DIVISION 16 – ELECTRICAL SPECIFICATION

16010 GENERAL PROVISIONS

(A) THE ARCHITECTURAL GENERAL AND SPECIAL CONDITIONS FOR THE CONSTRUCTION OF THIS PROJECT SHALL BE A PART OF THE ELECTRICAL SPECIFICATIONS. THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE GENERAL AND SPECIAL CONDITIONS BEFORE SUBMITTING THE PROPOSAL.

(B) THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK INCLUDED IN THIS SECTION AND THE DELEGATION OF WORK TO THE ELECTRICAL CONTRACTOR SHALL NOT RELIEVE HIM OF THIS RESPONSIBILITY. THE ELECTRICAL CONTRACTOR AND HIS SUBCONTRACTORS WHO PERFORM WORK UNDER THIS SECTION SHALL BE RESPONSIBLE TO THE GENERAL CONTRACTOR.

(C) WHERE ITEMS OF THE GENERAL CONDITIONS OR OF THE SPECIAL CONDITIONS ARE REPEATED IN THIS SECTION OF THE SPECIFICATIONS, IT IS INTENDED TO CALL PARTICULAR ATTENTION TO OR QUALIFY THEM; IT IS NOT INTENDED THAT ANY OTHER PART OF THE GENERAL CONDITIONS OR SPECIAL CONDITIONS SHALL BE ASSUMED TO BE OMITTED IF NOT REPEATED HEREIN.

(D) THE NAMING OF A CERTAIN BRAND OR MAKE OR MANUFACTURER IN THE SPECIFICATIONS IS TO ESTABLISH A QUALITY STANDARD FOR THE ARTICLE DESIRED. THE CONTRACTOR IS RESTRICTED TO THE USE OF THE SPECIFIC BRAND OF THE MANUFACTURER NAMED. HOWEVER, WHERE A SUBSTITUTION IS REQUESTED, A SUBSTITUTION WILL BE PERMITTED ONLY WITH THE WRITTEN APPROVAL OF THE ENGINEER. NO SUBSTITUTE MATERIAL OR EQUIPMENT SHALL BE ORDERED, FABRICATED, SHIPPED OR PROCESSED IN ANY MANNER PRIOR TO THE APPROVAL OF THE ARCHITECT/ENGINEER. THE CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ADDITIONAL EXPENSES AS REQUIRED IN ANY WAY TO MEET CHANGES FROM THE ORIGINAL MATERIAL OR EQUIPMENT SPECIFIED. IF NOTICE OF SUBSTITUTION IS NOT FURNISHED TO THE ENGINEER WITHIN FIFTEEN DAYS AFTER THE GENERAL CONTRACT IS AWARDED, THEN EQUIPMENT AND MATERIALS NAMED IN THE SPECIFICATIONS ARE TO BE USED.

(E) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND PRESENT FIVE (5) COPIES OF SHOP DRAWINGS OR BROCHURES FOR ALL FIXTURES, EQUIPMENT, AND ACCESSORIES TO THE ENGINEER FOR THE ENGINEER'S APPROVAL. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND PRESENT FIVE (5) COPIES OF A SCHEDULE OF MANUFACTURERS OF ALL MATERIALS FOR WHICH SHOP DRAWINGS OR BROCHURES ARE NOT PRESENTED. NO EQUIPMENT SHALL BE ORDERED, PURCHASED OR INSTALLED PRIOR TO APPROVAL OF THE SHOP DRAWINGS, BROCHURES, AND SCHEDULES. CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE; FABRICATIONS PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATION OF HIS WORK WITH THAT OF ALL OTHER TRADES AND THE SATISFACTORY PERFORMANCES OF HIS WORK.

(F) THE ELECTRICAL CONTRACTORS SHALL EXAMINE DRAWINGS RELATING TO WORK OF ALL TRADES AND BECOME FULLY INFORMED AS TO THE EXTENT AND CHARACTER OF WORK REQUIRED AND ITS RELATION TO ALL OTHER WORK IN THE PROJECT.

(G) BEFORE SUBMITTING BID, CONTRACTOR SHALL VISIT THE SITE AND EXAMINE AND SPACE CONDITIONS ON WHICH HIS WORK IS IN ANY WAY DEPENDENT FOR THE BEST WORKMANSHIP AND OPERATION ACCORDING TO THE INTENT OF THE SPECIFICATIONS AND DRAWINGS. HE SHALL REPORT TO THE ARCHITECT AND CONDITION WHICH MIGHT PREVENT HIM FROM INSTALLING HIS EQUIPMENT IN THE MANNER INTENDED.

(H) NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED FOR FAILURE TO VISIT SITE, OR FOR ANY ALLEGED MISUNDERSTAND OF MATERIALS TO BE FURNISHED OR WORK TO BE DONE.

(I) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ARRANGEMENTS AND COSTS FOR PROVIDING TEMPORARY ELECTRICAL METERING, MAIN SWITCHES, AND DISTRIBUTION PANELS AT THE SITE AS REQUIRED FOR CONSTRUCTION PURPOSES. THE DISTRIBUTION PANELS SHALL BE LOCATED AT THE CENTRAL POINT DESIGNATED BY THE ARCHITECT. THE GENERAL CONTRACTOR SHALL INDICATE PRIOR TO INSTALLATION WHETHER THREE PHASE OR SINGLE-PHASE SERVICE IS REQUIRED.

(J) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ONE OSHA APPROVED PIGTAIL SOCKET WITH 150-WATT LAMP FOR EVERY 500 SQUARE FEET OF FLOOR SPACE, EVENLY DISTRIBUTED THROUGHOUT THE BUILDING.

(K) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL POWER OUTLETS TO TOTAL ONE FOR EVERY 2000 SQUARE FEET OR PART THEREOF OF FLOOR AREA AND THESE SHALL BE 15-AMP, SINGLE-PHASE RECEPTACLES FOR EITHER 110 OR 220 VOLTS AS DIRECTED BY THE GENERAL CONTRACTOR.

(L) ANY LIGHT OR POWER OUTLETS REQUIRED OVER THE MAXIMUM QUANTITY NOTED ABOVE SHALL BE PAID FOR BY THE CONTRACTOR REQUIRING THE SAME. THE POWER CONSUMPTION SHALL BE PAID FOR BY THE GENERAL CONTRACTOR.

16015 ELECTRICAL DRAWINGS AND REFERENCE SYMBOLS

(A) THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERALLY THE LOCATIONS OF MATERIAL AND EQUIPMENT. THESE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE WORK UNDER THIS SECTION WITH THE ARCHITECTURAL, STRUCTURAL, PLUMBING, HEATING AND AIR CONDITIONING, AND THE DRAWINGS OR OTHER TRADES FOR EXACT DIMENSIONS, CLEARANCES AND ROUGHING-IN LOCATIONS; THIS CONTRACTOR SHALL COOPERATE WITH ALL TRADES IN ORDER TO MAKE MINOR FIELD ADJUSTMENTS TO ACCOMMODATE THE WORK OF OTHERS.

(B) THE DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY, EACH TO THE OTHER, AND THE WORK REQUIRED BY EITHER SHALL BE INCLUDED IN THE CONTRACT AS IF CALLED FOR BY BOTH.

(C) IF DIRECTED BY THE ARCHITECT, THE CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF OTHER TRADES OR FOR PROPER EXECUTION OF THE WORK.

(D) ELECTRICAL SYMBOLS USED ON THIS PROJECT ARE SHOWN IN A SYMBOL LIST ON THE ACCOMPANYING WORKING DRAWINGS. THIS LIST SHOWS STANDARD SYMBOLS AND ALL MAY NOT APPEAR ON THE PROJECT DRAWINGS; HOWEVER, WHEREVER THE SYMBOL ON PROJECT DRAWINGS OCCURS, THE ITEM SHALL BE PROVIDED AND INSTALLED.

16020 WORK INCLUDED

(A) THE SCOPE OF THE WORK CONSISTS OF THE FURNISHING AND INSTALLING OF COMPLETE ELECTRICAL SYSTEMS – EXTERIOR AND INTERIOR – INCLUDING MISCELLANEOUS SYSTEMS. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL SUPERVISION, LABOR, MATERIALS, EQUIPMENT, MACHINERY, AND ANY AND ALL OTHER ITEMS NECESSARY TO COMPLETE THE SYSTEMS. THE ELECTRICAL CONTRACTOR SHALL NOTE THAT ALL ITEMS OF EQUIPMENT ARE SPECIFIED IN THE SINGULAR; HOWEVER THE CONTRACTOR SHALL PROVIDE AND INSTALL THE NUMBER OF ITEMS OR EQUIPMENT AS INDICATED ON THE DRAWINGS AND AS REQUIRED FOR COMPLETE SYSTEMS.

(B) IT IS THE INTENTION OF THE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK, TESTED, AND READY FOR OPERATION.

(C) ANY APPARATUS, APPLIANCE, MATERIAL OR WORK NOT SHOWN ON DRAWINGS BUT MENTIONED IN THE SPECIFICATIONS, OR VICE VERSA, OR ANY INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE WORK COMPLETE AND PERFECT IN ALL RESPECTS AND READY FOR OPERATION EVEN IF NOT PARTICULARLY SPECIFIED, SHALL BE FURNISHED DELIVERED AND INSTALLED BY THE CONTRACTOR WITHOUT ADDITIONAL EXPENSE TO THE OWNER.

(D) MINOR DETAIL NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER INSTALLATION AND OPERATION, SHALL BE INCLUDED IN THE CONTRACTOR'S ESTIMATE, THE SAME AS IF HEREIN SPECIFIED OR SHOWN.

(E) WITH SUBMISSION OF BID, THE ELECTRICAL CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE ARCHITECT OF ANY MATERIALS OR APPARATUS BELIEVED INADEQUATE OR UNSUITABLE, IN VIOLATION OF LAWS, ORDINANCES, RULES; ANY NECESSARY ITEMS OR WORK OMITTED. IN THE ABSENCE OR SUCH WRITTEN NOTICE, IT IS MUTUALLY AGREED THE CONTRACTOR HAS INCLUDED THE COST OF ALL REQUIRED ITEMS IN HIS PROPOSAL, AND THAT HE WILL BE RESPONSIBLE FOR THE APPROVED SATISFACTORY FUNCTIONING OF THE ENTIRE SYSTEM WITHOUT EXTRA COMPENSATION.

