ELECTRICAL GENERAL NOTES

A. CONTRACT PERFORMANCE

1. EXECUTE THE WORK IN THE BEST AND MOST THOROUGH MANNER & TO THE SATISFACTION OF THE CONSULTING ENGINEERS, WHO WILL JOINTLY INTERPRET THE MEANING OF THE DRAWINGS AND SPECIFICATIONS AND SHALL HAVE THE POWER TO REJECT ANY WORK AND MATERIALS WHICH, IN THEIR JUDGMENT, ARE NOT IN FULL ACCORDANCE THEREWITH.

2. EXCEPT FOR CHANGES AS MAYBE SPECIFICALLY APPROVED BY THE CONSULTING ENGINEERS, IN ACCORDANCE WITH ALTERNATES OF OPTIONS STATED HEREINAFTER, ALL WORK MUST BE IN FULL ACCORDANCE WITH THE INTENT OF THE PLANS AND SPECIFICATIONS, COMPLETE IN EVERY WAY AND READY FOR SATISFACTORY AND EFFICIENT OPERATION WHEN DELIVERED TO THE OWNER.

3. WHERE DISAGREEMENTS OCCUR BETWEEN THE PLANS AND THE SPECIFICATIONS, OR WITHIN EITHER DOCUMENT ITSELF, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IMMEDIATELY AND THE ARCHITECT SHALL PROVIDE THE CONTRACTOR WITH AN INTERPRETATION ON HOW TO PROCEED.

4. THE DRAWINGS SHOW VARIOUS CONDUIT AND PIPING SYSTEMS SCHEMATICALLY. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY JUNCTION BOXES, PULL BOXES, SUPPORT AND ACCESSORIES TO MEET APPLICABLE CODES, BUILDING STANDARDS AND FULFILL CONTRACT DOCUMENTS. NO ADDED COMPENSATION WILL BE PERMITTED FOR VARIATIONS DUE TO FIELD CONDITIONS.

5. THE CONTRACTOR COVENANTS AND AGREES THAT HE AND HIS SUBCONTRACTORS AND HIS AND THEIR AGENTS, SERVANTS AND EMPLOYEES WILL PROVIDE AND MAINTAIN A SAFE PLACE TO WORK AND THAT HE AND THEY WILL COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENTAL AUTHORITY HAVING JURISDICTION THEREOF AND THE CONTRACTOR AGREES TO INDEMNITY, DEFEND AND HOLD HARMLESS THE CONSULTING ENGINEER, ARCHITECT AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE OR EXPENSE, INCLUDING ATTORNEY'S FEES ARISING FROM FAILURE OR ALLEGED FAILURE ON THE PART OF THE CONTRACTOR, HIS SUBCONTRACTORS AND HIS AND THEIR AGENTS, SERVANTS AND EMPLOYEES TO PROVIDE AND MAINTAIN A SAFE PLACE TO WORK OR TO COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENTAL AUTHORITY HAVING JURISDICTION THEREOF.

6. THE CONTRACTOR AND EACH SUBCONTRACTOR COVENANTS AND AGREES TO INDEMNITY, DEFEND AND HOLD HARMLESS THE CONSULTING ENGINEER, ARCHITECT AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE OR EXPENSE, INCLUDING ATTORNEY'S FREES ARISING FROM A FAILURE OR ALLEGED FAILURE ON THE PART OF THE CONTRACTOR, HIS SUBCONTRACTORS AND HIS AND THEIR AGENTS, SERVANTS AND EMPLOYEES PROPERLY TO DISCHARGE THE OBLIGATIONS ASSUMED BY HIM OR THEM IN THE PERFORMANCE OF THE WORK, INCLUDING ANY ACT OR OMISSION ALLEGEDLY RESULTING IN DEATH OR PERSONAL INJURY OR PROPERTY DAMAGE OR IMPROPER CONSTRUCTION, CONSTRUCTION TECHNIQUES OR THE USE OF IMPROPER OR INAPPROPRIATE MATERIAL OR TOOLS.

7. ALL WORK SHALL BE DONE IN CONFORMANCE WITH ALL GOVERNING CODES, INCLUDING AMENDMENTS, BULLETINS, ETC., AS WELL AS STANDARDS OF INSTALLATION AND EQUIPMENT ESTABLISHED FOR THE BUILDINGS, AND REQUIREMENTS OF THE OWNER.

8. OBTAIN ALL NECESSARY PERMITS AND APPROVAL FROM GOVERNING AUTHORITIES AND FILE ALL NECESSARY FORMS. PAY ALL INSPECTION FEES.

9. COORDINATE SCHEDULING OF ALL WORK TO BE PERFORMED WITH OWNER AND/OR HIS AGENT AND INCLUDE ALL NECESSARY PREMIUM TIME REQUIRED FOR SHUTDOWNS, WORK IN OCCUPIED AREAS, ETC.

10. ALL AREAS ASSOCIATED WITH WORK TO BE PERFORMED SHALL BE EXAMINED PRIOR TO BID SUBMISSION. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR CONDITIONS FOUND DURING INSTALLATION.

11. BEFORE COMMENCING WORK, EXAMINE ALL ADJOINING WORK ON WHICH THIS WORK IS IN ANY WAY DEPENDENT FOR PERFECT WORKMANSHIP ACCORDING TO THE INTENT OF THIS SPECIFICATION, AND REPORT TO THE CONSTRUCTION MANAGER ANY CONDITION WHICH PREVENTS PERFORMANCE OF FIRST-CLASS WORK, NO "WAIVER OF RESPONSIBILITY" FOR INCOMPLETE, INADEQUATE OR DEFECTIVE ADJOINING WORK WILL BE CONSIDERED UNLESS NOTICE HAS BEEN FILED BEFORE SUBMITTAL OF A PROPOSAL.

