDED UP THE WALL A MINIMUM OF 6" OR EQUAL TO THE HEIGHT OF THE FLOOR BASE.
10. NO ROOF PENETRATIONS PERMITTED WITHIN ROOF WATER PLY, REFER TO ROOF PLAN FOR LOCATIONS.
11. REFER TO RISER DIAGRAM FOR ALL WATER, WASTE AND VENT SIZES.
12. THE SUSPENSION OF ANY ITEMS FROM BASE BUILDING STRUCTURE BY MEANS OF DRILLING, WELDING, SHOOTING ARE PROHIBITED. CONTRACTOR TO MAKE SURE ALL THE EQUIPMENTS AND PIPES TO BE SUPPORTED BY MEANS OF THE BEAM CLAMPS.
13. ALL SANITARY PIPING CONNECTING TO AND DOWNSTREAM OF TOILETS SHALL BE 4" OR LARGER.
14. NO 90° HORIZONTAL TURNS SHALL BE USED IN THE SANITARY PIPING SYSTEM. ALL HORIZONTAL TURNS SHALL BE MADE WITH 45° ELBOWS WITH PIPE IN BETWEEN THE TWO ELBOWS.
15. COORDINATE OVERALL PIPING DIAMETER (INCLUDING INSULATION) WITH WALL DEPTH.
16. NOTIFY ARCHITECT IF OVER ALL PIPE DIAMETER EXCEEDS WALL DEPTH.
17. ALL UNDERGROUND SANITARY WASTE AND VENT PIPING SHALL BE PVC, DWV SOLID WALL SCHEDULE 40 WITH SOCKET-TYPE, SOLVENT WELDED JOINTS IN SIZES UP TO 12" / 14" AND LARGER PIPING SHALL BE PVC, DWV SOLID WALL SCHEDULE 80 WITH SOCKET TYPE, SOLVENT WELDED JOINT. ALL PVC PIPING SHALL BE INSTALLED IN ACCORDANCE TO ASTM D2321. HUBLESS CAST IRON IS THE APPROVED SUBSTITUE MATERIAL FOR DRAIN. CONTRACTOR TO CO-ORDINATE WITH THE AHJ FOR THE MATERIAL AS PER THE LOCAL AHJ.
18. ALL HORIZONTAL SANITARY, WASTE, & STORM PIPING SHALL BE SLOPED AT 1/8" PER FOOT, UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, IN DIRECTION OF FLOW.
19. ALL PLUMBING SHUTOFF VALVE SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND SHALL BE EASILY ACCESSIBLE EASILY ACCESSED FOR FUTURE OPERATION
20. CONTRACTOR SHALL FIELD VERIFY IF SPACE HAS EXISTING BACKFLOW PREVENTER AND SHUT-OFF VALVE PRIOR TO BID. IF NOT PROVIDE NEW ASSEMBLY PER CODE.

KEYED NOTES:

1. EXTEND AND CONNECT NEW 2" / 4" SANITARY PIPING TO THE EXISTING SANITARY LINE RUNNING IN THE SPACE. CONTRACTOR SHALL VERIFY THE MAIN SANITARY PIPE SIZE, ROUTING, INVERT, DIRECTION OF FLOW & TIE-IN CONNECTION PRIOR TO BID.
2. CONNECT NEW 2" VENT LINE TO NEW 3" VENT THRU ROOF. CONTRACTOR TO FIELD VERIFY THE VTR TO BE INSTALLED 10FT AWAY FROM ANY MECHANICAL UNITS.
3. EXISTING WATER METER TO BE REMAIN AT THE EXISTING LOCATION WITH ASSOCIATED ACCESSORIES AND FITTINGS. CONTRACTOR TO VERIFY IN FIELD THE SAME TO BE IN WORKING CONDITION. PROVIDE NEW WATER METER IF IT IS NOT IN WORKING CONDITION. BASE BID ACCORDINGLY.
4. PROVIDE THE TRAP PRIMER FOR THE FLOOR DRAIN (FD-1).
5. EXTEND AND CONNECT NEW 1" COLD WATER LINE TO THE EXISTING COLD WATER LINE IN THE SPACE. CONTRACTOR TO VERIFY IN FIELD ROUTING, SIZE AND LOCATION. UPGRADE THE EXISTING COLD WATER LINE SIZE IF NOT SUFFICIENT.
6. PROVIDE APPROVED ASSE 1070 THERMOSTATIC MIXING VALVE (TMV-1) SET TO 110°F AT LAVATORY.
7. RELOCATE EXISTING LAVATORY AND WATER CLOSET WITH ASSOCIATED ACCESSORIES AND FITTINGS AS SHOWN ON THE FLOOR PLAN. CONTRACTOR TO FIELD VERIFY EXISTING LAVATORY AND WATER CLOSET CONDITION AND PROVIDE NEW IF NOT IN GOOD CONDITION.
8. EXISTING PLUMBING EQUIPEMENT TO BE DEMOLISHED AS SHOWN ON FLOOR PLAN, EXISTING WATER LINE TO BE DEMOLISHED AND SAME TO BE CAPPED AT FIXTURE.
9. PROVIDE A NEW STORAGE TANK TYPE ELECTRIC WATER HEATER (WH-1) WITH ASSOCIATED ACCESSORIES AND FITTINGS. WATER HEATER INSTALL ABOVE MOP SINK (MS-1). REFER PLUMBING SCHEDULE ON SHEET #P-1.0 FOR MORE DETAILS.
10. ROUTE T AND P INDIRECT WASTE FROM WATER HEATER (WH-1) TO MOP SINK WITH APPROVED AIR GAP.