16025 WORK NOT INCLUDED

(A) THE FOLLOWING EQUIPMENT ITEMS AND WORK SHALL BE THE RESPONSIBILITY OF OTHERS.

1. MOTORS AND CONTROLS, UNLESS INDICATED OTHERWISE, SHALL BE FURNISHED BY OTHERS, BUT SHALL BE INSTALLED AND CONNECTED BY THE ELECTRICAL CONTRACTOR AS INDICATED ON THE DRAWINGS.
2. TELEPHONE SYSTEMS WIRES, CABLE, EQUIPMENT, AND INSTRUMENTS SHALL BE FURNISHED AND INSTALLED BY THE VENDOR OR TELEPHONE COMPANY.
3. ELEVATOR SIGNAL AND CONTROL WIRING BEYOND SERVICE FEEDER NOTED ON DRAWINGS SHALL BE PROVIDED AND INSTALLED BY OTHERS.
4. CONTROLS FOR MOTORS ON MECHANICAL EQUIPMENT UNLESS INDICATED OTHERWISE, WILL BE FURNISHED BY OTHERS BUT SHALL BE INSTALLED AND WIRED BY THE ELECTRICAL CONTRACTOR.

16060 CODES AND FEES

(A) ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH ALL APPLICABLE CODES, SPECIFICATIONS, LOCAL ORDINANCES, INDUSTRY STANDARDS, UTILITY COMPANY AND FIRE INSURANCE CARRIER'S REQUIREMENTS.

(B) IN CASE OF DIFFERENCE BETWEEN THE BUILDING CODES SPECIFICATIONS, STATE LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS, UTILITY COMPANY REGULATIONS, FIRE INSURANCE CARRIER'S REQUIREMENTS, AND THE CONTRACT DOCUMENTS, THE MOST STRINGENT SHALL GOVERN, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT IN WRITING OF ANY SUCH DIFFERENCE.

(C) NONCOMPLIANCE: SHOULD THE CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE BUILDING CODES, STATE LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS FIRE INSURANCE CARRIER'S REQUIREMENTS, AND UTILITY COMPANY REGULATIONS, HE SHALL BEAR THE COST ARISING IN CORRECTING ANY SUCH DEFICIENCIES.

(D) APPLICABLE CODES AND ALL STANDARDS SHALL INCLUDE ALL STATE LAWS, LOCAL ORDINANCES, UTILITY COMPANY REGULATIONS AND THE APPLICABLE REQUIREMENTS OF THE FOLLOWING NATIONALLY ACCEPTED CODES AND STANDARDS:

1. BUILDING CODES
   A. NATIONAL BUILDING CODES
   B. LOCAL BUILDING CODE
   C. NATIONAL ELECTRIC CODES
   D. STATE ELECTRICAL CODE
   E. LOCAL MUNICIPAL ELECTRICAL CODE
2. INDUSTRY STANDARDS, CODES, AND SPECIFICATIONS
   A. AMCA – AIR MOVING AND CONDITIONING ASSOCIATION
   B. ASHRAE – AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS
   C. ASME – AMERICAN SOCIETY OF MECHANICAL ENGINEERS
   D. ASTM – AMERICAN SOCIETY FOR TESTING AND MATERIALS
   E. EIA – ELECTRONIC INDUSTRIES ASSOCIATION
   F. IEEE –INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
   G. IPCEA – INSULATED POWER CABLE ENGINEERS' ASSOCIATION
   H. NEC – NATIONAL ELECTRIC CODE (NFPA NO. 70–2005) AS INDICATED IN THE PAINTING SPECIFICATIONS, COLOR ELECTED BY THE ARCHITECT.
   I. NBS – NATIONAL BUREAU OF STANDARDS
   J. NEMA – NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
   K. NFPA – NATIONAL FIRE PROTECTION ASSOCIATION
   L. ANSI – AMERICAN NATIONAL STANDARDS INSTITUTE
   M. UL – UNDERWRITERS' LABORATORIES
3. INSURANCE CARRIERS
   A. FIA – FACTORY INSURANCE ASSOCIATION
   B. FMED – FACTORY MUTUAL ENGINEERING DIVISION

16050 BASIC ELECTRICAL MATERIALS AND METHODS

16101 GENERAL

(A) ALL MATERIALS AND EQUIPMENT SHALL BE NEW, UNDAMAGED, AND SHALL BEAR THE UL LABEL OF APPROVAL AND SHALL BE LISTED FOR USE IN EACH SPECIFIC LOCATION, UNLESS APPROVAL DOES NOT APPLY.

(B) SAMPLES OF ALL MATERIALS PROPOSED FOR USE SHALL BE PRESENTED TO THE ENGINEER FOR HIS APPROVAL WHEN REQUESTED.

(C) EQUIPMENT FINISH: ALL ELECTRICAL EQUIPMENT SHALL BE FURNISHED FACTORY PAINTED FOR FINISHED WITH TWO COATS OF HIGH GRADE ENAMEL AND IN THE MANUFACTURER'S STANDARDS COLORS UNLESS OTHERWISE SPECIFIED.

1. UNPAINTED EQUIPMENT AND MATERIALS, EXCEPT CONDUIT, SHALL BE CLEANED AND PRIMED TO BE PAINTED BY THE PAINTING CONTRACTOR IN ACCORDANCE WITH THE PAINTING SECTION OF ARCHITECTURAL SPECIFICATIONS.
2. THE COLORS OF ALL EXPOSED ELECTRICAL MATERIAL AND APPARATUS SHALL BE AS SELECTED BY THE OWNER.
3. EXPOSED CABINETS AND BOXES (FRONTS AND DOORS) SHALL BE PAINTED WITH TWO COATS OF HIGH GRADE ENAMEL

16111 CONDUITS

(A) CONDUIT SIZES SHALL BE AS INDICATED ON THE DRAWINGS, OR MINIMUM IN ACCORDANCE WITH NEC, INCLUDING PROVISION

INCH CONDUIT MAYBE USED.

(B) SPECIAL CONDUIT FITTINGS SHALL BE APPROPRIATE FOR EACH APPLICATION.

(C) CONDUIT SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OR THE NEC AND SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

(D) THE ENTIRE CONDUIT SYSTEM SHALL BE INSTALLED TO PROVIDE A CONTINUOUS BOND THROUGHOUT THE SYSTEM.

(E) ELECTRICAL METALLIC TUBING (EMT) MAY BE USED FOR SATELITE CLOSET PANEL FEEDERS, HOME RUNS, AND RACEWAYS OTHER THAN FOR SERVICE ENTRANCE AND MAIN FEEDERS UNLESS PROHIBITED BY THE NEC OR LOCAL ORDINANCES. EMT SHALL BE UL APPROVED, GALVANIZED INSIDE AND OUTSIDE, COMPLYING WITH ASA C-80.3 FOR ZINC COATED EMT WITH FITTINGS OF THE SAME TYPE MATERIAL AND FINISH, AND OF THE PRESSURE CONNECTED TYPE.

(F) ALL CONDUIT JOINTS SHALL BE CUT SQUARE, THREADED, REAM SMOOTH, AND DRAWN UP TIGHT, BENDS OR OFFSETS SHALL BE MADE WITH AN APPROVED BENDER OR HICKEY, OR HUB-TYPE CONDUIT FITTINGS. NUMBER OF BENDS PER RUN SHALL CONFORM TO THE NEC LIMITATIONS.

(G) CONCEALED CONDUITS SHALL BE RUN IN A DIRECT LINE WITH LONG SWEEP BENDS AND OFFSETS. EXPOSED CONDUITS SHALL BE PARALLEL TO AND AT RIGHT ANGLES TO BUILDING LINES, USING CONDUIT FITTINGS FOR ALL TURNS AND OFFSETS.

(H) METAL CLAD (MC) MAY BE USED FOR BRANCH CIRCUITS. MC CONDUIT PROVIDED MUST INCLUDE SEPARATE BONDED GREEN EQUIPMENT GROUND WIRE. ISOLATED GROUND CIRCUITS SHALL CONTAIN TWO GREEN GROUND WIRES; ONE FOR EQUIPMENT GROUND AND ONE FOR ISOLATED GROUND.

(I) EXPOSED CONDUITS SHALL BE SECURELY FASTENED IN PLACE ON MAXIMUM 5' FOOT INTERVALS; AND HANGERS, SUPPORTS OR FASTENERS SHALL BE PROVIDED AT EACH ELBOW AND AT THE END TO EACH STRAIGHT RUN TERMINATING AT A BOX OR CABINET.

(J) AC CONDUIT OR BX CONDUIT MAY NOT BE USED UNLESS PROVIDED WITH FULL AWG# 12 OR LARGER GREEN GROUND WIRE. NOT I.G. CIRCUITS MUST HAVE TWO GREEN GROUND WIRES; ONE FOR EQUIPMENT GROUND AND ONE FOR I.G. GROUND.

16120 WIRES AND CABLES

(A) WIRE AND CABLE SHALL MEET ALL STANDARDS AND SPECIFICATIONS APPLICABLE, AND SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE NEC. INSULATED WIRE AND CABLE SHALL HAVE SIZE, TYPE OF INSULATION, VOLTAGE AND MANUFACTURER'S NAME PERMANENTLY MARKED ON OUTER COVERING AT REGULAR INTERVALS NOT EXCEEDING FOUR FEET. WIRE AND CABLE SHALL BE DELIVERED IN COMPLETE COILS OR REELS WITH IDENTIFYING TAGS, STATING SIZE, TYPE OF INSULATION, ETC.

(B) WIRE AND CABLE SHALL BE SUITABLY PROTECTED FROM WEATHER AND OTHER DAMAGE DURING STORAGE AND HANDLING, AND SHALL BE IN FIRST-CLASS CONDITION AFTER INSTALLATION.