12. COORDINATE ALL WORK WITH OTHER TRADES TO ENSURE INSTALLATION IS MADE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

13. FURNISH ADEQUATE LIABILITY INSURANCE AND BONDING AS REQUIRED BY OWNER.

14. INCLUDE ALL LABOR, MATERIALS, AND APPURTENANCES REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING OF ALL WORK, COMPLETE AND MAKE READY FOR OPERATION IN A MANNER SATISFACTORY TO THE ARCHITECT AND CONSULTING ENGINEER, ALL WORK SHOWN ON DRAWINGS AND SPECIFIED HEREIN.

15. ALL WORK SHALL BE GUARANTEED FOR TWO (1) FULL YEAR FROM THE DATE WHEN THE OWNER HAS ISSUED A "CERTIFICATE OF SUBSTANTIAL COMPLETION".

B. INSTALLATION PROCEDURE

1. THIS CONTRACTOR'S WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: FURNISHING AND INSTALLATION OF ALL ELECTRICAL WORK, INCLUDING ELECTRICAL AND COMMUNICATIONS OUTLETS IN WALLS AND FLOOR, LIGHTING FIXTURES WITH LAMPS, SWITCHES, DIMMERS, EMERGENCY BATTERY UNITS, ETC., AND ASSOCIATED BRANCH CIRCUIT WIRING, DISCONNECT SWITCH SPECIAL RECEPTACLES, ETC. ALL SPECIAL EQUIPMENT, SUCH AS FANS, AIR CONDITION UNITS, COPIERS, ETC, WILL BE FURNISHED BY OTHERS (U.O.N). WHERE EQUIPMENT REQUIRES PERMANENT CONNECTIONS SHALL BE PROVIDED WITH APPROPRIATE DISCONNECTING MEANS.

2. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL WORK SHOWN N DRAWINGS WITH OTHER TRADES TO ASSURE THAT ALL SYSTEMS ARE COMPLETE AND OPERATIONAL. THIS CONTRACTOR SHALL COORDINATE ALL EQUIPMENT LOCATIONS AND CONDUIT RUNS SUPPLIED AND/OR INSTALLED UNDER THIS SECTION TO AVOID CONFLICTS OR OBSTRUCTIONS TO OTHER TRADES. THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY PULL BOXES, VERTICAL SUPPORT BOXES, AND CONDUIT OFFSETS REQUIRED TO ACCOMPLISH THE ABOVE NOTED COORDINATION AT NO ADDITIONAL COST TO THE OWNER, WHETHER OR NOT INDICATED ON PLANS. ALL VERTICAL SUPPORT BOXES, PULL BOXES, ETC, SHALL BE INSTALLED WHERE REQUIRED TO FACILITATE PULLS AND AT CODE REQUIRED INTERVALS, AT A MINIMUM

3. CONDUIT RUNS INDICATED ON PLAN ARE FOR REFERENCE ONLY. EXACT LOCATIONS AND ELEVATION SHALL BE DETERMINED AFTER COORDINATION WITH OTHER TRADES. THIS CONTRACTOR SHALL SUPPLY, AS PART OF THEIR SHOP DRAWING SUBMISSION, THE EXACT LOCATION OF ALL CEILING MOUNTED EQUIPMENT AND CONDUIT RUNS INCLUDING PROPOSED LOCATIONS AND MEANS OF SUPPORT AS WELL AS THE EXPECTED LOAD CONCENTRATION AT THE POINTS OF ATTACHMENT. THE ABOVE NOTED INFORMATION SHALL BE REVIEWED B THE STRUCTURAL ENGINEER BEFORE ANY WORK IS TO COMMENCE.

4. FURNISH AND INSTALL ALL NECESSARY CABLE SUPPORT BOXES, PULL BOXES AND CONDUIT SUPPORTS, WHERE NOTED AND AS REQUIRED BY APPLICABLE CODES. ALL LOW TENSION (COMMUNICATIONS, SECURITY, A/V, ETC,) CONDUIT, FIRE ALARM CONDUIT, ETC., WHICH HAVE RUNS IN EXCESS OF 100 FEET IN LENGTH AND/OR CONTAINING BENDS IN EXCESS OF 180 DEGREES SHALL BE PROVIDED WITH A PULLBOX. ALL PULLBOXES SHALL BE LABELED FOR THEIR INTENDED USE. DECALS SHALL BE PROVIDED TO INDICATE VOLTAGE LEVEL. FOR ALARM SYSTEM BOXES SHALL BE PAINTED RED, AND ALL WIRE AND CABLE PROVIDED UNDER THIS SECTION SHALL BE TAGGED (WITH FEEDER OR BRANCH CIRCUIT DESIGNATION) AT ALL BOXES. WHERE CONDUIT BENDS ARE REQUIRED IN COMMUNICATIONS RACEWAYS. PULL BOXES FOR COMMUNICATION RACEWAYS WILL BE PROVIDED IN STRAIGHT PULLS ONLY. LABEL EACH RACEWAY (PER TECHNOLOGY DEPT. REQUIREMENTS) EVERY 50 FEET HORIZONTALLY AND ON EACH FLOOR VERTICALLY. SUBMIT LABELING SYSTEM FOR REVIEW.

