8

ELECTRICAL SPECIFICATIONS

SECTION 26 00 00 – COMMON WORK RESULTS FOR ELECTRICAL

1. PERMITS AND CODES: OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND REQUIRED INSPECTIONS. COMPLY WITH ALL NATIONAL, STATE AND MUNICIPAL LAWS, CODES AND ORDINANCES RELATING TO BUILDING AND PUBLIC SAFETY.
2. TEMPORARY POWER: PROVIDE ANY REQUIRED TEMPORARY POWER AND UTILITIES FOR ALL TRADES AND ALL CONSTRUCTION TRAILERS. PROVIDE TEMPORARY CONSTRUCTION LIGHTING AND POWER. ELECTRICAL CONTRACTOR SHALL INCLUDE TEMPORARY ELECTRIC: ALL TEMPORARY ELECTRIC SHALL BE IN ACCORDANCE WITH OSHA CONSTRUCTION STANDARDS 29FCR, PART 1926 AND ARTICLE 590 OF THE 2020 NATIONAL ELECTRICAL CODE. TEMPORARY LIGHTING AND POWER SHALL BE PROVIDED IN ACCORDANCE WITH OSHA STANDARDS. THE OSHA MINIMUM ILLUMINATION IS 5 FOOTCANDLES IN GENERAL CONSTRUCTION AREAS, AND 10 FC IN MECHANICAL / ELECTRICAL ROOMS AND WORKROOMS. INCLUDED ARE CONNECTIONS TO ALL CONSTRUCTION TRAILERS. THE COST OF THIS WORK IS TO BE INCLUDED IN THE BASE ELECTRICAL BID FOR THE PROJECT.
3. TRENCHING REQUIREMENTS: REFER TO SUBCHAPTER C OF CHAPTER 756 OF THE COLORADO HEALTH AND SAFETY CODE FOR REQUIREMENTS APPLICABLE TO TRENCH SAFETY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS, AND NO PROVISION OF THESE DRAWINGS OR SPECIFICATIONS SHALL BE DEEMED TO EXCUSE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS FOR TRENCH SAFETY
4. VISITING THE JOB SITE: VISIT THE SITE OF THE PROPOSED CONSTRUCTION IN ORDER TO FULLY UNDERSTAND THE FACILITIES, DIFFICULTIES AND RESTRICTIONS ATTENDING THE EXECUTION OF THE WORK. NO ADDITIONAL COMPENSATION WILL BE ALLOWED THIS CONTRACTOR FOR WORK OR ITEMS OMITTED FROM HIS ORIGINAL PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF REGARDING SUCH MATTERS AFFECTING THE PERFORMANCE OF THE WORK IN THIS CONTRACT OR NECESSARY FOR THE INSTALLATION AND COMPLETION OF THE WORK INCLUDED HEREIN.
5. DRAWINGS: DRAWINGS ARE DIAGRAMMATIC; CONFIRM DIMENSIONS & LOCATIONS IN THE FIELD. IF CONFLICTING DIMENSIONS ARE SHOWN, USE LARGER DIMENSIONS AND VERIFY WITH ARCHITECT. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF FIXTURES AND WALL MOUNTED DEVICES.

6. MATERIAL: ALL MATERIALS SHALL BE NEW, MADE IN USA AND U.L. LISTED. MATERIAL INSTALLATION SHALL COMPLY WITH NEC REQUIREMENTS AND PERFORM BY CRAFTSMEN SKILLED IN THIS PARTICULAR WORK.

7. EQUIPMENT PROTECTION: PROTECT EQUIPMENT AND WORK FROM DAMAGE DURING HANDLING AND INSTALLATION UNTIL COMPLETION OF CONSTRUCTION.

8. COORDINATION WITH OTHERS: COOPERATION WITH TRADES OF ADJACENT, RELATED OR AFFECTED MATERIALS OR OPERATIONS, AND WITH TRADES PERFORMING CONTINUATIONS OF THIS WORK UNDER SUBSEQUENT CONTRACTS, IS CONSIDERED A PART OF THIS WORK IN ORDER TO EFFECT TIMELY AND ACCURATE PLACING OF WORK AND TO BRING TOGETHER, IN PROPER AND CORRECT SEQUENCE, THE WORK OF SUCH TRADES. PROVIDE OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS AND SHOP DETAILS FOR THE PROPER INSTALLATION OF THE WORK AND FOR THE PURPOSE OF COORDINATING ADJACENT WORK. ELECTRICAL POWER CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE IN THIS DIVISION UNLESS NOTED OTHERWISE. VERIFY ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT WITH DIVISION 15 AND OTHER SPECIAL DIVISIONS (ELEVATORS ETC) BEFORE ROUGHING IN THE ELECTRICAL CONNECTIONS AND ENERGIZING THE EQUIPMENT. REMOVE ANY IMPROPERLY INSTALLED ELECTRICAL EQPT AND CONDUIT THAT ARE LIMITING PROPER ACCESS FOR MECH/PLUMBING/SPECIAL EQPT SERVICE AND MAINTENANCE.
9. ACCESS DOORS: PROVIDE *MILCOR* OR EQUAL AS REQUIRED FOR ACCESS FOR ALL DEVICES REQUIRING ADJUSTMENT. SIMILARLY FOR ALL JUNCTION BOXES, PULL BOXES, ETC. THAT ARE REQUIRED TO BE ACCESSIBLE PER CODE AND/OR THE LOCAL AUTHORITY HAVING JURISDICTION. APPEARANCE OF ACCESS PANELS/DOORS SHALL BE ACCEPTABLE TO ARCHITECT. DOORS SHALL MATCH WALL OR CEILING RATING. ARCHITECT MUST APPROVE LOCATION AND APPEARANCE OF ALL ACCESS DOORS.

10. CLEAN UP: PROVIDE FOR ISOLATION OF WORK AREAS AND DAILY REMOVAL OF DEBRIS. CLEAN ALL EQUIPMENT AND FIXTURE LENSES. REPLACE ALL BURNED OUT LAMPS. TOUCH UP WITH PAINT WHERE REQUIRED.

11. SHOP DRAWINGS: SUBMIT COMPLETE INFORMATION ON ALL EQUIPMENT, LIGHT FIXTURES, GENERATOR, FIRE ALARM SYSTEM, CONDUIT/FITTINGS, WIRE, AND DEVICES. OVERCURRENT (OC) & DISCONNECT DEVICES SHOWN ON PLANS ARE BASED ON A SPECIFIC HVAC EQUIPMENT MANUFACTURER. HVAC CONTRACTOR MAY SUBMIT OTHER MANUFACTURERS, DIFFERENT MODELS OR RATINGS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE OC/DISCONNECT DEVICES WITH THE HVAC CONTRACTOR PRIOR TO SUBMITTING SUCH DEVICES FOR ENGINEER'S REVIEW. SUBMIT DETAILED LAYOUT OF ELECTRICAL ROOMS. INCOMPLETE SUBMITTALS WILL BE RETURNED TO THE CONTRACTOR UNREVIEWED. NO TIME EXTENSIONS OR COST INCREASES WILL BE ALLOWED FOR DELAYS CAUSED BY RETURN OF INCOMPLETE SUBMITTALS.