(C) CONDUCTORS SHALL BE SOFT DRAWN COPPER, ASTM B3 FOR SOLID WIRE, ASTM B8 FOR STRANDED CONDUCTORS. CONDUCTOR WIRE SIZES SHALL BE AMERICAN WIRE GAUGE (AWG); #6 AND LARGER OF STRANDED CONSTRUCTION; #8 AND SMALLER OF SOLID CONSTRUCTION.

(D) WIRE AND CABLE SHALL BE FACTORY COLOR-CODED WITH A SEPARATE COLOR FOR EACH PHASE AND NEUTRAL USED CONSISTENTLY THROUGHOUT THE SYSTEM. COLOR-CODING SHALL BE AS REQUIRED BY THE NEC.

(E) ALL CONDUCTORS SHALL BE RATED 600 VOLTS, UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS, OR FOR ELECTRONIC OR COMMUNICATION USE.

(F) CONDUCTORS FOR LIGHTING, RECEPTACLE, AND POWER BRANCH CIRCUITS, FEEDERS, AND SUBFEEDERS SIZE #1 AND SMALLER SHALL BE TYPE THHN.

(G) CONDUCTORS FOR FEEDERS AND SUBFEEDERS SIZE #1/0 AND LARGER SHALL BE TYPE THHN.

(H) BRANCH CIRCUITS WITHIN ALL ELECTRIC HEATER ELEMENTS SUCH AS ELECTRIC DUCT COILS, BASEBOARD RADIATION, AND CABINET UNIT HEATERS SHALL BE TYPE THHN HEAT RESISTANT, THERMOPLASTIC INSULATED, MAXIMUM OPERATING TEMPERATURE 90°C (194°F).

(I) UNDERGROUND FEEDER AND BRANCH CIRCUIT WIRE FOR DIRECT BURIAL IN EARTH OR IN CONDUIT SHALL BE TYPE UF FOR USE IN WET OR DRY LOCATIONS.

(J) FOR ANY SPECIFIC USE NOT COVERED HERE ABOVE, COMPLY WITH THE NEC IN CONDUCTOR USE.

16121 WIRE CONNECTIONS

(A) JOINTS ON BRANCH CIRCUITS SHALL OCCUR ONLY WHERE SUCH CIRCUITS DIVIDE AS INDICATED ON PLANS AND SHALL CONSIST OF ONE THROUGH CIRCUIT TO WHICH SHALL BE SPLICED THE BRANCH FROM THE CIRCUIT. IN NO CASE SHALL JOINTS IN BRANCH CIRCUITS BE LEFT FOR THE FIXTURE HANGER TO MAKE. NO SPLICES SHALL BE MADE IN CONDUCTOR EXCEPT AT OUTLET BOXES, JUNCTION BOXES, OR SPLICE BOXES.

(B) ALL JOINTS OR SPLICES FOR #10 AWG OR SMALLER SHALL BE MADE WITH UL APPROVED WIRE NUTS OR COMPRESSION TYPE CONNECTORS.

(C) ALL JOINTS OR SPLICES FOR #8 AWG OR LARGER SHALL BE MADE WITH A MECHANICAL COMPRESSION CONNECTOR. AFTER THE CONDUCTORS HAVE BEEN MADE MECHANICALLY AND ELECTRICALLY SECURE, THE ENTIRE JOINT OR SPLICE SHALL BE COVERED WITH SCOTCH #33 TAPE OR APPROVED EQUAL TO MAKE THE INSULATION OF THE CONDUCTORS. THE CONNECTOR SHALL BE UL APPROVED.

16125 PULLING CABLES

(A) INSTALL CONDUCTORS IN ALL RACEWAYS AS REQUIRED, UNLESS OTHERWISE NOTED, IN A NEAT AND WORKMANLIKE MANNER. TELEPHONE CONDUITS AND EMPTY CONDUITS AS NOTED, SHALL HAVE A #14 GALVANIZED PULL WIRE LEFT IN PLACE FOR FUTURE USE.

(B) CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH THE NEC. MAINS, FEEDERS, SUBFEEDERS SHALL BE TAGGED IN ALL PULL, JUNCTION, AND OUTLET BOXES AND IN THE GUTTER OF PANELS WITH APPROVED CODE TYPE WIRE MARKERS.

(C) NO LUBRICANT OTHER THAN POWDERED SOAPSTONE OR APPROVED PULLING COMPOUND MAY BE USED TO PULL CONDUCTORS.

(D) AT LEAST EIGHT (8) INCHES OF SLACK WIRE SHALL BE LEFT IN EVERY OUTLET BOX WHETHER IT BE IN USE OR LEFT FOR FUTURE USE.

(E) ALL CONDUCTORS AND CONNECTIONS SHALL TEST FREE OF GROUNDS, SHORTS AND OPENS FOR TURNING THE JOB OVER TO THE OWNER.

(F) PULL BOXES REQUIRED IN RUNS OVER 100 FEET OR WHEN MORE THAN THREE 90-DEGREE BENDS ARE USED, OR AS INDICATED ON THE DRAWINGS.

(G) FEEDERS ARE TO BE RUN ABOVE GROUND TO ALL POWER PANELS AND LIGHTING PANELS, UNLESS INDICATED OTHERWISE ON DRAWINGS.

(H) CONDUIT TERMINATING INSIDE OF PRESTRESSED CONCRETE PANEL VOIDS SHALL BE PROVIDED WITH NECESSARY BUSHINGS TO PREVENT DAMAGE TO WIRING RUN IN VOIDS.

(I) WHERE MOTORS CONDUIT TERMINAL BOXES FEEDERS SHALL BE CONNECTED TO SAME BY FLEXIBLE MEANS.

(J) ALL MOTORS WITH SLIDING BASE MOUNTINGS SHALL HAVE NOT LESS THAN 18 INCHES NOR MORE THAN 6 FEET OF CONDUIT CONNECTING RIGID CONDUIT FEED TO MOTOR TERMINAL BOX.

(K) CONDUCTORS SPLICES SHALL BE MADE ONLY IN JUNCTION BOXES, TERMINAL BOXES, OR PULL BOXES.

16133 OUTLET BOXES

(A) ALL OUTLET BOXES FOR CONCEALED WIRING SHALL BE SHEET METAL, GALVANIZED OR CADMIUM PLATED, AT LEAST 1-½ INCHES DEEP, SINGLE OR GANGED, OF SIZE TO ACCOMMODATE DEVICES AND NUMBER OF CONDUCTORS NOTED. BOXES SHALL BE EQUIPPED WITH PLASTER RING OR COVER AS NECESSARY.

(B) BOXES FOR EXPOSED WIRING SHALL BE MALLEABLE IRON, CADMIUM FINISH, OR CAST ALUMINUM ALLOY, AND SHALL NOT BE LESS THAN 4 INCHES SQUARE BY 1 ½ INCHES DEEP UNLESS OTHERWISE NOTED.

(C) FIXTURES OUTLET BOXES SHALL BE MINIMUM 4" IN OCTAGONAL AND, WHERE REQUIRED AS OUTLET AND JUNCTION BOXES, THEY SHALL BE 4-11/16" INCHES BY 2-1/8" INCHES DEEP.

(D) OUTLET BOXES FOR CONCEALED TELEPHONE AND SIGNALING SYSTEMS SHALL BE OF THE 4 INCH SQ. TYPE WITH PLASTER COVER AND BUSHED-OPENING COVER PLATE. SEE DETAIL ON DRAWINGS.

(E) OUTLET BOXES FOR HAZARDOUS AREAS SHALL BE EXPLOSION PROOF WITH APPROPRIATE FITTINGS, SEALOFFS, ETC.

(F) BOXES FOR FLOOR OUTLETS SHALL BE OF THE CAST-METAL THREADED-CONDUIT-ENTRANCE, WATERPROOF TYPE WITH MEANS FOR ADJUSTING COVER PLATE TO FINISHED FLOOR LEVEL. BOXES SHALL BE APPROXIMATELY 4 INCHES IN DIAMETER AND 3-½" INCHES DEEP, WITH AN APPROVED GASKET OR SEAL BETWEEN ADJUSTING RING AND BOX.

16134 PULL AND JUNCTION BOXES

(A) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL JUNCTION BOXES AND PULL BOXES WHERE INDICATED ON THE DRAWINGS, OR AS REQUIRED BY THE NEC, OR WHERE NECESSARY TO FACILITATE PULLING IN WIRES AND CABLES WITHOUT DAMAGE.

(B) BOXES SHALL BE FORMED FROM SHEET STEEL, WITH CORNERS FOLDED IN SECURELY WELDED, WITH INCH INWARD FLANGE ON ALL FOUR EDGES. WITH BOX DRILLED FOR MOUNTING, AND WITH FLANGE DRILLED FOR ATTACHMENT OF COVER. BOX SHALL BE GALVANIZED AFTER FABRICATION. COVER SHALL BE MADE OF ONE PIECE GALVANIZED STEEL AND PROVIDED WITH ROUND HEAD BRASS MACHINE SCREWS FOR FASTENING TO BOX. BOX AND COVER SHALL BE MADE OF CODE GAUGE STEEL, OR HEAVIER AS SPECIFIED. BOXES SHALL BE A MINIMUM OF 4-½" INCHES DEEP, AND SIZED AS REQUIRED TO MEET NEC STANDARDS, OR LARGER AS SPECIFIED, UTILIZING MANUFACTURER" STANDARD SIZE, OR NEXT LARGER TO MEET DIMENSIONAL REQUIREMENTS.

16140 WIRING DEVICES

AND CONTROL DEVICES. (EXCEPT SIGNAL AND TELEPHONE OUTLETS PROVIDED BY CABLE VENDOR). PLATES SHALL BE SELECTED BY ARCHITECT.

(C) WHEN DEVICES ARE INSTALLED IN EXPOSED OUTLET BOXES, THE PLATES OR COVERS SHALL BE OF A TYPE DESIGNED FOR THE BOXES.