5. UNLESS SPECIFICALLY APPROVED. NO WIRES SHALL BE PULLED IN UNTIL THE CONDUIT SYSTEM IS COMPLETED. NO GREASE OR OIL SHALL BE USED TO FACILITATE THE PULLING OF WIRES; ONLY APPROVED PULLING COMPOUND SHALL BE USED, ALL WIRES SHALL BE CONTINUOUS BETWEEN OUTLET AND OUTLET, OR FROM PANELBOARD TO THE FIRST OUTLET. JOINTS THAT BECOME NECESSARY IN CIRCUIT WORK AT THE OUTLETS SHALL BE MADE WITH APPROVED PRESSURE CONNECTORS. ALL JOINTS SHALL BE COVERED WITH AN INSULATION EQUAL TO THAT ON THE CONDUCTORS. APPROVED PRESSURE CONNECTORS, IDEAL WINGNUTS, SCOTCH-LOCK, BUCHANAN, OR AS APPROVED, SHALL BE USED,

6. EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL LIGHTING FIXTURES, SWITCHES, WALL OUTLETS, ETC., SHALL BE IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS.

7. NO ELECTRICAL CONNECTIONS SHALL BE MADE TO, OR WORK PERFORMED ON, ENERGIZED EQUIPMENT.

8. FINAL CONNECTIONS TO EQUIPMENT SHALL BE MADE ACCORDING TO VENDOR APPROVED SHOP DRAWINGS.

9. VERIFY ELECTRICAL REQUIREMENTS OF ALL NEW EQUIPMENT TO BE USED. ALL SPECIAL PURPOSE OUTLETS INDICATED ON PLAN SHALL BE VERIFIED WITH EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION, TO ENSURE PROPER WIRING AND COMPATIBILITY WITH ATTACHMENT PLUGS OR JUNCTION BOXES THAT MAY BE FURNISHED AS AN INTEGRAL PART OF THE EQUIPMENT.

10. COORDINATE ALL LOCATIONS AND HEIGHTS OF STUB-UPS AND OUTLETS IN FIELD WITH VENDORS AND/OR FURNITURE MANUFACTURERS'S APPROVED SHOP DRAWINGS. ALL RECEPTACLES ARE TO BE ACCESSIBLE.

11. ALL ELECTRICAL SHALL BE ACCESSIBLE BELOW COUNTERS OR BEHIND EQUIPMENT. CONTRACTOR SHALL COORDINATE EXACT LOCATION OF EQUIPMENT RECEPTACLES WITH EQUIPMENT MANUFACTURER'S REQUIREMENTS AND THE LOCAL INSPECTOR.

12. ELECTRICAL CONTRACTOR SHALL PROVIDE DISCONNECTS FOR ALL EQUIPMENT PER CODE AND SHALL COORDINATE ALL DISCONNECT SWITCH REQUIREMENTS AND LOCATION WITH THE ELECTRICAL INSPECTOR, VENDORS APPROVED SHOP DRAWING AND FINAL EQUIPMENT LOCATIONS.

13. ELECTRICAL CONTRACTOR SHALL VERIFY PHASE LOAD BALANCING ON POWER PANELS UPON COMPLETION OF THE ELECTRICAL INSTALLATION. INCLUDE RE-DISTRIBUTION OF CIRCUITS WITHIN PANELS TO BALANCE WITHIN A 10% WINDOW (+/-5%).

14. ALL CONDUIT AND CABLE "HOMERUNS" SHALL CONSIST OF A SINGLE CIRCUIT PER CONDUIT FOR FEEDERS SERVED BY AN OVERCURRENT PROTECTIVE (OCP) DEVICE IN EXCESS OF 20 AMPERES, SINGLE POLE. WHERE WIRE AND CONDUIT BRANCH CIRCUITS SHARE A CONDUIT HOMERUN, OCP LESS THAN OR EQUAL TO 20 AMPERES SINGLE POLE). THERE SHALL BE A MAXIMUM OF THREE CIRCUITS COMBINED IN A RACEWAY TO THE PANELBOARD, UNLESS OTHERWISE NOTED. ALL CONDUCTORS SHALL BE DERATED PER NATIONAL ELECTRICAL CODE (LATEST VERSION). COMBINING OF MULTIPLE HOMERUNS (MORE THAN THREE) IN A SING CONDUIT SHALL NOT BE PERMITTED.

15. ALL CONDUIT SHOWN FOR INDOOR WORK SHALL BE EMT (¾" MINIMUM) WITH SET-SCREW TYPE COUPLINGS UNLESS OTHERWISE NOTED.

16. PROVIDED IMC CONDUIT WITH THREADED COUPLINGS WHERE REQUIRED BY CODE.

17. TYPE MC CABLE MAY BE UTILIZED FOR BRANCH LIGHTING AND RECEPTACLE CIRCUITRY, WHERE PERMITTED BY CODE AND PROVIDED THAT:

   a. IT IS NOT LOCATED WITHIN VIEW, ALL EXPOSED RACEWAYS MUST BE IN CONDUIT.

   b. CONTAINS AN INSULATED GROUND WIRE.

   c. CONDUIT IS RUN TO THE FIRST DEVICE DOWN-LINE OF THE PANEL (I,E. RECEPTACLE, LIGHT FIXTURE, ETC.).

18. INCLUDE ALL LABOR, MATERIALS, AND APPLICATIONS REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING OF ALL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, IN A MANNER SATISFACTORY TO THE ARCHITECT.