PLUMBING FIXTURE SCHEDULE

TAG	PLUMBING FIXTURE	DESCRIPTION	CONNECTION SIZE - INCHES				REMARK
			SOIL/WASTE	VENT	COLD WATER	HOT WATER	
RE.WC	RELOCATED WATER CLOSET	EXISTING TO BE RELOCATED	4"	-	¾"	¾"	-
RE.LAV	RELOCATED LAVATORY	EXISTING TO BE RELOCATED	2"	2"	½"	½"	PROVIDE ASSE 1070 APPROVED THERMOSTATIC MIXING VALVE SET TO 110°F.
MS-1	MOP SINK	MAKE: FIAT MODEL: MSB-24-24	3"	-	¾"	¾"	FIAT 24"X24" MOP SERVICE BASIN WITH NO. 830 AA, 889 CC, 1453 BB AND 832 AA SERVICE FAUCET, WALL GUARD, STRAINER AND MOP HANGER. PROVIDE ALL REQUIRED ACCESSORIES AS PER MANUFACTURER REQUIREMENT.
EDF-1	ELECTRIC DRINKING FOUNTAIN	MAKE: ELKAY MODEL: EZS8L	2"	½"	½"	-	WALL MOUNT ADA COOLER NON-FILTERED REFRIGERATED, LIGHT GRAY GRANITE FINISH.
WH-1	WATER HEATER	NEW STORAGE TANK ELECTRIC WATER HEATER, MAKE: RHEEM, XE40M06ST45U1 OR SIMILAR	-	-	¾"	¾"	40-GALLON ELECTRIC WATER HEATER. 4.5 KW @ 240V. MAKE:RHEEM, MODEL:XE40M06ST45U1 OR SIMILAR. PROVIDE DRAIN PAN UNDER FLOOR MOUNTED WATER HEATER, TERMINATE DRAIN LINE IN MOP SINK. PROVIDE FULL SIZE T&P RELIEF LINE, TERMINATE 2" ABOVE RIM LEVEL OF MOP SINK. PROVIDE ALL REQUIRED ACCESSORIES AS PER MANUFACTURER'S INSTRUCTIONS. DIMENSIONS: 20.25"(DIA) X 48.50"(HT.) PROVIDE EXPANSION TANK (ET-1) AMTROL ST-5C-DD. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
FD-1	FLOOR DRAIN	JAY R. SMITH ZN415-B-P	3"	-	-	-	PROVIDE TRAP PRIMER CONNECTION WATTS TP300 OR EQUIVALENT.
FCO	FLOOR CLEAN OUT	JAY R. SMITH 4105 SERIES	3"	-	-	-	-
TMV-1	THERMOSTATIC MIXING VALVE	WATTS MODEL: LFE-480	-	-	½"	½"	THERMOSTATIC WATER MIXING VALVE MODEL LFE-480, INTEGRAL COMBINATION CHECK STOPS WITH STRAINERS, TEMPERATURE RANGE: 80°F TO 120 °F, FLOW CAPACITY OF A MINIMUM OF 0.5 GPM.

NOTE : CONTRACTOR TO COORDINATE WITH ARCHITECTURAL / OWNER FOR ALL PLUMBING FIXTURES SPECIFICATIONS AND MOUNTING HEIGHT INSTALLATION.

5 | SCALE N.T.S. | PLUMBING FIXTURE SCHEDULE

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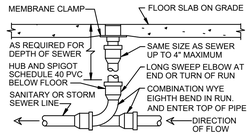
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PLUMBING PLANS, RISERS AND SCHEDULE

SHEET

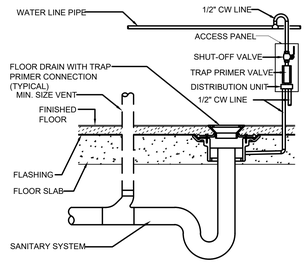
P1.0

PROVIDE ROUND SECURED NICKEL BRONZE ADJUSTABLE TOP WITH "CO" CAST IN COVER. PROVIDE CLEANOUT TOP WITH VARIATIONS SUITABLE FOR FLOOR COVERING (CARPET MARKER, RECESSED FOR TILE, SCORATED FOR UNFINISHED FLOORS). PROVIDE BRONZE PLUG IN CAST IRON BODY.