(D) WHERE LIGHTING BRANCH CIRCUITS ARE TO BE CONTROLLED BY A DIMMING DEVICE, THEY SHALL BE AS MANUFACTURED BY LUTRON WITH RATING AND RANGE OF DIMMER AS INDICATED ON THE DRAWINGS OR BY THE CALCULATED LOAD ON THE CIRCUIT.

(E) TIME SWITCHES SHALL BE FURNISHED AND INSTALLED WHERE CALLED FOR ON THE DRAWINGS AND SHALL BE MANUFACTURED BY WATTSTOPPER.

(F) OUTLETS AND CIRCUITS INDICATED BY THE APPROPRIATE SYMBOL ON THE DRAWINGS SHALL BE CONTROLLED BY A REMOTE CONTROL LOW-VOLTAGE RELAY SYSTEM AS MANUFACTURED BY WATTSTOPPER. THE SYSTEM SHALL BE COMPLETE WITH ALL RELAYS, SWITCHES, METER SWITCHES, POWER SUPPLY, OCCUPANCY SENSORS, ETC.

16190 SUPPORTING DEVICES

(A) THE ELECTRIC CONTRACTOR SHALL PROVIDE AND INSTALL METALLIC SUPPORTS NOT MORE THAN EIGHT FEET APART OR AS REQUIRED FOR THE PROPER INSTALLATION OF RACEWAY SYSTEMS AND ALL OTHER EQUIPMENT INSTALLED UNDER THIS DIVISION OR THE CONTRACT.

(B) CONDUIT SHALL BE SUPPORTED ON APPROVED TYPES OF WALL BRACKETS, CEILING TRAPEZES, STRAP HANGERS OR PIPE SUPPORTS, SECURED BY MEANS OF TOGGLE BOLTS IN HOLLOW MASONRY WALLS OR UNITS. EXPANSION BOLTS WILL BE USED IN CONCRETE OR BLOCK MACHINE SCREWS ON METAL SURFACES AND WOOD SCREWS ON WOOD CONSTRUCTION.

(C) CONDUIT SHALL BE SECURELY FASTENED TO ALL SHEET METAL OUTLETS, JUNCTION AND PULL BOXES WITH TWO GALVANIZED LOCKNUTS AND BUSHING, CARE BEING TAKEN TO SEE THAT THE FULL NUMBER OF THREADS PROJECT THROUGH TO PERMIT THE BUSHING TO BE DRAWN TIGHT AGAINST THE END OF THE CONDUIT, AFTER WHICH THE LOCKNUTS SHALL BE MADE TIGHT SUFFICIENTLY TO DRAW THEM INTO FIRM ELECTRICAL CONTACT WITH THE OUTLET BOX.

(D) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONCRETE PADS, SUPPORTS, PIERS, BASES, FOUNDATIONS, AND ENCASEMENT REQUIRED FOR THE ELECTRICAL EQUIPMENT AND CONDUIT. THE CONCRETE PADS FOR THE ELECTRICAL EQUIPMENT SHALL BE SIX INCHES LARGER ALL AROUND THAN THE BASE OF THE EQUIPMENT UNLESS SPECIFICALLY INDICATED OTHERWISE.

16195 ELECTRICAL IDENTIFICATION

(A) THE ELECTRICAL CONTRACTOR SHALL MAINTAIN ACCURATE RECORDS OF ALL DEVIATIONS IN WORK AS ACTUALLY INSTALLED FROM WORK INDICATED ON THE DRAWINGS. ON COMPLETION OF THE PROJECT, TWO (2) COMPLETE SETS OF MARKED-UP PRINTS SHALL BE DELIVERED TO THE ARCHITECT. MARKED-UP PRINTS SHALL HAVE ELECTRICAL CONTRACTOR (EC) LOGO WITH ENGINEERS LOGO DELETED FROM DRAWINGS.

(B) PROVIDE A RIGID PHENOLIC PLASTIC NAMEPLATE WITH 1/8-INCH ENGRAVED LETTER; MOUNT ON EACH STARTER, DISCONNECT SWITCH PUSHBUTTON STATION, POWER AND LIGHTING PANEL, AND AT EACH CEILING OR WALL ACCESS PANEL TO ELECTRICAL WORK. ATTACH NAMEPLATES WITH SELF-TAPPING SHEET METAL SCREWS.

16199 ELECTRONIC EQUIPMENT

(A) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION AND CONNECTION OF A PROPER POWER SUPPLY TO ALL ELECTRONIC EQUIPMENT FURNISHED BY OTHERS. HE SHALL VERIFY ALL VOLTAGE, FREQUENCY, ETC., REQUIREMENTS PRIOR TO ENERGIZING THE CIRCUIT. THOSE INSTALLING THE EQUIPMENT WILL BE RESPONSIBLE FOR THE PROPER OPERATION OF THE EQUIPMENT PROVIDED THE PROPER POWER SUPPLY CIRCUIT IS INSTALLED BY THE ELECTRICAL CONTRACTOR.

16400 SERVICE AND DISTRIBUTION
16440 DISCONNECT SWITCHES

(A) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL SAFETY SWITCHES AS INDICATED ON THE DRAWINGS OR AS REQUIRED. ALL SAFETY SWITCHES SHALL BE GENERAL DUTY AND UL LISTED. THE SWITCHES SHALL BE FUSED SAFETY SWITCHES (FSS) OR NON-FUSED SAFETY SWITCHES (NFSS) AS SHOWN ON THE DRAWINGS OR REQUIRED AND SHALL BE MANUFACTURED BY SIEMENS.

(B) SWITCHES SHALL HAVE A OVER-THE-CENTER OPERATING HANDLE AND MECHANISM WHICH SHALL BE AN INTEGRAL PART OF THE BOX. PADLOCKING PROVISIONS SHALL BE PROVIDED FOR PADLOCKING IN THE OFF POSITION WITH AT LEAST THREE PADLOCKS. SWITCHES SHALL BE HORSEPOWER RATED FOR 250 VOLTS AC OR DC OR 600 VOLTS AC AS REQUIRED. LUGS SHALL BE UL LISTED FOR COPPER AND ALUMINUM CABLE. SWITCHES SHALL HAVE A DEFEATABLE COVER INTERLOCK.

(C) SWITCHES SHALL BE FURNISHED IN NEMA 1 GENERAL PURPOSE ENCLOSURES WITH KNOCKOUTS UNLESS OTHERWISE NOTED OR REQUIRED. SWITCHES LOCATED ON THE EXTERIOR OF THE BUILDING OR IN "WET" LOCATIONS SHALL HAVE NEMA 3R ENCLOSURES (WP).

(D) THE SAFETY SWITCHES SHALL BE SECURELY MOUNTED IN ACCORDANCE WITH THE NEC. THE CONTRACTOR SHALL PROVIDE ALL MOUNTING MATERIALS AND INSTALL FUSES IN THE FSS. THE FUSES SHALL BE DUAL ELEMENT TIME DELAY ON MOTOR CIRCUITS.

(E) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL AS WELL AS BE RESPONSIBLE FOR THE PROPER OPERATION OF ALL ELECTRONIC EQUIPMENT INDICATED ON THE ELECTRICAL DRAWINGS.

16450 GROUNDING

(A) THE CONDUIT SYSTEMS, NEUTRAL CONDUCTOR FOR THE WIRING SYSTEM, AND THE TELEPHONE SYSTEM SHALL BE SECURELY GROUNDED. THE GROUNDS SHALL BE NEC GROUNDS IN EACH CASE. A GROUND SHALL BE ESTABLISHED AND TESTS CARRIED OUT TO INDICATE THAT SATISFACTORY GROUND HAS BEEN ESTABLISHED IN ACCORDANCE WITH THE NEC. WRITTEN RESULTS OF THIS TEST SHALL BE FORWARDED TO THE ENGINEER BEFORE CONNECTION TO THE SERVICE.

16460 TRANSFORMERS

(A) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL DRY-TYPE TRANSFORMERS SHOWN ON THE DRAWINGS AND INDICATED HEREIN. TRANSFORMERS SHALL BE 3 PHASE, 60-CYCLE, TWO-WINDING TYPE WITH CLASS 'H' INSULATION; SHALL HAVE DELTA-CONNECTED PRIMARIES AND WYE-CONNECTED SECONDARIES WITH A GROUNDED NEUTRAL. RATED CAPACITY SHALL BE NOTED HEREIN OR ON THE PLANS. TRANSFORMERS SHALL HAVE 2-1/2 PERCENT FULL CAPACITY TAPS BELOW AND ABOVE NORMAL ON THE PRIMARY SIDE.

(B) UNITS SHALL HAVE A MAXIMUM SOUND-LEVEL RATING OF 55 DB (SHALL NOT EXCEED DECIBEL RATINGS LISTED IN THE NEMA STANDARDS FOR SPECIFIC KVA SIZES); SHALL BE CEILING MOUNTED ON SPRING VIBRATION ELIMINATORS. CIRCUIT CONNECTIONS SHALL BE IN MC CONDUIT IN APPROVED MANNER.

(C) TRANSFORMER SHALL BE K-13 RATED WITH BUILT-IN HARMONIC FILTER AND TVSS AND MANUFACTURED BY HARMONICS LIMITED.

16471 BRANCH CIRCUIT PANELBOARD

(A) POWER AND LIGHTING PANELS SHALL BE OF THE DEAD FRONT, SAFETY TYPE, WITH THERMAL MAGNETIC, QUICK-MAKE, QUICK-BREAK, TRIP FREE, BOLTED-TYPE MOLDED CASE CIRCUIT BREAKERS. VOLTAGE RATINGS, NUMBER OF POLES, FRAME SIZE, TRIP RATINGS, MAIN BREAKER OR LUGS, NEUTRAL BUS, AND GROUND BUS ARE ALL AS SHOWN ON THE DRAWINGS. BUS BARS SHALL BE RECTANGULAR, SOLID COPPER, SECURELY MOUNTED AND BRACED. ALL CONNECTIONS TO BUS BARS SHALL BE SECURELY BOLTED. CABINET BOXES SHALL BE CONSTRUCTED OF CODE GRADE GALVANIZED STEEL, SIZED TO PROVIDE MINIMUM 4 INCHES WIDE WIRING GUTTERS ON SIDES, TOP AND BOTTOM. FRONTS SHALL BE CONSTRUCTED OF CODE GRADE STEEL, ADJUSTABLE INDICATING TRIM CLAMPS AND WITH DOOR PROVIDED WITH PIANO HINGES DOOR-IN-DOOR TYPE AND CYLINDER TYPE LOCK AND CATCH. TWO KEYS PER PANEL SHALL BE FURNISHED, AND ALL LOCKS KEYED ALIKE. FRONT SHALL BE FINISHED PAINTED BLUE-GRAY.