19. WHERE CONDUITS, CABLE TRAY OR OTHER ELECTRICAL EQUIPMENT PENETRATE FIRE OR SMOKE RATED WALLS, PARTITIONS, FLOOR SLABS, ETC., THE SPACE BETWEEN THE SLEEVE OR CUTOUT AND THE ELECTRICAL EQUIPMENT SHALL BE CAULKED WITH A UL LISTED, INTUMESCENT TYPE, APPROVED FIRESTOP SYSTEM. SPACE BETWEEN THE SLEEVE OR CUTOUT AND THE ELECTRICAL EQUIPMENT SHALL BE SIZED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS FOR CONDUIT SIZE AND DAMMING MATERIAL THICKNESS FOR THE TYPE OF RATED CONSTRUCTION FOR WHICH THE SYSTEM IS TO BE USED. THE FIRESTOP SYSTEM SHALL BE AS MANUFACTURED BY 3M FIR PROTECTION PRODUCTS OR AS APPROVED. SEE ARCHITECTURAL DRAWINGS FOR FIRE RATING OF WALLS AND FLOORS.

20. WHERE WORK IS ONGOING IN ELECTRICAL PANELS THE COVERS ARE NOT TO BE LEFT OFF UNLESS WORK IS CURRENTLY BEING PERFORMED ON THE PANEL. COVERS SHALL BE REPLACED EACH NIGHT AT THE END OF SHIFT.

21. TEMPORARY POWER FROM EXISTING PANELS FOR LIGHTS, DRILLS, WELDING EQUIPMENT, ETC,. SHALL BE LABELED ON THE PANEL AND PRE-APPROVED BY BUILDING OWNER/MANAGER 48 HOURS PRIOR TO INSTALLATION.

C. ARCHITECT'S AND/OR ENGINEER'S REVIEW

1. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO THE START OF ANY WORK. ANY WORK OR EQUIPMENT INSTALLED PRIOR TO REVIEW OF SHOP DRAWINGS AND FOUND TO BE UNACCEPTABLE SHALL BE REMOVED AND MODIFIED AT THE CONTRACTOR'S SOLE EXPENSE INCLUDING ANY RESULTANT SCHEDULING DELAYS EXPERIENCED BY ANY TRADE.

2. THE ARCHITECT AND/OR ENGINEER WILL REVIEW SHOP DRAWINGS AND SAMPLES FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND THE INFORMATION CONTAINED IN THE CONTRACT DOCUMENTS. THE ARCHITECT'S AND/OR ENGINEER'S REVIEW OF SHOP DRAWINGS AND SAMPLES IS ONLY FOR THE CONVENIENCE OF THE OWNER IN FOLLOWING THE WORK AND DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE ARCHITECT'S AND/OR ENGINEER'S REVIEW SHALL NOT BE CONSTRUED AS A COMPLETE OR DETAILED CHECK OF THE WORK SUBMITTED, NOR SHALL IT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OF ANY SORT IN THE SHOP DRAWINGS AND SAMPLES, OR FROM THE NECESSITY OF FURNISHING ANY WORK REQUIRED BY THE CONTRACT DOCUMENTS WHICH MAY HAVE BEEN OMITTED FROM SHOP DRAWING SUBMITTALS.

3. THE REVIEW OF A SEPARATE ITEM SHALL NOT INDICATE REVIEW OF THE COMPLETE ASSEMBLY IN WHICH IT FUNCTIONS. NOTHING IN THE ARCHITECT'S ANS/OR ENGINEER'S REVIEW OF SHOP DRAWINGS AND SAMPLES SHALL BE CONSIDERED AS AUTHORIZING:

   a. A DEPARTURE FROM CONTRACT DOCUMENTS OR SPECIFICATIONS, OR,

   b. ADDITIONAL COST TO THE OWNER, OR,

   c. INCREASED TIME FOR COMPLETION OF THE WORK.

4. NO PART OF THE WORK SHALL BE IN THE FABRICATION SHOP OR IN THE FIELD UNTIL THE ARCHITECT AND/OR ENGINEER HAS REVIEWED THE SHOP DRAWINGS AND SAMPLES FOR THAT POTION OF THE WORK. THEREAFTER, THE WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND THE INDICATED STATUS OF THE REVIEWED SHOP DRAWING.

5. SAMPLES SHALL BE SUBMITTED FOR REVIEW WHEN REQUESTED BY THE ARCHITECT AND/OR ENGINEER.

6. PROVIDE OPERATIONS AND MAINTENANCE MANUALS FOR ALL EQUIPMENT AND MATERIALS.

D. RECORD DRAWINGS

1. PREPARE AND FURNISH TO OWNER "AS BUILT" PLANS FOR ALL WORK INSTALLED. PROVIDE CAD DRAWINGS AND CAD FILES ON A COMPACT DISC COMPLETED IN THE LATEST VERSION OF AUTOCAD. ALL DRAWINGS SHALL BE IN A STYLE COMMENSURATE WITH THE ENGINEERING DESIGN.

2. UPON CONSTRUCTION, KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK AS SHOWN ON DRAWINGS AND THAT WHICH IS ACTUALLY INSTALLED. THIS RECORD SET OF PRINTS SHALL BE KEPT AT THE JOB SITE FOR INSPECTION.

3. UPON COMPLETION OF INSTALLATION, SUBMIT ONE SET OF BLACK AND WHITE PRINTS OF THESE "AS-BUILT" RECORD DRAWINGS TO THE CONSULTING ENGINEER FOR REVIEW. AFTER REVIEW BY THE CONSULTING ENGINEER, MAKE NECESSARY CHANGES TO THESE PRINTS AND THEN DELIVER THEM TO THE OWNER FOR RECORD. FINAL PAYMENT WILL BE WITHHELD UNTIL COMPLETION OF "AS-BUILT" DRAWINGS.