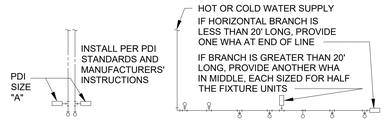


LOCATE AT BUILDING EXIT, AT ENDS OF RUNS, AT TURNS OF PIPE GREATER THAN 45 DEGREES, AT 50' INTERVALS ON STRAIGHT RUNS, AND WHERE SHOWN ON PLANS. PROVIDE BACKFILL PER ARCHITECTURAL SPECIFICATIONS. LOCATE CLEANOUTS WHERE THERE IS 18" CLEAR AROUND. CONSULT LOCAL CODES FOR OTHER FCO REQUIREMENTS.

1	SCALE	FLOOR CLEAN OUT DETAIL
	N.T.S.	



2	SCALE	FLOOR DRAIN WITH TRAP PRIMER
	N.T.S.	



SINGLE FIXTURE

PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD
A	1/2"	1-11
B	3/4"	12-32
C	1"	33-60
D	1-1/4"	61-113
E	1-1/2"	114-154
F	2"	155-330

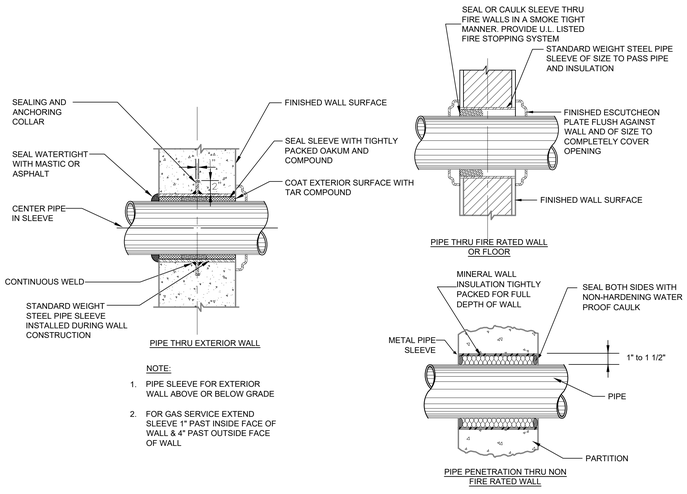
MULTIPLE FIXTURES

FIXTURE UNIT TABULATION

FIXTURE	COLD	HOT
VALVE WATER CLOSET	5	--
URINAL	5	--
COUNTER SINK	1.5	1.5
LAVATORY	1.5	1.5
MOP BASIN	2.25	2.25
WATER COOLER	.25	--

PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUAL WITH PISTON AND O-RING CONSTRUCTION HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL INLINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE UNITS PER TABLES ABOVE.

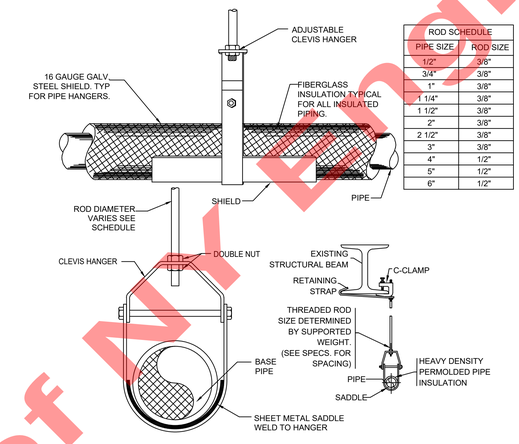
3	SCALE	WATER HAMMER ARRESTOR
	N.T.S.	



NOTE:

1. PIPE SLEEVE FOR EXTERIOR WALL ABOVE OR BELOW GRADE
2. FOR GAS SERVICE EXTEND SLEEVE 1" PAST INSIDE FACE OF WALL & 4" PAST OUTSIDE FACE OF WALL