(B) POWER PANELS SHALL BE NEMA 1, TYPE SQUARED, CUTTLER HAMMER OR SIEMENS WITH BRANCH BREAKERS, MAIN BREAKERS OR LUGS, NEUTRAL AND GROUND BUSES, ETC., ALL AS SHOWN ON THE DRAWINGS.

(C) POWER AND LIGHTING PANEL CONSTRUCTION DETAILS SHALL BE IN ACCORDANCE WITH UL STANDARDS AND SHALL CONFORM TO NEMA STANDARDS. THEY SHALL BEAR THE UL LABEL. PANELS SHALL MEET USASI SPECIFICATIONS W-P-115A, TYPE 1, CLASS I.

(D) ALL PANEL DIRECTORIES SHALL BE TYPED AND TERMINOLOGY APPROVED BY THE OWNER.

16120 FEEDER CIRCUIT

(A) THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM AS SHOWN ON THE DRAWINGS OR AS REQUIRED FOR A COMPLETE SYSTEM. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM WITH SECTION 16.2 OF THE SPECIFICATIONS, THE NEC, AND THE LOCAL ELECTRICAL CODE.

(B) ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED STEEL WITH A MINIMUM SIZE OF 3/4" INCH. ELECTRICAL METALLIC TUBING SHALL BE USED IN ALL LOCATIONS NOT OTHERWISE SPECIFIED FOR RIGID OR FLEXIBLE CONDUIT AND WHERE NOT IN VIOLATION OF THE NEC, AND FOR ALL HOME RUNS.

(C) FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED STEEL. FLEXIBLE METAL CONDUIT LOCATED IN WET LOCATIONS, SHALL BE THE LIQUIDTIGHT TYPE. A SHORT PIECE OF FLEXIBLE METAL CONDUIT SHALL BE USED FOR THE CONNECTION TO ALL MOTORS AND VIBRATING EQUIPMENT, CONNECTION BETWEEN RECESSED LIGHTING FIXTURES AND JUNCTION BOX, AND AS OTHERWISE NOTED, PROVIDED THE USE MEETS THE REQUIREMENTS OF THE NEC AND LOCAL CODES. THE FLEXIBLE METAL CONDUIT SHALL BE THE TYPE APPROVED FOR CONTINUOUS GROUNDING.

(D) THE CONDUCTOR MATERIAL SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:

1. FEEDERS SHALL BE TYPE RHW OR THW RATED AT 90°C.
2. BRANCH CIRCUITS SHALL BE TYPE THHN RATED AT 90°C.
3. SPECIAL LOCATIONS. CONDUCTORS IN SPECIAL LOCATIONS SUCH AS RANGE HOODS, LIGHTING FIXTURES, ETC., SHALL BE AS REQUIRED BY THE NEC, LOCAL CODE, OR AS OTHERWISE NOTED.

(E) NO CONDUCTOR SHALL BE SMALLER THAN #12 WIRE, EXCEPT FOR THE CONTROL WIRING AND AS STATED IN OTHER SECTIONS OF THE SPECIFICATIONS OR ON THE DRAWINGS. WIRING TO SWITCHES SHALL NOT BE CONSIDERED AS CONTROL WIRING.

(F) CONDUCTORS INDICATED ON THE DRAWINGS ARE BASED ON COPPER.

(G) ALL CONDUCTORS WITH THE SIZE OF #8 OR LARGER SHALL BE STRANDED.

(H) ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS IN EXCESS OF 100 LINEAR FEET SHALL BE INCREASED ONE SIZE TO PREVENT EXCESSIVE VOLTAGE DROP.

16475 OVERCURRENT PROTECTIVE DEVICES

(A) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL WHERE INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE NEC MOLDED-CASE CIRCUIT BREAKERS IN A NEMA TYPE ONE ENCLOSURE. BREAKERS SHALL Y MO BE MANUALLY OPERATED, TRIP-FREE AND DESIGNED SO THAT ALL POLES OPEN SIMULTANEOUSLY. TRIPPING MECHANISM SHALL BE MAGNETICALLY OPERATED, SHALL OPEN INSTANTANEOUSLY ON SHORT CIRCUITS AND HAVE TIME DELAY ON OVERLOADS, AND HAVE EFFECTIVE SEALING AGAINST TAMPERING. BREAKERS SHALL BE AS CALLED FOR ON THE DRAWINGS OR IN THE PANELBOARD.

(B) FUSES, UNLESS INDICATED OTHERWISE, SHALL BE DUAL ELEMENT, TIME-LAG, CARTRIDGE TYPE AS MANUFACTURED BY BUSSMAN. FUSES FOR MOTOR CIRCUITS SHALL BE SIZED IN ACCORDANCE WITH THE NEC. LABELS INDICATING THE SIZE AND TYPE OF REPLACEMENT FUSES SHALL BE GLUED TO INSIDE OF DOOR ON ALL FUSIBLE SWITCHES AND PANELBOARDS.

(C) ALL FUSES SHALL BE OF THE CURRENT AND VOLTAGE RATING AS REQUIRED OR INDICATED.

(D) A DUPLICATE SET OF ALL FUSES SHALL BE FURNISHED TO THE OWNER AT COMPLETION OF THE PROJECT.

16481 MOTORS

(A) ALL MOTORS WHICH ARE AN INTEGRAL PART OF A PIECE OF EQUIPMENT FURNISHED BY OTHERS SHALL NOT BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. HOWEVER, WHERE INDICATED ON THE ELECTRICAL DRAWINGS, THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL DISCONNECT-SWITCHES, FEEDERS, AND CONTROL CIRCUITS FOR THESE PIECES OF EQUIPMENT.

(B) THE MECHANICAL CONTRACTOR OR OTHERS FURNISHING MOTOR-DRIVEN EQUIPMENT WILL BE RESPONSIBLE FOR THE PROPER OPERATION OF THE EQUIPMENT, BUT THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE ELECTRICAL WORK IN CONNECTION THEREIN.

16500 LIGHTING

16501 GENERAL

(A) THIS SECTION OF THE SPECIFICATIONS INCLUDES THE FURNISHING AND INSTALLATION OF LIGHTING FIXTURES AND LIGHTING EQUIPMENT FOR ALL OUTLETS IN THE PROJECT AS LISTED IN THE FIXTURE SCHEDULE, INCLUDING THE CONNECTION OF THE FIXTURES AND EQUIPMENT TO THE ELECTRIC WIRING OF THE BUILDING.

(B) LIGHTING FIXTURES SHALL BE OF THE TYPES, SIZES, ETC., SHOWN IN THE FIXTURE SCHEDULE AND NOTES REFERENCED HEREIN.

(C) THE FURNISHING AND INSTALLATION OF THE LIGHTING FIXTURES OR LIGHTING EQUIPMENT MUST BE EXECUTED IN A MANNER THAT WILL INSURE COMPLETION COINCIDENT WITH THE COMPLETION OF THE CONSTRUCTION OF THE PROJECT, UNLESS OTHERWISE REQUIRED BY THE CONTRACT SPECIFICATIONS.

(D) MATERIALS AND WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY AND IN ACCORDANCE WITH THE HIGHEST COMMERCIAL STANDARDS.

(E) THE CONTRACTOR SHALL SUBMIT FOR APPROVAL ONE EACH OF ANY OF THE LIGHTING FIXTURES REQUIRED UNDER THE CONTRACT. THE FIXTURE OR FIXTURES SHALL BE TAGGED WITH THE NAME OF THE BUILDING OR PROJECT FOR WHICH THE FIXTURE IS INTENDED AND BE SHIPPED, ALL CHARGES PREPAID, TO THE ADDRESS SPECIFIED. WHEN FIXTURE OR FIXTURES HAVE SERVED THEIR PURPOSE, THEY WILL BE TURNED OVER TO THE CONTRACTOR FING EQUIPMENT OR USE IN THE PROJECT. IN THE EVENT THE SUBMISSION IS DISAPPROVED, THE FIXTURE OR FIXTURES MEETING THE CONTRACT REQUIREMENTS.

(F) ORDERING OF THE LIGHTING FIXTURES FOR THE PROJECT SHALL NOT BE COMMENCED UNTIL THE CONTRACTOR HAS RECEIVED UNQUALIFIED APPROVAL OF THE SUBMITTED SAMPLE LIGHTING FIXTURES.

16502 LAMPS

(A) ALL LIGHTING FIXTURES SHALL BE LAMPED AS INDICATED ON THE LIGHTING FIXTURE SCHEDULE. LAMPS SHALL BE THOSE MANUFACTURED BY PHILLIPS OR BUILDING STANDARDS.

(B) AT THE TIME OF ACCEPTANCE OF THE BUILDING, THE LIGHTING FIXTURES SHALL BE COMPLETELY RELAMPED AS NECESSARY AND SHALL BE THOROUGHLY CLEANED.

16503 LUMINAIRE ACCESSORIES

(A) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL, WITH NO ADDITIONAL COST TO THE OWNER, ALL ACCESSORIES AS NOTED OR REQUIRED TO INSTALL AND MAKE WORKABLE ALL LIGHTING FIXTURES AND RELATED ITEMS CONTAINED UNDER THIS SECTION OF THE SPECIFICATION.