4. AS-BUILT DRAWINGS SHALL CONTAIN EXACT ROUTING AND ELEVATIONS OF ALL CONDUIT BANKS, ACTUAL PANELBOARD CIRCUIT BREAKER POLE POSITIONS USED FOR EACH CIRCUIT, AND EXACT LOCATION OF ALL EQUIPMENT, ALL DIMENSIONS SHALL BE REFERENCED TO BUILDING STRUCTURE CENTERLINES.

E. EQUIPMENT SPECIFICATIONS

1. ALL EQUIPMENT AND MATERIALS SHALL BE NEW, UL LISTED AND SHALL CONFORM TO ANY ADDITIONAL LABELING, TESTING AND CONSTRUCTION REQUIREMENTS ESTABLISHED BY THE GOVERNING AUTHORITIES. SAME SHALL BE GUARANTEED FOR 1 YEAR SUBSEQUENT TO FINAL ACCEPTANCE.

2. ALL EQUIPMENT (ELECTRICAL AND MECHANICAL) SHALL BE SPECIFIED TO HAVE VOLTAGE RATINGS COMPATIBLE WITH THE PROVISIONS OF ANSI C84.

3. ALL CONDUITS FOR LIGHTING AND POWER SYSTEMS SHALL BE ¾" (MINIMUM).

4. INTERMEDIATE METAL CONDUIT SHALL BE USED WHERE SUBJECTED TO ANY WATER OR MOISTURE CONDITIONS, OR WHERE BURIED IN SLAB.

5. PROVIDE CONDUIT EXPANSION FITTINGS TOGETHER WITH BONDING JUMPER AND SUITABLE SLEEVES WHERE REQUIRED. CONDUIT EXPANSION FITTING SHALL BE INSTALLED IN EACH CONDUIT RUN WHEREVER IT CROSSES AN EXPANSION JOINT IN THE STRUCTURE. THE EXPANSION FITTING SHALL BE INSTALLED ON ONE SIDE OF THE JOINT WITH ITS SLIDING SLEEVE END FLUSH WITH THE AND WITH A LENGTH OF BONDING JUMPER IN THE EXPANSION JOINT EQUAL TO AT LEAST THREE TIMES THE NORMAL WIDTH OF THE JOINT.

6. ALL 15A OR 20A, SINGLE POLE, 120 VOLT OR 208 VOLT BRANCH CIRCUIT RUNS IN EXCESS OF 100 FEET FROM THE PANEL TO THE DEVICE SHALL BE PROVIDED WITH #10 MINIMUM AWG WIRE FOR ITS ENTIRE LENGTH.

7. JUNCTION OR PULL BOXES SHALL BE FURNISHED AND INSTALLED WHERE INDICATED ON PLANS AND WHEREVER ELSE SUCH A BOX MAY BE NECESSARY TO FACILITATE INSTALLATION OR CONFORM TO CODE REQUIREMENTS. COORDINATE LOCATIONS OF SAME WITH ARCHITECT FOR ACCESSIBILITY AND AESTHETIC CONSIDERATIONS. GENERALLY, JUNCTION BOXES AND PULL BOXES SHALL BE INSTALLED EVERY 100 FEET IN CONDUIT HORIZONTAL RUNS AND SHALL NOT BE EXPOSED IN FINISHED SPACES. ALL CABLES WITHIN PULL BOXES SHALL BE PROPERLY TAGGED FOR IDENTIFICATION. LABEL ALL CONDUITS WITH FEEDER DESIGNATION AT ENTRY AND EXIT TO THE BOX.

8. INSULATING BUSHING OR INSULATING THROATS SHALL BE INSTALLED ON ALL FITTINGS.

9. FOR AREAS OF PUBLIC ASSEMBLY (SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS), BRANCH CIRCUITS FOR LIGHTING AND POWER SHALL BE RIGID GALVANIZED STEEL, AND SHALL BE SEPARATED FROM THE NORMAL LIGHTING AND POWER CIRCUITS, ADDITIONALLY, BRANCH CIRCUITS FOR EMERGENCY EGRESS AND EXIT LIGHTING SHALL BE DEDICATED.

F. PANELBOARDS

1. ALL PANELBOARDS SHALL BE OF THE ENCLOSED TYPE, FLUSH OR SURFACE MOUNTED, AS REWIRED, IN CODE GAUGE STEEL CABINETS, WITH STEEL TRIM, CONCEALED HINGES, DOORS AND FLUSH TYPE LOCKS, ALL KEYED ALIKE. PROVIDE DUAL CONCEALED HINGED DOORS (DOOR-IN-DOOR CONSTRUCTION) WITH TWO KEYED LATCHES, AND WITHOUT BOLTS OR SCREWS ON THE NON-HINGED SIDE OF THE DOORS WHERE INDICATED ON DOCUMENTS (SEE ARCHITECTURAL DRAWINGS.)

2. ALL BUSES, INCLUDING NEUTRAL, SHALL BE ELECTRICAL GRADE HARD-DRAWN COPPER AND SIZED IN CONFORMANCE WITH NEMA STANDARDS. BUSES SHALL BE ARRANGED FOR SEQUENCE PHASING AND LOADS SHALL BE BALANCED AS EQUALLY AS POSSIBLE AMONGST THE THREE PHASES.

3. PANELBOARDS SHALL BE EQUIPPED WITH QUICK-MAKE, QUICK-BREAK FUSED SWITCHES OR BOLT-ON MOLDED CASE CIRCUIT BREAKERS, OF VOLTAGE REQUIRED, AND OF SIZE AND NUMBER OF POLES INDICATED ON THE SCHEDULES.