12. RECORD DRAWINGS: WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, PROVIDE RECORD DRAWINGS IN CAD/REVIT FORMAT (USING THE SAME SOFTWARE AND VERSION THE PROJECT WAS DESIGNED IN), PLUS FULL SIZE HARD COPY. ELECTRONIC DRAWINGS MAY BE AVAILABLE FROM ENGINEER FOR A FEE. RECORD DRAWINGS SHALL INCLUDE EXACT DIMENSIONS AND LOCATION FOR ALL UNDER-SLAB CONDUIT, SWITCHGEAR, PANELBOARDS, TRANSFORMERS, EQUIPMENT, AND REVISED HOMERUN CIRCUIT LOCATIONS.

13. FINAL INSPECTION & TESTING: ALL ELECTRICAL SYSTEMS MUST BE CHECKED FOR PROPER POLARITY AND SEQUENCE, ALL MOTORS MUST BE CHECKED FOR PROPER ROTATION AND ALL EQUIPMENT CHECKED FOR PROPER VOLTAGE AND PHASING REQUIREMENTS. PRIOR TO THE APPLICATION OF ANY POWER, THE CONTRACTOR MUST CERTIFY THAT ALL CONNECTED EQUIPMENT MATCH THE CHARACTERISTICS OF THE SUPPLY CIRCUIT VOLTAGE, PHASING AND FEEDER REQUIREMENTS. AFTER ALL SYSTEMS HAVE BEEN COMPLETED AND PUT INTO OPERATION, SUBJECT EACH SYSTEM TO AN OPERATING TEST UNDER DESIGN CONDITIONS TO ENSURE PROPER SEQUENCE AND OPERATION THROUGHOUT THE RANGE OF OPERATION. MAKE ADJUSTMENTS AS REQUIRED TO ENSURE PROPER FUNCTIONING OF ALL SYSTEMS. SPECIAL TESTS ON INDIVIDUAL SYSTEMS ARE SPECIFIED UNDER INDIVIDUAL SECTIONS

SECTION 26 05 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

1. WIRE: (TRIANGLE, AMERICAN INSULATED CABLE CO., OR CABLEC)
2. ALL WIRING SHALL BE IN CONDUIT (EXCEPT PLENUM RATED LOW VOLTAGE CABLES). ALL WIRES MUST BE 75°C RATED OR BETTER, 60°C RATED WIRE SHALL NOT BE USED. 90°C RATED WIRE MAY BE USED BUT ONLY AT 75°C AMPACITY. EMERGENCY AND NORMAL CIRCUITS MUST BE INSTALLED IN SEPARATE CONDUIT AND DEVICE BOXES PER N.E.C. ARTICLE 700.9.(B).
   A. MINIMUM SIZE #12 EXCEPT CONTROLS MAY BE #14. USE #10 CONDUCTORS FOR 20 AMPERE, 120 VOLT BRANCH CIRCUITS LONGER THAN 100 FEET. USE #10 CONDUCTORS FOR 20 AMPERE, 277 VOLT BRANCH CIRCUITS LONGER THAN 200 FEET.
   B. TYPE THHN/THWN-2, 90 DEG C, STRANDED COPPER THERMOPLASTIC IN DRY LOCATIONS.
   C. TYPE THWN IN WET LOCATIONS (OUTDOOR, UNDERGROUND, ON ROOF).
   D. ALL WIRE SHALL BE 98% CONDUCTIVITY COPPER, 600 VOLT. ALUMINUM WIRES MAY NOT BE USED.
   E. WIRE #10 AND SMALLER MAY BE SOLID OR STRANDED, #8 OR LARGER SHALL BE STRANDED.
   F. COMMUNICATION WIRES (FIRE ALARM, TELEPHONE, HVAC THERMOSTAT, DATA ETC.): PLENUM RATED LOW-SMOKE CABLE MAY BE USED IN LIEU OF WIRE/CONDUIT TYPE INSTALLATION. ALL PLENUM RATED CABLE SHALL BE PROPERLY SUPPORTED BY BRIDAL RINGS, CABLE TIES, CLIPS ETC MADE BY ERICO (CADDY COMMUNICATION FASTENERS) OR EQUAL. DO NOT USE SCRAP WIRE TO WRAP AND SUPPORT COMMUNICATION WIRES. HOMEMADE SUPPORT DEVICES ARE NOT ACCEPTABLE. DO NOT LAY COMMUNICATION CABLE DIRECTLY ON TOP OF CEILING TILES, INSTALL CABLES A MINIMUM OF 12" ABOVE CEILING TILES AND 12" FROM HVAC DUCTWORK. PROVIDE A MINIMUM 6" SEPARATION BETWEEN POWER CONDUIT AND COMMUNICATION WIRINGS.
   G. ALL CABLING IN EXPOSED CEILING AREAS SHALL BE INSTALLED CLEAN AND TIGHT TO STRUCTURE
3. PROVIDE COMMON TRIP MULTI-POLE BREAKERS FOR ALL MULTI-WIRE CIRCUITS PER NEC 2020 ART. 210.4(B).
4. THE COMBINED VOLTAGE DROP FROM FEEDER SOURCE TO BRANCH DEVICE SHALL NOT EXCEED 5%.
5. FIELD INSULATION TESTING: INSULATION RESISTANCE OF ALL CONDUCTORS SHALL BE TESTED. EACH CONDUCTOR SHALL HAVE ITS INSULATION RESISTANCE TESTED AFTER THE INSTALLATION IS COMPLETED AND ALL SPLICES, TAPS AND CONNECTIONS ARE MADE EXCEPT CONNECTION TO OR INTO ITS SOURCE AND POINT (OR POINTS) OF TERMINATION. INSULATION RESISTANCE OF CONDUCTORS WHICH ARE TO OPERATE AT 600 VOLTS OR LESS SHALL BE TESTED BY USING A BIDDLE MEGGER OF NOT LESS THAN 1000 VOLTS DC. INSULATION RESISTANCE OF CONDUCTORS RATED AT 600 VOLTS SHALL BE FREE OF SHORTS AND GROUNDS AND HAVE A MINIMUM RESISTANCE PHASE-TO-PHASE AND PHASE-TO-GROUND OF AT LEAST 10 MEGOHMS. CONDUCTORS THAT DO NOT EXCEED INSULATION RESISTANCE VALUES LISTED ABOVE SHALL BE REMOVED AT CONTRACTOR'S EXPENSE AND REPLACED AND TEST REPEATED. THE CONTRACTOR SHALL FURNISH ALL INSTRUMENTS AND PERSONNEL REQUIRED FOR TESTS, SHALL TABULATE READINGS OBSERVED, AND SHALL FORWARD COPIES OF THE TEST READINGS TO THE OWNER. THESE TEST REPORTS SHALL IDENTIFY EACH CONDUCTOR TESTED, DATE AND TIME OF TEST AND WEATHER CONDITIONS. EACH TEST SHALL BE SIGNED BY THE PARTY MAKING THE TEST.

SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

1. GROUNDING: ALL CONDUIT WORK AND ELECTRICAL EQUIPMENT SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC REQUIREMENTS. PROVIDE GREEN EQUIPMENT GROUNDING CONDUCTOR WITH ALL POWER AND RECEPTACLE AND LIGHTING CIRCUITS. GREEN EQUIPMENT GROUNDING CONDUCTOR SHALL BE ROUTED FROM PANEL GROUND BUS TO FINAL DEVICES.
2. GROUNDING ELECTRODES: PROVIDE 3/4" X 10-FT LONG, COPPER-CLAD, STEEL GROUNDING ROD. FOR BELOW-GRADE CONNECTIONS PROVIDE COMPRESSION C CRIMP; FOR ABOVE GRADE CONNECTIONS PROVIDE MECHANICAL BOLTED-TYPE CONNECTIONS UTILIZING HIGH CONDUCTIVE COPPER ALLOY OR BRONZE LUGS OR CLAMPS. SERVICE GROUND RESISTANCE: MUST BE LESS THAN 25 OHMS. PROVIDE ADDITIONAL GROUND RODS AS REQUIRED TO OBTAIN 5 OHMS OR LESS.
3. GROUNDING CONDUCTORS: ROUTE ALONG SHORTEST AND STRAIGHTEST PATHS POSSIBLE. AVOID OBSTRUCTING ACCESS OR PLACING CONDUCTORS WHERE THEY MAY BE SUBJECTED TO STRAIN, IMPACT, OR DAMAGE.
4. GROUNDING AND BONDING FOR PIPING:
   A. METAL WATER SERVICE PIPE: INSTALL INSULATED COPPER GROUNDING CONDUCTORS, IN CONDUIT, FROM BUILDING'S MAIN SERVICE EQUIPMENT, OR GROUNDING BUS, TO MAIN METAL WATER SERVICE ENTRANCES TO BUILDING. CONNECT GROUNDING CONDUCTORS TO MAIN METAL WATER SERVICE PIPES; USE A BOLTED CLAMP CONNECTOR OR BOLT A LUG-TYPE CONNECTOR TO A PIPE FLANGE BY USING ONE OF THE LUG BOLTS OF THE FLANGE. WHERE A DIELECTRIC MAIN WATER FITTING IS INSTALLED, CONNECT GROUNDING CONDUCTOR ON STREET SIDE OF FITTING. BOND METAL GROUNDING CONDUCTOR CONDUIT OR SLEEVE TO CONDUCTOR AT EACH END.
   B. WATER METER PIPING: USE BRAIDED-TYPE BONDING JUMPERS TO ELECTRICALLY BYPASS WATER METERS. CONNECT TO PIPE WITH A BOLTED CONNECTOR.
   C. BOND EACH ABOVEGROUND PORTION OF GAS PIPING SYSTEM DOWNSTREAM FROM EQUIPMENT SHUTOFF VALVE.

SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

1. SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS:
   A. GALVANIZED-STEEL SLOTTED SUPPORT SYSTEMS WITH METALLIC COATINGS.
   B. ALUMINUM SLOTTED SUPPORT SYSTEMS WITH NONMETALLIC COATINGS.
   C. NONMETALLIC SLOTTED SUPPORT SYSTEMS.
   D. RACEWAYS AND CABLE SUPPORTS.
   E. STEEL CONDUITS AND CABLE HANGERS, CLAMPS, AND ASSOCIATED ACCESSORIES.
   F. SUPPORT FOR NONARMORED CONDUCTORS AND CABLES IN VERTICAL CONDUIT RISERS.
   G. STRUCTURAL STEEL FOR FABRICATED SUPPORTS AND RESTRAINTS.
2. MOUNTING, ANCHORING, AND ATTACHMENT COMPONENTS:
   A. POWDER-ACTUATED FASTENERS.
   B. MECHANICAL-EXPANSION ANCHORS.
   C. CONCRETE INSERTS.
   D. CLAMPS FOR ATTACHMENT TO STEEL STRUCTURAL ELEMENTS.
   E. STEEL SPRINGHEAD TOGGLE BOLTS.
   F. THREADED HANGER RODS.
   G. FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES: WELDED OR BOLTED STEEL SHAPES.
3. CONCRETE BASES: 3000-PSI, 28-DAY COMPRESSIVE-STRENGTH CONCRETE.

4. MAXIMUM SUPPORT SPACING AND MINIMUM HANGER ROD SIZE FOR RACEWAY: SPACE SUPPORTS FOR EMTS, IMCS, AND RMCS AS REQUIRED BY NFPA 70. MINIMUM ROD SIZE SHALL BE 1/4 INCH IN DIAMETER. MULTIPLE RACEWAYS OR CABLES: INSTALL TRAPEZE-TYPE SUPPORTS FABRICATED WITH STEEL SLOTTED OR OTHER SUPPORT SYSTEM, SIZED SO CAPACITY CAN BE INCREASED BY AT LEAST 25 PERCENT IN FUTURE WITHOUT EXCEEDING SPECIFIED DESIGN LOAD LIMITS. ALL SUPPORTS SHALL BE INDEPENDENT OF FIRE, PLUMBING, MECHANICAL, AND TELECOM.