16505 BALLASTS

(A) EACH BALLAST SHALL BE DESIGNED TO START AND SATISFACTORILY OPERATE THE TYPE OF FLUORESCENT LAMP REQUIRED IN THE PARTICULAR FIXTURE AND SHALL CONFORM TO THE CURRENT PRACTICE AND REQUIREMENTS OF THE "CERTIFIED BALLAST MANUFACTURERS," UNLESS THE LAMPS ARE OF UNUSUAL TYPES FOR WHICH "CERTIFIED" BALLASTS ARE NOT AVAILABLE COMMERCIALLY. BALLAST SHALL BE UL CLASS P OF THE HIGH POWER FACTOR TYPE IN SIZES IN WHICH THEY ARE AVAILABLE OF THE SERIES-SEQUENCE TYPE. MULTILAMP BALLASTS FOR OPERATING PREHEAT AND INSTANT TYPES OF LAMPS SHALL BE OF THE LEAD-LAG TYPE. BALLASTS SHALL BE SECURELY FASTENED IN PLACE WITH MOUNTING SURFACE OF BALLAST MAKING AS COMPLETE CONTACT WITH SURFACE OF BALLAST MOUNTING AREA OF FIXTURE AS PRACTICAL. BALLASTS HAVING FOUR (4) MOUNTING HOLES SHALL BE ATTACHED TO THE MOUNTING SURFACE OF THE FIXTURE BY MEANS OF FOUR (4) BOLTS AND NUTS OF THE MACHINE SCREW THREAD TYPE, NOT SMALLER THAN THE #8-32 SIZE (TWO AT EACH END OF BALLAST) AND SHALL BE FITTED WITH LOCKWASHERS. BOLTS SHALL BE INSTALLED IN A NON-TURNING, CAPTIVE MANNER. NUTS WILL NOT BE REQUIRED WHERE BOLTS ARE SHOWN TO BE THREADED INTO SHEET STEEL MOUNTING PLATES OF #18 USS GAUGE ON STANDARD PPS LIGHTING FIXTURES. BALLAST FOR OPERATING LAMP SIZES 30 WATTS OR LARGER SHALL BE PROTECTED AGAINST OVERHEATING BY A BUILT-IN, THERMALLY ACTUATED AUTOMATIC RECLOSING DEVICE SENSITIVE TO BOTH WINDING TEMPERATURES AND CURRENT WHICH WILL PREVENT BALLAST CASE TEMPERATURE EXCEEDING 110°C. AFTER OPENING, THE CIRCUIT SHALL RECLOSE WHEN THE CASE TEMPERATURE DROPS BELOW 85°C.

(B) BALLAST FOR OPERATION OF FIXTURES FOR INDOOR USE SHALL COMPLY WITH THE REQUIREMENTS OF THE UL FOR CLASS P BALLASTS, IN LIEU OF THE PROTECTION SPECIFIED HEREIN BEFORE. BALLAST PROTECTORS SHALL BE OF THE THERMALLY ACTUATED AUTOMATIC-RESET BUILT-IN TYPE.

(C) IN ADDITION THE LIGHTING FIXTURE MANUFACTURER SHALL SUBMIT, THROUGH THE CONTRACTOR, A CERTIFICATION THAT THE BALLAST, IN CONJUNCTION WITH THE FLUORESCENT LIGHTING FIXTURES PROPOSED TO BE FURNISHED ON THE PROJECT, WILL OPERATE WITHIN THE TEMPERATURE LIMITS AS REQUIRED BY THE UL STANDARDS FOR SAFETY, ELECTRIC LIGHTING FIXTURES, UL57.

16510 INTERIOR LUMINARIES

(A) UPON COMPLETION OF THE INSTALLATION OF THE LIGHTING FIXTURES AND LIGHTING EQUIPMENT, THEY MUST BE IN FIRST CLASS OPERATING ORDER, IN PERFECT CONDITION AS TO FINISH AND FREE FROM DEFECTS. AT THE TIME OF FINAL INSPECTION, ALL FIXTURES AND EQUIPMENT MUST BE COMPLETELY LAMPED AND BE COMPLETE WITH THE REQUIRED GLASSWARE, REFLECTORS, SIDE PANELS, LOUVERS OR OTHER COMPONENTS NECESSARY TO COMPLETE THE FIXTURES. ALL FIXTURES AND EQUIPMENT SHALL BE CLEAN AND FREE FROM DUST, PLASTER, OR PAINT SPOTS. ANY REFLECTOR, GLASSWARE, SIDE, PANELS, OR OTHER PARTS BROKEN PRIOR TO THE FINAL INSPECTION MUST BE REPLACED BY THE CONTRACTOR.

(B) FURNISH AND INSTALL LIGHTING FIXTURES AS SHOWN ON THE ELECTRICAL AND ARCHITECTURAL DRAWINGS. VERIFY EXACT LOCATIONS OF FIXTURES WITH ARCHITECTURAL REFLECTED CEILING PLANS. (SEE SCHEDULE IN ARCHITECTURAL DRAWINGS FOR FIXTURE SPECIFICATIONS. PROVIDE REQUIRED ACCESSORIES FOR CEILING TYPES.)

(C) FIXTURES WITH BATTERY PACK SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR WITH BATTERY PACK SIMILAR TO "BODINE" MODEL # B50. COORDINATE WITH FIXTURE MANUFACTURER FOR BATTERY PACK MOUNTING. FIXTURES SHALL BE WIRED TO BE SWITCHABLE OR UNSWITCHABLE AS SHOWN, WITH 2 LAMPS ON BATTERY PACK IN EACH FIXTURE. PROVIDE UNSWITCHED SOURCE OF POWER TO EMERGENCY BALLAST OF SWITCHABLE EMERGENCY LIGHTS.

(D) ALL BRANCH CIRCUIT WIRING FOR LIGHTING SHALL BE #12 AWG, TYPE THHN, AND SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT) ABOVE THE HUNG CEILING. THE EMT SHALL BE SUPPORTED ACCORDING TO THE CODE(S) HAVING JURISDICTION BASED ON THE NUMBER AND SIZE OF CONDUCTORS ENTERING AND LEAVING THE BOX.

(E) ALL FLUORESCENT LAMPS SHALL BE ENERGY SAVING "T-5" OR "T-8" TYPE. LAMP COLOR AS PER ARCHITECT.

(F) ALL FLUORESCENT BALLASTS SHALL BE ELECTRONIC TYPE, C.B.M. APPROVED.

(G) ALL INCANDESCENT LAMPS SHALL BE 130 VOLTS.

(H) ALL INCANDESCENT FIXTURES SHALL BE EQUIPPED WITH THERMAL PROTECTION.

(I) RE-LAMP ALL BURNT OUT LIGHTING FIXTURES PRIOR TO OWNER OCCUPANCY.

16720 FIRE ALARM AND DETECTION SYSTEMS

(A) VISUAL ALARM FLASHING STROBE LIGHT SHALL BE MINIMUM 75 CANDELAS, AND WALL MOUNTED @ 80" A.F.F. PER "A.D.A." REQUIREMENTS.

(B) ALL ALARM DEVICES SHALL BE ACTIVATED ON ANY FIRE ALARM.

(C) STROBE LIGHT MUST BE PLACED 80 INCHES ABOVE FINISH FLOOR OR 6 INCHES BELOW CEILING, WHICH EVER IS LOWER. INSTALL MANUAL PULL STATIONS AT 48" A.F.F.

(D) PROVIDE IONIZATION TYPE SMOKE DETECTORS, STROBES, MANUAL PULL STATIONS, COMBINATION SPEAKER/STROBES, AND CARD READERS IN TENANT SPACE, AS SHOWN IN THE PLAN, INCLUDING WIRING AS PER MANUFACTURER'S REQUIREMENTS AND TIE-IN TO THE BUILDING FIRE ALARM TERMINAL CABINET (CONTACT BUILDING REPRESENTATIVE FOR LOCATION).

(E) THIS CONTRACTOR SHALL REMOVE ALL EXISTING SPEAKERS, SPEAKER/STROBES, STROBES, SMOKE DETECTORS, AND HEAT DETECTORS FROM THE AREA OF WORK, U.O.N. REMOVE ALL WIRING TO THE SOURCE. INSTALL NEW & KEEP EXISTING OPERATIONAL UNTIL CUT-IN OF NEW UNITS.

(F) THIS CONTRACTOR SHALL PROVIDE TEMPORARY LOOP DURING CONSTRUCTION UTILIZING DEVICES PER CODE.

(G) ALL EQUIPMENT SHALL BE NEW, U.L. LISTED, BUILDING STANDARD PRODUCTS. COMPLETE INSTALLATION SHALL CONFORM TO N.F.P.A. AND LOCAL FIRE DEPT. REGULATIONS. ALL WIRING SHALL BE AS PER MANUFACTURER'S REQUIREMENTS IN TYPE OF RACEWAY (EMT OR RIGID STEEL) AS APPROVED BY LOCAL FIRE MARSHAL. CONTACT THE BUILDING'S FIRE ALARM VENDOR, FOR THE "UBS"SPACE AND COORDINATE WORK.

(H) MOUNTING OF ALL NEW DEVICES SHALL BE PER LATEST ADA CODE.

(I) CONTRACTOR SHALL PROVIDE STROBES WITH FINISH AS APPROVED BY ARCHITECT.

(J) CONTRACTOR SHALL PROVIDE SECURITY CUTOFF RELAY, SECURITY DEVICES SHALL BE FAIL SAFE.

(K) FIRE ALARM SYSTEM DRAWINGS, ADDITIONS, MODIFICATIONS, REPROGRAMMING, WIRING, TESTING, FILING AND INSPECTIONS SHALL BE PERFORMED BY THE BUILDING FIRE ALARM CONTRACTOR, FOR COORDINATION, CONTACT BUILDING FIRE ALARM CONTRACTOR (B.F.A.C.).

(L) THE TENANT'S CONTRACTOR, AT ITS EXPENSE OR THE TENANT'S EXPENSE, SHALL CORRECT ANY DEFECT WHICH SHALL APPEAR ON ANY FIRE DEPARTMENT INSPECTION OF THE WORK COVERED UNDER THIS CONTRACT, AND SHALL BE RESPONSIBLE FOR ANY FINES LEVIED AS A RESULT OF ANY LETTER OF DEFECT OR VIOLATION.