4. A TYPE WRITTEN DIRECTORY OF 5 INCHES X 8 INCHES WITH METAL FRAME AND LEXAN FACE SHALL BE PROVIDED ON THE INSIDE OF THE DOOR OF EACH CABINET, INDICATING THE LOAD SERVED BY EACH CIRCUIT. UTILIZE ARCHITECTURAL DRAWINGS TO INDICATE ROOM NAMES AND NUMBERS OF ALL EQUIPMENTS SERVED. (E.G 1. RECEPT: ROOMS27-202, 203, 205, 207). UPDATE PANEL DIRECTORIES OF ALL EXISTING PANELS.

5. POWER, LIGHTING AND UTILITY PANELS FOR 120/208 VOLTS SHALL BE BOLT-ON CIRCUIT BREAKER TYPE UNLESS OTHERWISE NOTED. SINGLE POLE BRANCHES SHALL BE BOLT-ON TYPE OF AT LEAST 10,000 AMPERES RMS SYMMETRICAL INTERPRETING CAPACITY (OR AS INDICATED ON THE DRAWINGS). MULTIPLE POLE BREAKERS SHALL BE COMMON TRIP, OF THE CAPACITY AND NUMBER OF POLES AS INDICATED IN SCHEDULES. PANELBOARDS SHALL BE EQUIPPED WITH 200% SOLID NEUTRAL BAR AND CONTAIN THE NUMBER OF POLES, OVERCURRENT DEVICES AND BUSED SPACES AS SPECIFIED IN SCHEDULE. PANELBOARDS SHALL INCLUDE A SEPARATE GROUND BUS ISOLATED FROM THE CASING. FUSIBLE TYPE PANELS SHALL CONFORM TO REQUIREMENTS OF ABOVE PARAGRAPH.

6. PROVIDE ISOLATED GROUND BUSES ON STAND-OFF ISOLATORS WHERE INDICATED ON SCHEDULES.

7. PROVIDE NEW CIRCUIT BREAKERS IN PANELS AS REQUIRED TO MEET THE SCHEDULES OR CIRCUIT DESIGN INTENT.

8. GUTTER SPACE SHALL BE INCREASED WHEN CONTAINING FEEDER TAPS.

9. PROVIDE WIRE TROUGHS WHERE ACCESS TO THE FLOOR SYSTEM IS REQUIRED.

10. WHERE SPACE LIMITATIONS REQUIRED REDUCED PANEL WIDTH, PROVIDE VERTICAL (SINGLE ROW) BREAKER TYPE PANELS AS PART OF THE INITIAL SCOPE PRICE.

11. ALL PANEL BUS BARS SHALL CONSIST OF A MINIMUM 1/8 INCH DEPTH COOPER BUS.

12. PROVIDE SHUNT TRIP MAIN CIRCUIT BREAKERS FOR ALL PANELS TO BE CONTROLLED BY BREAKGLASS STATIONS, ANSUL SYSTEMS(IN KITCHENS OR SERVERIES) ETC.

13. PROVIDE GFI TYPE BRANCH CIRCUIT BREAKERS FOR ALL CIRCUITS SERVING KITCHENS, HEAT TRACING CIRCUITS, H-WATT CIRCUITS, FREEZE PROTECTION CIRCUITS, WINDOW WASHING CIRCUITS, OUTDOOR CIRCUITS, ETC. AND AS REQUIRED BY CODE.

G. FUSES

1. ALL FUSES SHALL BE OF THE SAME MANUFACTURER, BUSSMAN, OR AS APPROVED, AND SHALL BE INSTALLED, AS REQUIRED. IN ALL CUTOUTS, PANE.S AND SAFETY SWITCHES.

2. UNLESS OTHERWISE NOTED, FUSES SHALL BE BUSSMAN TYPE LPN, LPS OR KRP-C

H. SECONDARY TRANSFORMERS

1. PROVIDE DRY TYPE 100% NON-LINER, NON-SINUSOIDAL TRANSFORMERS OF QUANTITY AND KVA RATING AS SHOWN ON DOCUMENTS, 3ø, 480 VOLT-DELTA-208Y/120 VOLT, 3ø, 4 W, FURNISHED W/TWO 2-1/2% TAPS ABOVE AND FOUR 2-1/2% BELOW NORMAL 480V PRIMARY FOR TRANSFORMERS. THE NEUTRAL OF THE TRANSFORMERS SHALL BE BROUGHT UP TO A LUG AND BOLT INSIDE OF CASE SO THAT THE NEUTRAL CAN BE GROUNDED EXTERNALLY. ALL REQUIREMENTS SHALL BE IN ACCORDANCE WITH UL 1561 AND UL 506.

2. TRANSFORMERS SHALL BE SPECIFICALLY DESIGNED TO SUPPLY RATED CURRENT WHEN LOADED WITH NONLINEAR LOADS AND MEET THE MINIMUM REQUIREMENTS OF EPACT2005 DEPARTMENT OF ENERGY'S STANDARD LEVEL 3 (CSL-3).

3. A COPPER ELECTRONIC SHIELD SHALL BE INSERTED BETWEEN THE PRIMARY AND SECONDARY WINDINGS TO ATTENUATE HIGH FREQUENCY HARMONICS.

4. THE SECONDARY NEUTRAL SHALL BE TWICE THE AMPACITY OF THE SECONDARY PHASE CONDUCTORS, AND THE PRIMARY WINDING CONDUCTOR SHALL BE OF SUFFICIENT SIZE TO LIMIT THE TEMPERATURE RISE TO ITS RATED VALUE, EVEN WITH THE CIRCULATING 3RD HARMONIC CURRENT.