SECTION 26 05 33 – RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

1. CONDUIT: SHALL BE RIGID GALVANIZED STEEL (RGS) OR ELECTRICAL METALLIC TUBING (EMT) AS MANUFACTURED BY ALLIED, TRIANGLE OR WHEATLAND.
2. INDOORS ABOVE GRADE: EMT OR RGS. AMERICAN CONDUIT PULLEASE ALUMINUM EMT IS ACCEPTABLE. PER UL 514B, BOTH STEEL AND DIECAST FITTINGS ARE APPROVED FOR USE WITH ALUMINUM EMT. DO NOT USE FLAT STEEL FISHTAPES WITH ALUMINUM EMT. FOR SMALLER SIZES USE ONLY ROUND FIBERGLASS FISHTAPES. FOR LARGER SIZES USE POLYPROPYLENE STYLE ROPE.
3. INDOORS OR OUTDOORS ABOVE GRADE, STUB-UPS, ON ROOF, MECHANICAL ROOMS, OR WHERE SUBJECT TO PHYSICAL DAMAGE: RGS.
4. BELOW GRADE: SCHEDULE 40 PVC OR RGS. PROVIDE TRANSITION FITTINGS FROM PVC SCH 40 TO RGS FOR ALL ABOVE GRADE CONDUIT. ALL UNDERGROUND METALLIC CONDUIT SHALL HAVE 40-MIL THICK EXTERNAL PVC COATING FOR CORROSION PROTECTION. UNDERGROUND CONDUIT MINIMUM SIZE 1". MINIMUM BURIAL DEPTH PER NEC 300.5 FROM FINISHED GRADE TO TOP OF CONDUIT. PROVIDE CONCRETE ENCASEMENT FOR ALL INCOMING SERVICE CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE. PROVIDE RED DETECTABLE WARNING TAPE OVER ENTIRE RUN OF SERVICE AND MAJOR CONDUIT RUNS.
5. UNDER SLAB: RGS, SCHEDULE 40 PVC.
6. INSTALL GROUND WIRES WHERE SHOWN ON THE DRAWINGS. COMPRESSION OR SET-SCREW TYPE FITTINGS MAY BE USED FOR EMT. MINIMUM CONDUIT SIZE 3/4 INCH, HOWEVER HOMERUN TO PANEL SHALL BE MINIMUM 3/4 INCH.
7. TYPE "MC" METAL CLAD CABLE IS ACCEPTABLE ONLY IF APPROVED BY THE OWNER IN WRITING AND THE LOCAL AUTHORITY. MC CABLE, IF APPROVED, HOWEVER, MAY BE USED ONLY FOR DROPS FROM CEILING PLENUM JUNCTION BOXES TO RECEPTACLES AND LIGHT SWITCHES IN WALLS. MC CABLE MAY ALSO BE USED AS FIXTURE WHIPS FROM CEILING PLENUM JUNCTION BOXES TO LIGHT FIXTURES, WHIPS MUST BE 6-FT OR LESS. HOMERUN CIRCUITS TO PANELS SHALL BE IN CONDUIT, MC HOMERUN TO PANELS ARE NOT ACCEPTABLE. TYPE "AC" ARMORED CABLE (COMMONLY REFERRED TO AS "BX") IS NOT ACCEPTABLE AND SHALL NOT BE USED. KAF-TECH ATKORE MC GLIDE-LITE ALUMINUM MC CABLE IS ACCEPTABLE. IF USED, AN ALUMINUM CABLE ARMOR SHALL HAVE A CONTINUOUS LOW-PROFILE CONVOLUTION MINIMIZING LOW SPOTS TO PREVENT INSTALLATION DAMAGE IN ACCORDANCE WITH MC GLIDE-LITE. THE LOW-PROFILE ARMOR SHALL BE APPLIED OVER THE CABLED WIRE ASSEMBLY WITH AN INTERLOCK IN COMPLIANCE WITH SECTION 5 OF UL 1569. INSTALLATION SHALL BE PER MANUFACTURER RECOMMENDATIONS. OKONITE OR SOUTHWIRE MC IS PREFERRED
8. ELECTRICAL NONMETALLIC TUBING (ENT, NEC ARTICLE 362) SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. FLEXIBLE CONDUIT SHALL BE UTILIZED AS FINAL CONNECTIONS (3'-6' ONLY) AT THE FOLLOWING EQUIPMENT: MOTORS, LIGHTING FIXTURES, HEATER, POWER SUPPLIES, AND ANY OTHER VIBRATION PRODUCING EQUIPMENT. UTILIZE 3/4" FLEXIBLE METALLIC CONDUIT MINIMUM AND INCLUDE A GREEN GROUND WIRE. USE SEALTITE LFMC IN WET LOCATIONS SUCH AS OUTDOOR CONDENSING UNITS, WALK-IN COOLER/FREEZER, KITCHEN, ROOFTOP HVAC EQPT, ETC. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE EVERY 5 FEET AND WITHIN 3 FEET OF ALL BOXES. USE LOCKNUTS INSIDE AND OUT AT BOXES. MAINTAIN MINIMUM 12" SEPARATION FROM ALL HIGH TEMPERATURE PIPES. ALL CONDUIT RUNS SHALL BE INSTALLED EITHER PARALLEL OR PERPENDICULAR TO BUILDING LINES. ROUTE CONDUIT AS DIRECTLY AS POSSIBLE WITH LARGEST RADIUS BENDS POSSIBLE. MAKE BENDS WITH STANDARD ELBOWS OR BENDS PER NEC. PROVIDE EXPANSIONS FITTINGS IF CONDUIT CROSSES STRUCTURAL EXPANSION JOINT. ALL CONDUITS ON ROOF SHALL BE SUPPORTED BY AN ENGINEERED, PREFABRICATED PORTABLE PIPE SYSTEM SPECIFICALLY DESIGNED TO BE INSTALLED ABOVE FINISHED ROOF WITHOUT ROOF PENETRATIONS, FLASHINGS OR DAMAGE TO ROOF MEMBRANE.
9. SUPPORT AT INTERVAL NOT TO EXCEED 10' ON CENTER, AND WITHIN 5' OF ANY DEFLECTION OF CONDUIT. CLEAN CONDUIT INTERIOR AFTER INSTALLATION; COAT SCRATCHES WITH ZINC PAINT. PROVIDE PULL WIRE IN ALL CONDUIT (POWER, FIRE ALARM, TELEPHONE AND OTHER COMMUNICATION CONDUIT). PULL WIRE ALSO REQUIRED IN ALL SPARE CONDUIT.
10. OUTLET BOXES: SHALL BE GALVANIZED STEEL SUITABLE FOR LOCATION. CEILING OUTLET BOXES SHALL BE 4" OCTAGON. WALL OUTLET BOXES SHALL BE PROPER DESIGN TO ACCOMMODATE THE DEVICES REQUIRED - 4 INCH SQUARE WITH RAISED COVER. PROVIDE RACO, STEEL CITY OR APPLETON. ALL J-BOXES / SPLICE BOXES MUST BE ACCESSIBLE.
11. JUNCTION /PULL BOXES: FOR EACH CONDUIT RUN: PROVIDE ONE JUNCTION/PULL BOX FOR EACH EQUIVALENT THREE QUARTER BENDS (270°). UNDERGROUND FEEDERS: MINIMUM ONE PULL BOX FOR EACH 350 FEET OF CONDUIT RUN.
12. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CIRCUITS IN SAME CONDUIT UNLESS OTHERWISE NOTED. WHEN INSTALLING MORE THAN THREE CURRENT CARRYING CONDUCTORS IN SAME CONDUIT, CONTRACTOR SHALL DERATE THE AMPACITY OF ALL CURRENT CARRYING CONDUCTORS PER NEC 2020 ART. 310.15(B)(2)(A).