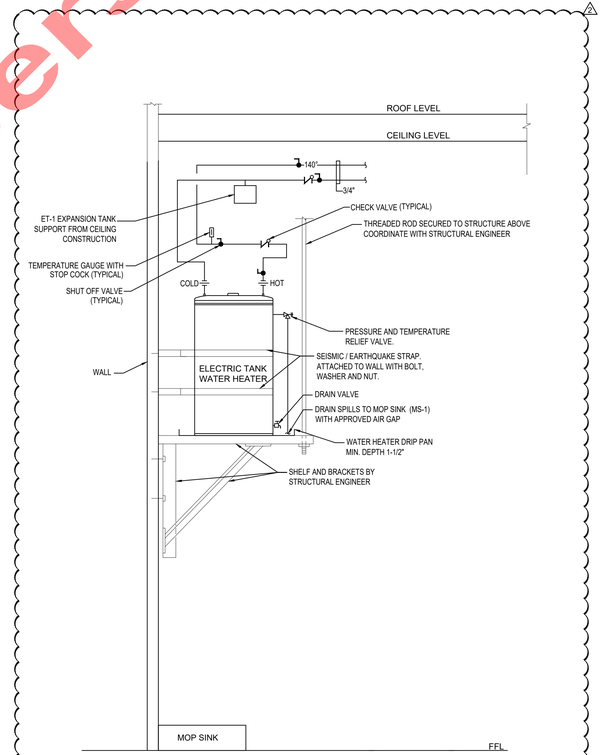
4	SCALE	PIPE SLEEVE THROUGH WALL SECTION
	N.T.S.	



ROD SCHEDULE

PIPE SIZE	ROD SIZE
1/2"	3/8"
3/4"	3/8"
1"	3/8"
1 1/4"	3/8"
1 1/2"	3/8"
2"	3/8"
2 1/2"	3/8"
3"	3/8"
4"	1/2"
5"	1/2"
6"	1/2"

5	SCALE	HANGER DETAIL
	N.T.S.	



NOTE:

1. CONTRACTOR TO COORDINATE WITH STRUCTURAL ENGINEER FOR WATER HEATER PLATFORM.
2. WATER HEATER STRAPPING SHALL BE AT POINT WITHIN THE UPPER ONE THIRD LOWER ONE-THIRD IF ITS VERTICAL DIMENSION. AT HE LOWER POINT, A MINIMUM (1/3) AND DISTANCE OF FOUR (4) INCHES SHALL BE MAINTAINED ABOVE THE CONTROLS WITH THE STRAPPING.
3. PROVIDE A MINIMUM 1-1/2-INCH DEEP, 24-GAUGE MINIMUM THICKNESS GALVANIZED SHEET METAL DRIP PAN UNDER WATER HEATER AND AT ALL LOCATIONS W/ LEAK DETECTION.

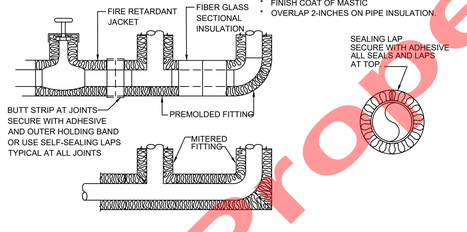
8	SCALE	ELECTRIC WATER HEATER DETAILS
	N.T.S.	

CONCEALED VALVES AND FITTINGS

- WRAP WITH 1-INCH THICK, 1-POUND DENSITY TO REQUIRED PIPE INSULATION THICKNESS
- SECURE WITH WIRE OR TAPE.
- VAPOR SEAL COLD WATER, CHILLED WATER AND STORM WATER PIPING.

CONCEALED VALVES AND FITTINGS

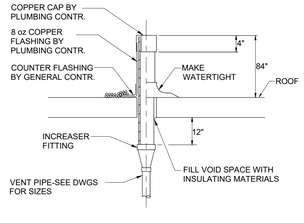
- PREMOLDED FIBER GLASS OR RADIAL MITERED PIPE INSULATION
- SKIM COAT OF INSULATION CEMENT
- COAT OF MASTIC
- WRAP WITH FIBER GLASS REINFORCING CLOTH.
- FINISH COAT OF MASTIC
- OVERLAP 2-INCHES ON PIPE INSULATION.



6	SCALE	PIPE INSULATION DETAIL
	N.T.S.	

NOTES:

1. MINIMUM SIZE OF VENT EXTENSION THROUGH ROOF TO BE 4".
2. CHANGE OF DIAMETER TO BE MADE AT LEAST 12" BELOW ROOF.
3. VENT PIPE TO EXTEND UP TO 7'-0" ABOVE ROOF IN ACCESSIBLE ATERTIGHT BY PROPER FLASHING.
4. ALL VENT RISERS SHALL BE OFFSET AS REQUIRED TO CLEAR ROOF STRUCTURE DUCTWORK OR MECH. ROOF TOP UNITS.
5. PLUMBING CONTRACTOR TO COORDINATE WITH OTHER TRADES.
6. ROOFING CONTRACTOR SHALL SUPPLY BOOT FLASHING FOR RUBBER ROOF SYSTEMS.



7	SCALE	VENT THROUGH ROOF DETAIL
	N.T.S.	

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Description

PLUMBING DETAILS

SHEET

P2.0