5. THE TRANSFORMER SHALL UTILIZE AN INSULATION SYSTEM THAT HAS BEEN PROPERLY TEMPERATURE CLASSIFIED AND LISTED BY UL. TRANSFORMERS SHALL HAVE A 220 CLASSIFICATION AND A 150 DEGREE CELSIUS WINDING TEMPERATURE RISE AT FULL LOAD.

6. ALL TRANSFORMERS SHALL HAVE VIBRATION ISOLATORS THAT ISOLATE THE CASE FROM THE CORE AND COIL ASSEMBLY. TRANSFORMERS SHALL BE CAPABLE OF FLOOR, WALL OR CEILING (TRAPEZE) MOUNTING, AS INDICATED ON THE DRAWINGS. TRANSFORMERS SHALL BE TRAPEZE MOUNTED U.O.N.

7. VIBRATION ISOLATORS EQUAL TO MASON INDUSTRIES TYPE HD AND TYPE CD FOR TRAPEZE AND FLOOR MOUNTING RESPECTIVELY, SHALL BE INSTALLED BETWEEN CASE AND TRAPEZE OR FLOOR.

8. PROVIDE COPPER GROUND CONDUCTOR, WITH EXOTHERMIC (CADWELD OR AS APPROVED) TO BUILDING STEEL WHERE STEEL IS PROVIDED. SIZE OF GROUND SHALL BE CODE MINIMUM OR AS INDICATED ON THE DRAWINGS. ALL FINAL CONNECTIONS TO TRANSFORMER CASING SHALL BE MADE USING A MINIMUM 24 INCH LENGTH OF FLEXIBLE METAL CONDUIT WITH GROUND BUSHING. ALL CONDUCTORS SHALL BE IN CONDUIT.

9. ALL CONNECTIONS TO THE TRANSFORMER SHALL BE MADE WITH TWO BOLT, LONG BARREL COMPRESSION FITTINGS.

I. GENERAL

1. OUTLET BOXES SHALL BE CODE GAUGE GALVANIZED STAMPED STEEL, 4 INCH SQUARE BY 1-1/2 INCHES DEEP FOR POWER AND 4 INCHES SQUARE BY 2-1/2 INCHES DEEP FOR COMMUNICATION, FIRMLY ANCHORED IN PLACE. BOX VOLUME SHALL BE AS REQUIRED BY GOVERNING CODES WITH BLANK COVERS PROVIDED FOR ALL BOXES USED FOR JUNCTION PURPOSES. GEM BOXES SHALL ONLY BE USED WHERE DIMENSIONAL RESTRAINTS EXIST AND WHERE THE CONTRACTOR HAS OBTAINED PERMISSION FROM THE ENGINEER. MULTI-GANG BOXES SHALL BE PROVIDED WITH EXTENSION COLLARS MOUNTED WITHIN 1/8 INCH OF OUTER SURFACE. WHERE OUTLET BOXES ARE SHOWN FOR FLUSH MOUNTED DEVICES, A SINGLE GANG PLASTER RING SHALL BE PROVIDED, AND MOUNTED WITH 1/8 INCH OF OUTER SURFACE.

2. DISCONNECT SWITCHES SHALL BE QMQB FUSIBLE OR NONFUSIBLE WITH CURRENT AND VOLTAGE RATING AS INDICATED ON PLANS. SWITCHES SHALL BE HORSEPOWER RATED, ENCLOSED TYPE, SUITABLE FOR PADLOCKING IN OPEN POSITION.

3. HORSEPOWER RATED THERMAL SWITCHES (BRYANT OR AS APPROVED) SHALL BE USED FOR ALL MOTOR CIRCUITS. ELECTRICAL CONTRACTOR SHALL INSTALL WHERE APPLICABLE TOGGLE SWITCHES FOR USE AS DISCONNECTED. THESE SWITCHES SHALL BE "T" RATED FOR RESISTANCE LOADS AND "M" RATED FOR MOTOR LOADS.

4. STANDARD DUPLEX CONVENIENCE RECEPTACLES SHALL BE SPECIFICATION GRADE NEMA 5-15R, 5-20R, 2 POLE, 3 WIRE, GROUNDED, 15 OR 20 AMPERE RATED FOR DEVICES SHOWN ON A 15 OR 20 AMPERE CIRCUIT (RESPECTIVELY). PROVIDE DEVICES RATED TO THE EQUIPMENT CIRCUIT BREAKER SIZE UNLESS OTHERWISE NOTED. GROUND FAULT TYPE SHALL BE USED WHERE REQUIRED BY GOVERNING CODES INCLUDING ALL DEVICES SHOWN TO BE WITHIN SIX FEET OF A SINK/WATER.

5. SWITCHES SHALL BE FLUSH, SPECIFICATION GRADE, QUIET TUMBLER TYPE, GROUNDED, BEHIND COMMON PLATE WITH BARRIERED BACK BOX WHERE REQUIRED BY CODE FOR MULTIPLE CIRCUITS GREATER THAN 250 VOLTS. SINGLE POLE SWITCHES SHALL BE 20 AMPERES, 277 VOLT.

6. DEVICE TYPES, MANUFACTURES AND COLORS SHALL BE SPECIFIED BY THE ARCHITECT. IF NO SPECIFICATION HAS BEEN PROVIDED, THIS CONTRACTOR SHALL OBTAIN ALL INFORMATION REGARDING THE ABOVE FROM THE ARCHITECT PRIOR TO THE SUBMISSION OF BID, OR SHALL INCLUDE THE ABILITY TO FURNISH ANY MANUFACTURER SELECTED BY THE ARCHITECT DURING THE SHOP DRAWING SUBMISSION PHASE.