SECTION 26 05 44 – SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

1. ALL PENETRATIONS THROUGH FIRE RATED FLOORS AND WALLS SHALL BE SEALED WITH 3M FIRE RESISTANT FOAM SEALANT, TO PREVENT THE SPREAD OF SMOKE, FIRE, TOXIC GAS OR WATER THROUGH THE PENETRATION EITHER BEFORE, DURING OR AFTER A FIRE. THE FIRE RATING OF THE PENETRATION SEAL SHALL BE AT LEAST THAT OF THE FLOOR OR WALL INTO WHICH IT IS INSTALLED, SO THAT THE ORIGINAL FIRE RATING OF THE FLOOR OR WALL IS MAINTAINED AS REQUIRED BY ARTICLE 300.21 OF THE NATIONAL ELECTRICAL CODE.

SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

1. IDENTIFICATION: LABEL ALL JUNCTION AND PULL BOXES WITH PANELS AND CIRCUIT NUMBERS. MARK ALL BRANCH CONDUIT WITH CIRCUIT NUMBERS AT EACH SURFACE MOUNTED PANEL LOCATION. FOR RECESSED PANELS, MARK BRANCH CONDUIT IN CEILING PLENUM JUST ABOVE PANELS.
2. COLOR CODE: CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS:
   A. 480Y/277V 3PH, 4W
      a. PHASE A: BROWN
      b. PHASE B: ORANGE
      c. PHASE C: YELLOW
      d. NEUTRAL: GRAY
      e. GROUND: GREEN
      f. ISOLATED GROUND: GREEN/YELLOW STRIPE
   B. 208Y/120V 3PH, 4W
      a. PHASE A: BLACK
      b. PHASE B: RED
      c. PHASE C: BLUE
      d. NEUTRAL: WHITE
      e. GROUND: GREEN
      f. ISOLATED GROUND: GREEN/YELLOW STRIPE
   C. 240/120V 1PH, 3W
      a. PHASE A: BLACK
      b. PHASE B: RED
      c. NEUTRAL: WHITE
      d. GROUND: GREEN
      e. ISOLATED GROUND: GREEN/YELLOW STRIPE
3. ALL PANELS SHALL BE IDENTIFIED USING NAMEPLATES WITH 4 ROWS OF TEXT (LETTER HEIGHT SHALL BE 1/4" MINIMUM), EXAMPLE:
   PANEL "XX" 225 AMPS MCB, SECTION #1 OF 2-SECTION PNL
   208Y/120V, 3 PHASE, 4 WIRE
   FEEDER SIZE 4 # 4/0 THWN, 1 # 4 G, 2 1/2" C.
   FED FROM DIST PANEL "XXX", 1ST FLOOR

A. PANEL NAMEPLATES SHALL BE ENGRAVED THREE-LAYER LAMINATED PLASTIC, WHITE LETTERS ON BLACK BACKGROUND FOR NORMAL POWER, RED LETTER/BLACK BACKGROUND FOR EMERGENCY POWER. SECURE NAMEPLATES TO EQUIPMENT USING SCREWS OR RIVETS.
B. ALL DISCONNECTS, STARTERS, COMBINATION STARTER/DISCONNECT, TRANSFORMERS, WIREWAYS, COMMUNICATION CABINETS, JUNCTION AND PULL BOXES ETC. SHALL BE SIMILARLY IDENTIFIED.

SECTION 26 05 73 – ELECTRICAL STUDIES

1. PROVIDE SHORT CIRCUIT CALCULATION, PROTECTIVE DEVICE COORDINATION AND ARC FLASH HAZARD STUDIES. WHERE EMERGENCY SYSTEM(S) ARE PROVIDED, STUDIES SHALL INCLUDE OVERCURRENT DEVICES SELECTIVE COORDINATION WITH ALL SUPPLY SIDE OVERCURRENT PROTECTIVE DEVICES. EMERGENCY SYSTEMS(S) OVERCURRENT PROTECTIVE DEVICES SHALL BE SELECTIVELY COORDINATED WITH ALL SUPPLY SIDE OVERCURRENT PROTECTIVE DEVICES, IN COMPLIANCE WITH REQUIREMENT AS OUTLINED IN NEC 620, 700, 701, 708 & 517. STUDIES SHALL ENCOMPASS ELECTRICAL DISTRIBUTION SYSTEM FROM NORMAL POWER SOURCE OR SOURCES TO AND INCLUDING BRANCH BREAKERS IN EACH PANELBOARD. PREPARE STUDY TO VERIFY REQUIRED EQUIPMENT RATINGS PRIOR TO ORDERING DISTRIBUTION EQUIPMENT. ALL OVERCURRENT PROTECTIVE DEVICES SHALL BE SELECTED BASED ON THE RESULTS OF THE STUDIES. EQUIPMENT SHORT CIRCUIT CURRENT RATINGS (AIC) SHOWN ON DRAWINGS ARE FOR REFERENCE ONLY. PROVIDE EQUIPMENT WITH THE CORRECT AIC RATING BASED ON THE RESULTS OF THE STUDIES. SUBMIT REPORT WITH EQUIPMENT SUBMITTALS FOR ENGINEER'S REVIEW. PERFORM STUDY WITH AID OF COMPUTER SOFTWARE PROGRAMS. REPORT SHALL INCLUDE: (A) CALCULATION METHODS AND ASSUMPTIONS, (B) ONE LINE DIAGRAM, (C) STATE CONCLUSIONS AND RECOMMENDATIONS. STUDIES AND REPORT SHALL BE PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF PROJECT.
2. CONTRACTOR SHALL PROVIDE WARNING LABELS ON ELECTRICAL EQUIPMENT INDICATING INCIDENT ENERGY LEVEL, LEVEL OF HAZARD AND THE REQUIRED PERSONAL PROTECTION EQUIPMENT. EQUIPMENT REQUIRED TO BE LABELLED SHALL INCLUDE, BUT NOT LIMITED TO, SWITCHBOARDS, DISTRIBUTION PANELS, MOTOR CONTROL CENTERS, PANELS, CONTACTORS, DISCONNECT SWITCHES AND MOTOR STARTERS.
3. CONTRACTOR SHALL PROVIDE ARC REDUCTION TRIP UNIT CIRCUIT BREAKERS WHERE ARC FLASH STUDIES REVEAL DANGEROUS OR CATEGORY 3 LEVELS WITH REMOTE KEYED SWITCH AND PROVIDE BLUE BEACON LIGHT VISIBLE FROM ALL AREAS OF THE EQUIPMENT ROOM TO INDICATE “MAINTENANCE MODE” IS ACTIVE.