(M) ALL WIRING IS TO BE SUPERVISED SO THAT THE FIRE COMMAND SYSTEM WILL BE NOTIFIED IN THE EVENT THE WIRING IS CUT.

(N) ALL WIRING THAT WILL NOT BE REUSED SHALL BE REMOVED.

(O) PROVIDE EXPANSION MODULES, RELAYS, STROBE GENERATOR AND ANY ACCESSORIES NEEDED TO COMPLETE THE INTENT OF DESIGN.

(P) FIRE ALARM CONTRACTOR SHALL ENSURE THAT THE ELECTRICAL POWER IS SWITCHED OFF PRIOR TO THE SPRINKLER(S) IN THE EQUIPMENT ROOM TURN ON.

(Q) THIS CONTRACTOR SHALL SUBMIT FULL SET OF DRAWINGS INCLUDING POINT TO POINT WIRING DIAGRAMS, SEQUENCE OF OPERATIONS, EQUIPMENT "CUTS" ETC. FOR FIRE ALARM FOR APPROVAL AND SHALL NOT PROCEED WITH INSTALLATION PRIOR TO APPROVALE OF SUBMITTAL.

(R) THIS CONTRACTOR MUST SUBMIT AND FILE ALL LIFE SAFETY DRAWINGS REQUIRED BY LOCAL GOVERNING AUTHORITIES. COORDINATE INSPECTIONS WITH LOCAL FIRE DEPARTMENT. PAY ALL FEES AND OBTAIN PERMITS. COST FOR FINAL CONNECTIONS TO SYSTEM AND RE-PROGRAMMING BY BUILDING FIRE ALARM CONTRACTOR TO BE INCLUDED IN THIS BID.

(S) PRIOR TO SUBMITTING HIS BID, THIS CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING BUT NOT LIMITED TO AVAILABILITY OF CIRCUITS /ZONES ETC., AND INFORM THE ENGINEER/ARCHITECT OF ANY DISCREPANCY AND INCLUDE IN HIS BID TO CORRECT THE SAME AS DIRECTED. 'UBS' IS NOT RESPONSIBLE FOR ANY ADDITIONAL COSTS RESULTING FROM VERIFIABLE EXISTING CONDITIONS DISCOVERED AFTER CONTRACT HAS BEEN AWARDED.

(T) ANY WORK INVOLVING LOUD NOISES (DRILLING, HAMMERING, ETC.) THAT WOULD DISTURB THE BUILDING'S TENANTS, SHALL BE CONDUCTED AFTER-HOURS, WITH OUT EXTRA CHARGE FOR THE CLIENT.

16741 TELEPHONE

(A) THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL EMPTY RACEWAY, OUTLET BOXES, PULL BOXES AND ASSOCIATED EQUIPMENT REQUIRED FOR A COMPLETE TELEPHONE SYSTEM AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM WITH SECTION 16100 ON THE DRAWINGS AND SPECIFICATIONS. ALL WIRING SHALL BE INSTALLED BY THE LOCAL TELEPHONE COMPANY. THE ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL TELEPHONE COMPANY.

(B) RIGID CONDUIT SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS; SERVICE ENTRANCE, UNDERGROUND IN CONTACT WITH EARTH, IN CONCRETE SLAB AND "WET" LOCATIONS.

(C) ELECTRIC METALLIC TUBING SHALL BE USED IN ALL LOCATIONS NOT OTHERWISE SPECIFIED TO BE RIGID CONDUIT.

(D) TELEPHONE WALL OUTLETS SHALL CONSIST OF A 4" TWO GANG OUTLET BOX, RAISED DEVICE COVER AND A TELEPHONE DEVICE PLATE OF THE SAME MATERIAL AS THE RECEPTACLE DEVICE PLATES. THE CONDUIT SHALL EXTEND FROM THE OUTLET TO THE DESIGNATE TELEPHONE SPACE UNLESS OTHERWISE NOTED.

(E) THE ELECTRICAL CONTRACTOR SHALL INSTALL A #14 GA GALVANIZED PULL WIRE IN THE RACEWAY SYSTEM FOR FUTURE USE.

16900 CONTROLS AND INSTRUMENTATION
16901 GENERAL

(A) ALL EQUIPMENT AND MATERIALS USED IN RELATION TO CONTROL WORK FOR THE PROJECT SHALL BE NEW AND SHALL BEAR THE MANUFACTURER'S NAME AND TRADE NAME. THE EQUIPMENT AND MATERIAL SHALL BE ESSENTIALLY THE STANDARD PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN THE PRODUCTION OF THE REQUIRED TYPE OF EQUIPMENT AND SHALL BE THE MANUFACTURER'S LATEST APPROVED DESIGN.

(B) THE ELECTRICAL CONTRACTOR SHALL RECEIVE AND PROPERLY STORE THE EQUIPMENT AND MATERIAL PERTAINING TO THE ELECTRICAL WORK. THE EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT, WATER, CHEMICAL OR MECHANICAL INJURY AND THEFT. THE MANUFACTURER'S DIRECTIONS SHALL BE FOLLOWED COMPLETELY IN THE DELIVERY, STORAGE, PROTECTION AND INSTALLATION OF ALL EQUIPMENT AND MATERIALS.

(C) THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL ITEMS NECESSARY FOR THE COMPLETE INSTALLATION OF THE EQUIPMENT AS RECOMMEND OR AS REQUIRED BY THE MANUFACTURER OF THE EQUIPMENT OR REQUIRED BY CODE WITHOUT ADDITIONAL COST TO THE OWNER, REGARDLESS OF WHETHER THE ITEMS ARE SHOWN ON THE PLANS OR COVERED IN THE SPECIFICATIONS.

(D) IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO CLEAN THE ELECTRICAL EQUIPMENT, MAKE NECESSARY ADJUSTMENTS AND PLACE THE EQUIPMENT INTO OPERATION BEFORE TURNING EQUIPMENT OVER TO OWNER. ANY PAINT THAT WAS SCRATCHED DURING CONSTRUCTION SHALL BE "TOUCHED-UP" WITH FACTORY COLOR PAINT TO THE SATISFACTION OF THE ARCHITECT. ANY ITEMS THAT WERE DAMAGED DURING CONSTRUCTION SHALL BE REPLACED.

16915 LIGHTING CONTROL SYSTEMS

(A) THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL COMPLETE REMOTE CONTROL WIRING SYSTEM FOR CONTROL OF LIGHTING, RECEPTACLES AND OTHER EQUIPMENT AS INDICATED ON DRAWINGS, DIAGRAMS AND SCHEDULES. SYSTEM SHALL BE COMPLETE WITH TRANSFORMERS, RECTIFIERS, RELAYS, SWITCHES, MASTER SELECTOR SWITCHES, PILOT LIGHTS, MOTOR MASTER CONTROLS, WALL SWITCH PLATES AND WIRING. ALL REMOTE-CONTROL WIRING COMPONENTS SHALL BE OF SAME MANUFACTURER AND INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER. REMOTE CONTROL EQUIPMENT SHALL BE AS MANUFACTURED BY WATTSTOPPER.

(B) EXCEPT WHERE OTHERWISE INDICATED, ALL SUCH REMOTE CONTROL WIRING SHALL BE IN ACCORDANCE WITH ARTICLE 725, CLASS 2, OF THE NEC.

(C) SWITCHES: REMOTE CONTROL SWITCHES SHALL BE HEAVY-DUTY, SPECIFICATION GRADE. THEY SHALL BE SINGLE POLE, DOUBLE THROW, MOMENTARY CONTACT TYPE. BOTH STANDARD AND PILOT LIGHT TYPE SWITCHES MUST BE AVAILABLE.

(D) TRANSFORMERS: TRANSFORMERS SHALL BE ENERGY-LIMITING TYPE APPROVED FOR CLASS 2 SYSTEMS, RATED 115/24 V OR 277/24 V AS REQUIRED.

(E) WIRING: LOW-VOLTAGE WIRING SHALL BE OF # 18 AWG GAUGE THERMOPLASTIC INSULATED TYPE WITH TWO, THREE OR FOUR CONDUCTORS AS REQUIRED AND SHALL BE RATED FOR 30 VOLT SERVICE WITH AT LEAST .0156-INCH INSULATION AS REQUIRED BY LOCAL CODES AND ORDINANCES. ALL WIRING SHALL BE CONCEALED WHEREVER PRACTICAL, RUN WITHOUT CONDUIT IN CEILING SPACES AND BETWEEN WALLS OR PARTITIONS. WHERE WIRING IS INSTALLED IN MASONRY PARTITIONS, OR IN EXPOSED LOCATIONS, CONDUIT SHALL BE USED. COMPLETE WIRING SYSTEMS SHALL BE COLOR CODED ACCORDING TO THE MANUFACTURER'S OR ENGINEER'S RECOMMENDATIONS AND CONDUCTORS MUST BE TAGGED OR IDENTIFIED AT TERMINALS.

(F) WHERE REMOTE CONTROL SWITCHES ARE ON METAL PARTITIONS, WIRING SHALL ENTER THE TOP OF THE PARTITION AND BE RUN CONCEALED WITHIN THE PARTITIONS. THE PROPER SIZE CUTOUT SHALL BE FABRICATED BY THE PARTITION MANUFACTURER FOR THE ELECTRICAL CONTRACTOR TO INSTALL SWITCHES.

16950 TESTING

(A) AS SOON AS ELECTRIC POWER IS AVAILABLE AND CONNECTED TO SERVE THE EQUIPMENT IN THE BUILDING, AND EVERYTHING IS READY FOR FINAL TESTING AND PLACING IN SERVICE, A COMPLETE OPERATIONAL TEST SHALL BE MADE. THE CONTRACTOR SHALL FURNISH ALL NECESSARY INSTRUMENTS AND EQUIPMENT AND MAKE ALL TESTS, ADJUSTMENTS, AND TRIAL OPERATIONS REQUIRED TO PLACE THE SYSTEM IN BALANCED AND SATISFACTORY OPERATING CONDITION; FURNISH ALL NECESSARY ASSISTANCE AND INSTRUCTIONS TO PROPERLY INSTRUCT THE OWNER'S AUTHORIZED PERSONNEL IN THE OPERATION AND CARE OF THE SYSTEM.