7. DEVICE PLATES SHALL BE AS INDICATED ON THE ARCHITECTURAL DRAWINGS. COORDINATE EXACT COLOR WITH ARCHITECT.

8. ALL CABLES SHALL BE COPPER WITH THWN OR THHN INSULATION FOR HORIZONTAL APPLICATIONS AND XHHW FOR VERTICAL APPLICATIONS (I.E. WHEN PASSING THROUGH A CABLE SUPPORT BOX), EMPLOYED AT THE 75°C CODE RATED AMPACITY. NO SMALLER THAN No.12 AWG SHALL BE USED UNLESS SPECIFICALLY NOTED ON PLANS. COLOR CODING SHALL CONFORM TO CODE REQUIREMENTS. DERATE ALL CABLES PER LATEST VERSION OF THE NATIONAL ELECTRICAL CODE.

9. ALL CONDUCTORS #10 AND SMALLER SHALL BE SOLID COPPER CONDUCTORS. ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER.

10. ALL CABLING FURNISHED FOR INSTALLATION EXPOSED (NOT IN AN ENCLOSED RACEWAY) IN AN AIR PLENUM CEILING OR FLOOR SHALL BE APPROVED FOR USE BY GOVERNING AUTHORITIES, AND SHALL CONFORM TO UL 910 WITH A MINIMUM OF 125 DEGREES CELSIUS RATED JACKED.

11. ALL SUPPLIED LUGS FOR EQUIPMENT REQUIRING HARD-WIRED CONNECTIONS, ETC. SHALL BE DOUBLE INDENT, 2 BOLT HOLE, LONG BARREL AND COMPRESSION TYPE. PROVIDE DOUBLE INDENT "HEXAGONAL" COMPRESSION DIES AND TOOL (T & B OR BURNDY OR AS REVIEWED). MECHANICAL LUGS, SINGLE INDENT COMPRESSION TOOLS AND UNIVERSAL DIES SHALL NOT BE PERMITTED. ALL COMPRESSION TOOLS AND DIES SHALL BE MANUFACTURED BY THE LUG VENDOR.

12. ALL SUPPLIED IN-LINE SPLICE CONNECTORS, "T: CONNECTORS, ETC., SHALL BE DOUBLE INDENT (PER CONDUCTOR), LONG BARREL AND COMPRESSION TYPE. PROVIDE DOUBLE INDENT "HEXAGONAL" COMPRESSION DIES AND TOOL (T & B, BURNDY OR AS REVIEWED). MECHANICAL CONNECTORS, SINGLE INDENT COMPRESSION TOOLS AND UNIVERSAL DIES SHALL NOT BE PERMITTED. ALL COMPRESSION TOOLS AND DIES SHALL BE MANUFACTURED BY THE CONNECTOR VENDOR.

13. PROVIDE LOCAL DISCONNECTS FOR ALL MOTORS, HARD-WIRED PANTRY/KITCHEN EQUIPMENT AND HOT WATER HEATERS, WHETHER OR NOT SHOWN ON PLAN. DISCONNECTS SHALL BE SIZED PER THE OVERCURRENT PROTECTION AND LOCATED PER THE ENGINEER AND ARCHITECT.

14. PROVIDE A 120 VOLT DEDICATED CIRCUIT FOR EACH CONDENSATE PUMP FOR ALL AC UNITS. COORDINATE WITH THE ENGINEER, THE PANEL AND BREAKER POSITION, PRIOR TO INSTALLATION.

15. ALL EQUIPMENT MATERIALS SHALL BE NEW, UL LISTED AND SHALL CONFORM TO ANY ADDITIONAL LABELING, TESTING AND CONSTRUCTION REQUIREMENTS ESTABLISHED BY THE GOVERNING AUTHORITIES. SAME SHALL BE GUARANTEED FOR 1 YEAR SUBSEQUENT TO FINAL ACCEPTANCE.

16. ALL EQUIPMENT (ELECTRICAL AND MECHANICAL) SHALL BE SPECIFIED TO HAVE VOLTAGE RATINGS COMPATIBLE WITH THE PROVISIONS OF ANSI C84.

17. ALL WORK SHALL BE IN CONDUIT.

18. DISCONNECTS FOR INCOMING SERVICE SHALL BE SERVICE RATED.

L. ELECTRONIC MEDIA REQUIREMENT

1. ALL INFORMATION INCLUDING, NOT LIMITED TO, SHOP DRAWING SUBMITTALS, "AS-BUILT" DRAWINGS, TEST RESULTS, AND OPERATION AND MAINTENANCE MANUALS SHALL BE SUBMITTED ON CD-ROM(S) PRIOR TO THE COMPLETION OF THE PROJECT.

   a. ALL "AS-BUILT" DRAWINGS SHALL BE IN ELECTRONIC .PDF FORMAT.

   b. ALL CUT SHEETS, SUBMITTALS, MANUALS, AND ASSOCIATED INFORMATION SHALL BE IN .PDF FORMAT.

2. EACH CD-ROM SHALL BE INDEXED TO ALLOW READY ACCESS TO ALL INFORMATION.

3. PROVIDE THREE (3) COPIES OF EACH CD-ROM.

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America's New Northeast Business Address

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Atlantic City, NJ 08401

SUBMISSIONS

NO.	DATE:	DESCRIPTION:
	2018 07 01	CONSTRUCTION DOCUMENTS

DRAWING TITLE:
ELECTRICAL SHEET SPECIFICATIONS

DRAWN BY: IJ
REVIEWED BY: EJT
PROJECT NO. 17010.01.001
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