SECTION 26 09 23 – LIGHTING CONTROL DEVICES

1. PROVIDE AS PER DRAWINGS AND DETAILS. ALL FACEPLATES SHALL BE DECORA STYLE. BACK OF HOUSE AREAS SHALL BE TOGGLE SWITCHES. FACE PLATES SHALL BE WHITE UNLESS NOTED OTHERWISE.
2. DIMMER SWITCHES: PROVIDE DEDICATED NEUTRAL FOR DIMMER CONTROLLED LIGHTING CIRCUIT. DO NOT SHARE NEUTRAL WITH 2 OR MORE BRANCH CIRCUITS. DO NOT BREAK FINS (HEAT SINKS) ON DIMMER SWITCH. DERATED DIMMER SWITCHES MAY BE USED ONLY WHERE SPECIFICALLY APPROVED BY ENGINEER.
3. OCCUPANCY SENSOR SWITCHES SHALL HAVE NEUTRAL WIRE. GROUND WIRE SHALL NOT BE USED AS CURRENT CARRYING CONDUCTOR.
4. OCCUPANCY SENSORS:
   A. ALL SENSOR LOCATIONS ARE APPROXIMATE. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS PRIOR TO INSTALLATION.
   B. ULTRASONIC CEILING MOUNT SENSORS SHOULD BE LOCATED A MINIMUM OF SIX (6) FEET FROM HVAC SUPPLY/RETURN VENTS.
   C. WALL MOUNTED OCCUPANCY SENSORS SHALL BE PROVIDED WITH INTEGRAL "TOUCH PLATE" MANUAL OFF CONTROL AND SHALL BE CONNECTED WITH THE NEUTRAL CONDUCTOR PER NEC ARTICLE 404.2.
   D. CONTRACTOR IS RESPONSIBLE FOR PROPER SENSITIVITY AND TIME DELAY SETTINGS, RECOMMENDED PLACEMENT AND FIELD VERIFICATION OF CIRCUITS WITH RESPECT TO POWER PLACEMENT.
   E. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF REQUIRED NUMBER OF SWITCH PACKS.
   F. ONE SWITCH PACK IS REQUIRED FOR EACH CIRCUIT TO BE CONTROLLED.
   G. ONE SWITCH PACK IS REQUIRED FOR EVERY FIVE SENSORS IN THE ZONE.
   H. SENSORS MOUNTED OVER THE DOOR MUST BE PLACED ONE FOOT INSIDE THE THRESHOLD.
   I. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE SENSOR BILL OF MATERIALS COMPLIES WITH THE SENSOR DESIGN AND SPECIFICATIONS.
   J. CONTRACTOR IS RESPONSIBLE FOR INSTALLING EQUIPMENT IN COMPLIANCE WITH LOCAL CODE.
   K. WALL MOUNTED OCCUPANCY SENSORS SHALL BE GANGED UNDER A COMMON COVERPLATE WHERE LOCATED ADJACENT TO DIMMERS OR SWITCHES (I.E. IN A CONFERENCE ROOM).
   L. FOR ALL AREAS INDICATED WITH OCCUPANCY SENSORS, FURNISH AND INSTALL SWITCHES, DIMMERS, MOTION SENSORS, AND SWITCH PACKS AS NECESSARY TO PERFORM THE FOLLOWING FUNCTIONS:
   M. ACTIVATION OF ANY MOTION SENSING DEVICE WITHIN THE INDICATED ZONE OF CONTROL SHALL ENERGIZE ALL LIGHT FIXTURES, REGARDLESS OF VOLTAGE, WITHIN THAT ZONE.
   N. WALL MOUNTED SWITCHES AND DIMMERS SHALL WORK IN CONJUCTION WITH MOTION SENSOR(S) TO PROVIDE MANUAL OPERATION OF SWITCHED FIXTURES WITHIN THE ZONE (UPON MOTION SENSOR ACTIVATION).

SECTION 26 09 43.23 – RELAY BASED LIGHTING CONTROLS

1. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS OF THE LIGHTING RELAY PANELS WITH THE BUILDING CONTROLS CONTRACTOR AND BUILDING ENGINEERING STAFF TO ASSURE PROPER OPERATION (ON, OFF, TIME OF DAY PROGRAMMING) OF THE LIGHTING RELAY SYSTEM AND ITS COMPONENTS PRIOR TO FINAL DELIVERY OF THE FLOOR. THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY REPORT ANY OBSERVED DEFICIENCIES TO THE BUILDING ENGINEERING STAFF. REPAIR OF EXISTING NON-FUNCTIONAL DEVICES OR INSTALLATION OF MISSING DEVICES SHALL BE PERFORMED ON A CHANGE ORDER BASIS OR UNDER SEPARATE CONTRACT. IN AS MUCH AS IS POSSIBLE, THE CONTRACTOR SHALL DELIVER TO THE OWNER A COMPLETE AND FUNCTIONING SYSTEM FOR EACH RENOVATED FLOOR.
2. LIGHTING CONTROL RELAY PANELS: STANDALONE LIGHTING CONTROL PANEL USING MECHANICALLY LATCHED RELAYS TO CONTROL LIGHTING AND APPLIANCES.
   A. SINGLE ENCLOSURE WITH INCOMING LIGHTING BRANCH CIRCUITS, CONTROL CIRCUITS, SWITCHING RELAYS, AND ON-BOARD TIMING AND CONTROL UNIT.
      a. CONTROL UNIT: POWER SUPPLY AND ELECTRONIC CONTROL FOR OPERATING AND MONITORING INDIVIDUAL RELAYS.
      b. TIMING UNIT: 365-DAY CALENDAR; ASTRONOMICAL CLOCK; SEVEN INDEPENDENT SCHEDULES, EACH HAVING 24 TIME PERIODS.
      c. SEQUENCING CONTROL WITH OVERRIDE.
   B. OVERRIDE CONTROL "BLINK WARNING" APPROXIMATELY FIVE MINUTES BEFORE OFF SEQUENCE.
   C. NONVOLATILE MEMORY RETAINS SETUP CONFIGURATIONS.
      a. RELAYS: ELECTRICALLY OPERATED, MECHANICALLY HELD SINGLE-POLE SWITCH, RATED AT 20 A AT 277-V AC.
      b. OPERATOR INTERFACE: INTEGRAL KEYPAD AND DIGITAL DISPLAY.

SECTION 26 22 13 – LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

1. PROVIDE DRY TYPE QUIET TRANSFORMERS (PER ANSI - C89 AND UL 506), SELF-COOLED NEMA CLASS AA, ALUMINUM-WINDING TRANSFORMER. TRANSFORMER SHALL BE COMPLIANCE WITH NEC CLEARANCE REQUIREMENTS. TRANSFORMERS MUST MEET OR EXCEED DOE 2016 ENERGY EFFICIENCY STANDARDS.
2. FURNISH FULL-LOAD TAPS IN THE PRIMARY WINDINGS AS FOLLOWS:

A.	3-15KVA, 1∅	TWO 5% TAPS BELOW RATED VOLTAGE
B.	9-15KVA, 3∅	TWO 5% TAPS BELOW RATED VOLTAGE
C.	25-100KVA, 1∅	SIX 2 1/2% TAPS, 4 BELOW AND 2 ABOVE RATED VOLTAGE
D.	30-300KVA, 3∅	SIX 2 1/2% TAPS, 4 BELOW AND 2 ABOVE RATED VOLTAGE

   E. SELECT THE APPROPRIATE TAP SETTING ON TRANSFORMER SO THAT THE ACTUAL SECONDARY VOLTAGE IS 1/2 (PLUS OR MINUS) OF A TAP SPAN AT FULL LOAD.