(B) PRIOR TO TESTING THE SYSTEM, THE FEEDERS AND BRANCH CIRCUITS SHALL BE CONTINUOUS FROM MAIN FEEDERS TO MAIN PANEL, TO SUBPANELS, TO OUTLETS, WITH ALL BREAKERS AND FUSES IN PLACE. THE SYSTEM SHALL BE TESTED FREE FROM SHORTS AND GROUNDS.

(C) NO CIRCUITS SHALL BE ENERGIZED WITHOUT THE OWNER'S APPROVAL.

(D) THE RIGHT IS RESERVED TO INSPECT AND TEST ANY PORTION OF THE EQUIPMENT AND/OR MATERIALS DURING THE PROGRESS OF ITS ERECTION. THE CONTRACTOR SHALL FURTHER TEST ALL WIRING AND CONNECTIONS FOR CONTINUITY AND GROUNDS BEFORE CONNECTING ANY FIXTURES OR EQUIPMENT.

(E) THE CONTRACTOR SHALL TEST THE ENTIRE SYSTEM WHEN THE SYSTEM IS FINALLY COMPLETED TO INSURE THAT ALL PORTIONS ARE FREE FROM SHORT CIRCUITS OR GROUND FAULTS.

(F) ELECTRICAL CONTRACTOR SHALL BALANCE THE LOAD WITH AMPROBE ON ALL PANELS SUBSEQUENT TO COMPLETION OF INSTALLATION, WITH ALL EQUIPMENT OPERATING SIMULTANEOUSLY. ELECTRICAL CONTRACTOR SHALL SUBMIT LOAD BALANCING REPORT TO PROJECT MANAGER FOR APPROVAL.

16980 DEMONSTRATION OF ELECTRICAL EQUIPMENT

(A) THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE ARCHITECT WITH CERTIFICATION OF THE INSPECTION AND APPROVAL OF AN ACTIVE MEMBER OF THE INTERNATIONAL ASSOCIATION OF ELECTRICAL INSPECTORS OF ALL WORK COMPLETED AND INCLUDED IN THE SECTION, IF REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE INSPECTOR WHEN WORK REACHES INSPECTION STAGE.

(B) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE LOCAL AUTHORITY HAVING JURISDICTION IN ORDER THAT LOCAL INSPECTION MAY BE CARRIED OUT THE PROPER STAGE.

(C) THE ELECTRICAL CONTRACTOR SHALL PAY FOR ALL PERMITS, INSPECTION FEES, AND INSTALLATION FEES AS REQUIRED TO COMPLETE THE WORK UNDER THIS SECTION OF THE CONTRACT.

(D) THIS CONTRACTOR SHALL GUARANTEE THE MATERIALS AND WORKMANSHIP FOR A PERIOD OF TWELVE (12) MONTHS FROM THE LINE THE INSTALLATION IS ACCEPTED BY THE OWNER. IF, DURING THIS TIME, ANY DEFECTS SHOULD SHOW UP DUE TO ANY DEFECTIVE MATERIALS, WORKMANSHIP, NEGLIGENCE OR WANT OF PROPER CARE ON THE PART OF THIS CONTRACTOR, HE SHALL FURNISH ANY NEW MATERIALS AS NECESSARY, REPAIR SAID DEFECTS, AND PUT THE SYSTEM IN ORDER AT HIS OWN EXPENSE ON RECEIPT OF NOTICE OF SUCH DEFECTS FROM THE ARCHITECT. THIS SPECIFICATION IS NOT INTENDED TO IMPLY THAT THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR NEGLIGENCE OF THE OWNER.

16990 CONNECT TO EXISTING WORK

(A) PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. COORDINATE WITH 'UBS'PROJECT MANAGER AND ARCHITECT.

(B) CONNECT NEW WORK TO EXISTING IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY BUILDING OWNER.

(C) DISCONNECT, REMOVE, OR RELOCATE ELECTRICAL MATERIAL AND EQUIPMENT AS NOTED AND AS REQUIRED BY CHANGES IN CONSTRUCTION.

(D) ALL RACEWAYS TO BE ABANDONED SHALL DISCONNECT WIRING AT LOAD (EQUIPMENT) AND AT LINE SIDE, CUT, AND CAP, FLUSH TO SURFACE.

(E) DISPOSE OF ALL MATERIAL AND EQUIPMENT AS DIRECTED.

(F) MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AFFECTED BY THIS WORK.

(G) REMOVE CONDUCTORS FROM EXISTING RACEWAYS TO BE REWIRED. CLEAN RACEWAY AS REQUIRED PRIOR TO REWIRING.

(H) ALARM AND EMERGENCY SYSTEM NOT BE INTERRUPTED.

(I) TEMPORARY SHUTDOWNS WHEN REQUIRED TO BE MADE ONLY WITH WRITTEN CONSENT TO OWNER AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION AND AT NO ADDITIONAL CHARGE.

(J) ALL REQUIRED WORK FOR TIE-IN TO THE EXISTING EQUIPMENT SHALL BE ACCOMPLISHED AFTER HOURS, THE EXACT DAY AND TIME SHALL BE DIRECTED BY OWNER, AND AT NO ADDITIONAL CHARGE.

SUBMITTALS:

MANUFACTURERS CATALOG CUTS AND SHOP DRAWINGS OF THE FOLLOWING APPARATUS, GIVING FULL DESCRIPTION AND OTHER PERTINENT FACTS, SHALL BE SUBMITTED TO THE ARCHITECT AND THE CONSULTING ENGINEER. THEIR APPROVAL SHALL BE SECURED BEFORE APPARATUS IN QUESTION IS ORDERED, BUILT OR INSTALLED.

1. INCANDESCENT AND FLUORESCENT LIGHTING FIXTURES, LAMPS AND BATTERY PACKS.
2. DISTRIBUTION EQUIPMENT (PANELS, DISCONNECTS, TRANSFORMER, ETC.).
3. DEVICES (SWITCHES, RECEPTACLES, DIMMERS, FACE PLATES, ETC.).

ELECTRICAL CONTRACTOR SHALL SUBMIT "AS-BUILT" RECORD DRAWINGS (SIZE 1/8" = 1'-0") ON SEPIA MYLAR AND LOAD BALANCING REPORT FOR BUILDING FILES ON COMPLETION OF PROJECT. QUANTITIES AND TYPES OF SUBMITTALS AS REQUESTED.

ABBREVIATIONS:

A	AMPERE	LTG	LIGHTING
AFF	ABOVE FINISHED FLOOR	MCB	MAIN CIRCUIT BREAKER
B/G	BREAK GLASS SWITCH	MFS	MAIN FUSED SWITCH
BLDG	BUILDING	NIC	NOT IN CONTRACT
C	CONDUIT	P	POLE
C.B.	CIRCUIT BREAKER	ϕ/PH	PHASE
CKT	CIRCUIT	PNL	PANEL
C.O.	CONDUIT ONLY	PRI	PRIMARY
CONV	CONVENIENCE	PWR	POWER
CT	CURRENT TRANSFORMER	RECEPT	RECEPTACLE
D.F.	DRINKING FOUNTAIN	SEC	SECONDARY
DISC SW	DISCONNECT SWITCH	SPEC	SPECIFICATION
DWG	DRAWING	SW	SWITCH
E.C.	ELECTRICAL CONTRACTOR	STD	STANDARD
EQUIP	EQUIPMENT	TEL	TELEPHONE
EXIST	EXIST EXISTING	TYP	TYPICAL
F & I	FURNISH AND INSTALL	U.O.N.	UNLESS OTHERWISE NOTED
F.B.O.	FURNISHED BY OTHERS	V	VOLTS
G	GROUND	W	WIRE
GFI	GROUND FAULT INTERRUPT	WP	WEATHER PROOF
I.G.	ISOLATED GROUND	XF	TRANSFORMER.
J.B.	JUNCTION BOX		

UBS

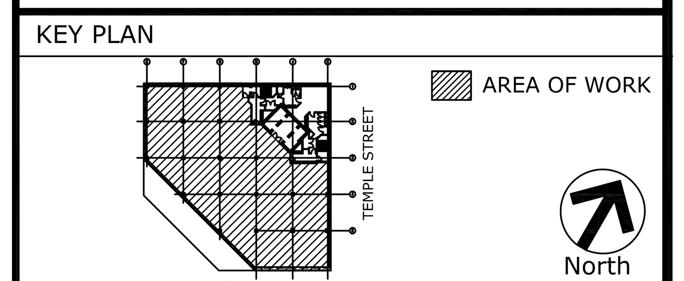
REVISIONS

NO.	DATE	DESCRIPTION

NO.	DATE	COPIES	TO WHOM
2	07.13.07		ISSUE FOR BID
1	07.13.07		ISSUE FOR PERMIT

ISSUE

KEY PLAN



CLIFFORD DIAS, P.E., P.C.
CONSULTING ENGINEERS
7 Dey Street - Suite 1601, New York, NY 10007
Tel: 212.608.4811 Fax: 212.267.0622
e-mail: mail@diaseng.com

Ted Moudis Associates
ARCHITECTURE
INTERIOR DESIGN
NEW YORK | CHICAGO
79 Madison Avenue
New York, NY 10017
212.308.4000
Fax/212.561 2020
One Financial Place
440 South LaSalle Street
Chicago, IL 60605
312.663.0130
Fax/312.663.0138
www.tedmoudis.com

PROJECT NUMBER	ELECTRICAL SEPECIFICATIONS
SCALE N.T.S	UBS ONE CITY CENTER PORTLAND, ME 04101
DATE 07.13.07	
PROJECT MANAGER	
PROJECT ARCHITECT	
DRAWN BY RE	E-1
CHECKED BY GB	
CADD FILE	