3. AVERAGE SOUND LEVELS MUST NOT EXCEED THE FOLLOWING VALUES:

A.	0-9KVA	40DB
B.	10-50KVA	45DB
C.	51-150KVA	50DB

4. PROVIDE A 220°C INSULATION SYSTEM FOR A MAXIMUM 115°C TEMPERATURE RISE OVER A 40°C AMBIENT. SPECIAL TRANSFORMERS: 150°C RISE FOR SHIELDED ISOLATION TYPE; 115°C RISE FOR K-RATED TRANSFORMERS.
5. MAKE TRANSFORMER CABLE CONNECTIONS WITH COMPRESSION-TYPE LUGS SUITABLE FOR TERMINATIONS OF 75°C RATED CONDUCTORS. CONSTRUCT CONCRETE PAD FOR FLOOR-MOUNTED TRANSFORMERS. MAINTAIN A MINIMUM OF 6 INCHES FREE AIR SPACE BETWEEN ENCLOSURE AND WALL. MOUNT TRANSFORMERS ON VIBRATION ISOLATING PADS SUITABLE FOR ISOLATING THE TRANSFORMER NOISE FROM THE BUILDING STRUCTURE.
6. PROVIDE DOUBLE OR ADDITIONAL LUGS AS REQUIRED WHERE TWO OR MORE SECONDARY FEEDERS ARE CONNECTED TO TRANSFORMERS. PROVIDE VIBRATION ISOLATORS FOR ALL TRANSFORMERS.

7. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON, AND SIEMENS.

SECTION 26 24 16 – PANELBOARDS

1. ALL PANELBOARDS SHALL HAVE COPPER BUSES. LOAD CENTER TYPE PANELBOARDS ARE NOT ACCEPTABLE AND SHALL NOT BE USED. PROVIDE BREAKERS WHICH ARE QUICK-MAKE AND QUICK-BREAK ON BOTH MANUAL AND AUTOMATIC OPERATION. USE A TRIP-FREE BREAKER WHICH IS TRIP INDICATING. INCORPORATE INVERSE TIME CHARACTERISTIC BY BIMETALLIC OVERLOAD ELEMENTS AND INSTANTANEOUS CHARACTERISTIC BY MAGNETIC TRIP. FOR 2-POLE AND 3-POLE BREAKERS, USE THE COMMON-TRIP TYPE SO THAT AN OVERLOAD OR FAULT ON ONE POLE WILL TRIP ALL POLES SIMULTANEOUSLY. HANDLE TIES ARE NOT ACCEPTABLE. ALL BREAKERS SHALL BE BOLT-ON THERMAL MAGNETIC TYPE. STAB-ON BREAKERS ARE NOT ACCEPTABLE. DO NOT USE TANDEM CIRCUIT BREAKERS. ALL CIRCUIT BREAKERS RATED 100 AMP OR LESS SHALL BE SUITABLE FOR TERMINATING 75°C WIRE (BREAKERS RATED FOR ONLY 60°C WIRE ARE NOT ACCEPTABLE. ALL PANELBOARDS SHALL BE FULLY RATED.
2. PANELBOARD DIRECTORIES: PROVIDE A STEEL DIRECTORY FRAME MOUNTED INSIDE THE DOOR WITH A HEAT-RESISTANT TRANSPARENT FACE AND A DIRECTORY CARD FOR IDENTIFYING THE LOADS SERVED. IDENTIFY EACH CIRCUIT WITH LOAD AND LOCATIONS (ROOM NAMES AND ROOM NUMBERS) AND INDICATE WITH TYPED DIRECTORIES.
3. INSTALL THE PANELBOARDS SUCH THAT THE CENTER OF THE SWITCH OR CIRCUIT BREAKER IN THE HIGHEST POSITION WILL NOT BE MORE THAN 6 1/2 FEET ABOVE THE FLOOR OR WORKING PLATFORM.

4. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON, AND SIEMENS.

SECTION 26 27 26 – WIRING DEVICES

1. WIRING DEVICES: PROVIDE ALL WIRING DEVICES SHOWN ON DRAWINGS COMPLETELY AND PROPERLY WIRED INCLUDING A SECURE GROUND CONNECTION. ALL DEVICES SHALL BE INSTALLED IN OUTLET BOXES OF REQUIRED SIZE AND VOLUME. GENERAL PURPOSE RECEPTACLES SHALL BE HUBBELL 5262 SERIES. ISOLATED GROUND RECEPTACLES SHALL BE HUBBELL IG-5362-ORANGE WITH ISOLATED GROUND CONNECTION. GROUND FAULT INTERRUPT RECEPTACLES (MARKED GFCI) SHALL BE HUBBELL GF-5262. REFER TO ARCHITECTURAL DRAWINGS FOR COLOR AND MOUNTING HEIGHTS.
2. **COVER PLATES:** HIGH ABUSE NYLON OR STAINLESS STEEL PER ARCHITECT. WHERE MORE THAN ONE SWITCH OCCURS AT THE SAME LOCATION, THEY SHALL BE GANGED UNDER ONE COVERPLATE, INSTALLED IN BOXES IN UNIFORM POSITION, SET TO OPEN AND CLOSE CIRCUITS BY MOVING IN THE SAME DIRECTION THROUGHOUT JOB. PROVIDE CIRCUIT NUMBER LABEL ON ALL DEVICE PLATES.
3. ALL ELECTRICAL BOXES ON OPPOSITE SIDES OF CORRIDOR WALL AND FIREWALLS MUST BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES.
4. REFER TO ARCHITECTURAL DRAWINGS FOR RECEPTACLE AND DATA J-BOX MOUNTING HEIGHTS.
5. COORDINATE NEMA RECEPTACLE TYPES FOR ALL COPIERS WITH COPIER MANUFACTURER(S) PRIOR TO INSTALLATION. CONTRACTOR SHALL REPORT ANY CIRCUIT DISCREPANCY TO THE ENGINEER FOR REVIEW.
6. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION ON ALL FLOOR DEVICES. LOCATIONS SHALL BE IN ACCORDANCE WITH ALL UNDERWRITER LABORATORIES AND LOCAL AUTHORITY REQUIREMENTS. IN NO CASE SHALL U.L. LISTED FIRE RATED POKE-THRU DEVICES BE INSTALLED LESS THAN 24" ON CENTER AND/OR MORE THAN ONE (1) PENETRATION PER 65 SQUARE FEET OF FLOOR AREA OF BEAM SPACE. THE CONTRACTOR SHALL CALL TO THE ATTENTION OF, AND REQUEST DIRECTION FROM THE ARCHITECT AND THE ENGINEER IN ANY CASE IN WHICH THE INSTALLATION MAY VARY FROM THESE REQUIREMENTS PRIOR TO ROUGH-IN. X-RAY SLAB PRIOR TO SAW CUTTING OR CORING.
7. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE FURNITURE MANUFACTURER THE INSTALLATION OF ALL ELECTRICAL DEVICES MOUNTED IN DEMOUNTABLE PARTITIONS. REFER TO ARCHITECT FOR LOCATION OF ALL DEMOUNTABLE PARTITIONS. THE LICENSED ELECTRICIAN SHALL MAKE THE FINAL CONNECTION BETWEEN CIRCUIT AND PLUG-IN FURNITURE SYSTEM.

SECTION 26 28 16 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1. PROVIDE ALL SAFETY DISCONNECT SWITCHES INDICATED ON THE DRAWINGS AND AT ALL MECHANICAL EQUIPMENT. PROVIDE HEAVY DUTY TYPE SAFETY SWITCHES SIMILAR TO GE TYPE TH. ALL SWITCHES SHALL BE FUSIBLE, EXCEPT THOSE INDIVIDUALLY ENCLOSED SAFETY SWITCHES INDICATED AS NON-FUSIBLE. PROVIDE NEMA 1 ENCLOSURE FOR NORMAL INDOOR INSTALLATIONS AND NEMA 3R ENCLOSURE FOR INSTALLATIONS OUTDOORS AND IN WET AREAS. COMPLY WITH CODE REQUIREMENTS FOR OTHER ENVIRONMENTS. PROVIDE EXTERNALLY OPERATED HANDLES WITH PROVISIONS FOR PADLOCKING IN THE OFF OR ON POSITION. SWITCH RATINGS SHALL BE SIZED LARGE ENOUGH FOR THE APPLIED LOAD. SWITCHES SERVING MOTORS SHALL BE HORSEPOWER RATED FOR THE INSTALLED MOTOR. VOLTAGE RATINGS SHALL BE SUFFICIENT FOR THE INSTALLED CIRCUIT VOLTAGE. TOGETHER WITH THE SPECIFIED FUSES (IF SWITCH IS FUSIBLE) THE SWITCH SHALL SAFELY AND WITHOUT FAILURE WITHSTAND SHORT CIRCUITS ON A SYSTEM CAPABLE OF DELIVERING UP TO 200,000 AMPS RMS SYMMETRICAL AT THE APPLIED VOLTAGE. INSTALL SWITCHES SECURELY TO WALLS. WHERE WALL IS NOT AVAILABLE, PROVIDE UNISTRUT SUPPORT STRUCTURE. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON, AND SIEMENS.

SECTION 26 51 00 – LIGHTING

1. PROVIDE QUANTITY OF FIXTURES AS INDICATED ON DRAWINGS. REFER TO LIGHT FIXTURE FOR SPECIFICATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHTS, LENGTHS, AND EXACT LOCATIONS.
2. ALL LIGHTING FIXTURES WHICH ARE SUPPORTED BY THE CEILING GRID SHALL BE SECURED TO THE GRID AS REQUIRED BY THE LOCAL CODE AUTHORITIES.

3. LINEAR LIGHTING FIXTURES SHALL BE SERIES INDICATED IN THE LIGHTING FIXTURE SCHEDULE WITH EXACT LENGTHS PER ARCHITECTURAL DRAWINGS. REFER TO THE ARCHITECT AND MILLWORK CONTRACTOR FOR EXACT LENGTH AND MOUNTING DETAILS. PROVIDE BONDING JUMPERS BETWEEN ADJACENT UNDER COUNTER LIGHTING FIXTURE CASINGS.

SECTION 27 5 00 – COMMUNICATION SYSTEMS

1. PROVIDE A J-BOX WITH PLASTER RING FOR DEVICE SUPPORT, AND 1" SPARE CONDUIT ROUTED TO THE ACCESSIBLE CEILING AT EACH POSITION INDICATED TO HAVE A DATA AND/OR TELEPHONE OUTLET, CARD READER, MAGNETIC LOCK, DOOR RELEASE, AUDIO/VISUAL DEVICE BOX, OR TV CABLE JUNCTION BOX.
2. SYMBOLS AND DEVICES NOT SPECIFICALLY NOTED REPRESENT ARCHITECTURAL, A/V, OR SECURITY DEVICE COMPONENTS. REFER TO THE RESPECTIVE DRAWINGS FOR LOCATIONS, ADDITIONAL INFORMATION AND SPECIFICATIONS.
3. REFER TO NEC 800.

SECTION 28 46 21 – FIRE ALARM

1. THE FACILITY HAS AN EXISTING FIRE ALARM SYSTEM. ELECTRICAL CONTRACTOR SHALL PROVIDE ADDITIONAL NEW FIRE ALARM DEVICES (SMOKE DETECTORS, PULL STATIONS, SPEAKERS/STROBES, ETC.) AS SHOWN ON PLAN AND CONNECT TO FACILITY-WIDE FIRE ALARM SYSTEM. PROVIDE ADDITIONAL POWER SUPPLIES, RE-PROGRAMMING, CIRCUIT RE-ASSIGNMENTS, NEW WIRES AND/OR CONDUIT/WIRE EXTENSION AND ALL ACCESSORIES AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM. VERIFY ZONING REQUIREMENTS WITH OWNER AND PROVIDE ACCORDINGLY. ALL NEW FIRE ALARM DEVICES AND MATERIAL SHALL MATCH EXISTING AND SHALL BE OF THE LATEST COMPATIBLE MODEL. ALL PENETRATIONS THROUGH FIRE RATED FLOORS AND WALLS SHALL BE SEALED WITH APPROVED FIRE-SAFING MATERIAL. SIMILAR FOR ALL OTHER COMMUNICATION SYSTEMS SHOWN ON PLAN.
2. REFER TO NEC 760.

MBA
ENERGY & INDUSTRIAL

Date Issued:

2022/07/27	IFP
2022/08/26	OWNER REV 1
2023/10/20	IFC SET

INFINITY
MEP CONSULTANTS
10260 Westheimer Road., Suite 250
Houston, Tx 77042
713-429-4949
www.InfinityMEP.com

PALMER RAIL MILL 2
OPERATIONS & MAINTENANCE BUILDING

Project Address:
PUEBLO, CO

DAVID M. SINZ
33379
10/20/23

Sheet Content:
ELECTRICAL SPECIFICATIONS

SCALE: 1/8" = 1'-0"

Drawn By: GL
Checked By: AH
Plot Date: 07/27/22
Project Number: 1493-00

Sheet:
E0.02