1. GENERAL:

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.

B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE PART OF THESE SPECIFICATIONS, AND THERE PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN COST.

C. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM THE MANUFACTURE IN SECTIONS OF A SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM THE BUILDING OWNER AND TENANT AT WHAT TIMES OF THE DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

D. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATIC ALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS/HER PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

E. INSTALL WORK AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM THE DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT OUR APPROVAL.

F. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

G. SEAL OPENING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS.

H. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.

I. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

J. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

K. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

L. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

M. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY CONDUIT (SIZES, CLEARANCES, ETC.) AND CONDITIONS.

N. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

O. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

2: SCOPE OF WORK:

A. THE SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE(NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON THE DRAWINGS AND HEREIN SPECIFIED.

B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OF REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATED OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY THE OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BE DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES FOR, AND FURNISH TO THE OWNER BEFORE BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS:

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, THE CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

1) PROJECT NAME AND LOCATION

2) NAME OF ARCHITECT AND ENGINEER

3) ITEM IDENTIFICATION

4) APPROVAL STAMP OF THE PRIME CONTRACTOR

C. SUBMISSIONS:

1) SUBMISSIONS 11 IN X 17 IN OR SMALLER. IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

2) SUBMISSIONS LARGER THAN 11 IN X 17 IN. SUBMIT TWO PRINTS AND ONE PAPER SEPA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPA TO THE ENGINEER.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

1) CIRCUIT BREAKERS

2) PANELBOARDS(INCLUDING DIMENSIONS, SCHEDULES AND CATALOG CUTS).

3) RACEWAYS

4) WIRE AND CABLE

5) WALL SWITCHES

6) INSERTION RECEPTACLES

7) LUMINAIRES

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS:

A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THE CONTRACT.

B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

D. REPRODUCIBLE "AS-BUILT" DRAWINGS PREPARED IN COMPUTER AIDED DRAFTED (AUTO CAD) FORMAT SHALL BE PROVIDED TO THE OWNER INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. A COMPLETE "AS-BUILT" DRAWING FILE SHALL BE PROVIDED TO THE OWNER AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL", "SHALL BE", "FURNISH", "PROVIDE" "A", "THE", "ALL" HAVE BEEN OMITTED FOR BREVITY.

B. DEFINITIONS:

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION

5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.

6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION. INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

C. GENERAL:

1) THE DRAWING SHOWS THE APPROXIMATE LOCATIONS OF ALL APPARATUS, THE EXACT LOCATIONS OF WHICH ARE SUBJECT TO THE APPROVAL OF THE OWNER, WHO RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES IN THE LOCATION INDICATED WITHOUT EXTRA COST. WHILE THE GENERAL RUN OF CONDUIT AND CABLES ARE INDICATED ON THE DRAWING. IT IS NOT INTENDED THAT THE EXACT ROUTING OR LOCATIONS OF CONDUIT AND CABLES BE DETERMINED THEREFROM.

2) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED ENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, MAINTAIN HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.

3) THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATE WITH ALL TRADES.

4) WIRE ALL FIXTURES, DEVICES, ETC. TO RESPECTIVE PANEL AND CONTROLS AS SHOWN ON PLANS IN SYMBOL FORM.

5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP AND REMOVAL FROM THE SITE OF RESULTING DEBRIS UPON COMPLETION OF WORK UNDER THIS SECTION.

6) PROVIDE SEPARATE SYSTEMS AND ENCLOSURES FOR 120/208 AND 277/480 VOLT POWER AND CONTROL WIRING. COMMON PULL BOXES AND JB'S ARE NOT ACCEPTABLE.

7) LOCATIONS INDICATED FOR LOCAL WALL SWITCHES ARE SUBJECT TO RELOCATIONS. AT OR NEAR DOORS INSTALL SWITCH INSIDE OPPOSITE HINGE, VERIFY FINAL DOOR HINGE. LOCATION IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.

8) HEIGHTS OF INSERTION AND CONTROL DEVICES: REFER TO THE ELECTRICAL GENERAL NOTES.

9) ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND. PROVIDE BARRIERS BETWEEN NORMAL ONLY AND NORMAL/EMERGENCY SWITCHES INSTALLED WITHIN A COMMON OUTLET BOX.

10) PANEL JUNCTION AND PULL BOXES LOCATED CLEAR OF OTHER TRADES, CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT, PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT AND WIRING, ADD BOX VOLUME WHERE REQUIRED.

D. TEMPORARY LIGHT AND POWER:

1) PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. COST OF ENERGY WILL BE PAID FOR BY OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

E. QUALITY ASSURANCE:

1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES INC. OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.

ON COMPLETION OF THE WORK, THE ENTIRE WIRING SYSTEM SHALL BE ENTIRELY FREE FROM GROUNDS, SHORT CIRCUITS, OPENS, OVERLOADS AND IMPROPER VOLTAGES AND THOROUGH TEST SHALL BE MADE. FURNISH ALL LABOR AND MATERIALS AND INSTRUMENTS.

2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE.

3) CURRENT CHARACTERISTICS:

a. SERVICE: 277/480 VOLT, 3 PHASE, 4 WIRE 60 HERTZ WITH GROUNDED NEUTRAL

b. DISTRIBUTION: 277/480 VOLT (AND 120/208 VOLT) 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL

4) HEIGHTS OF OUTLETS:

a. REFER TO THE ELECTRICAL GENERAL NOTES.

b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED

F. PRODUCT DELIVERY, STORAGE AND HANDLING:

1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.

2) ACCESSIBILITY: FOR OPERATIONS, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGE OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

G. MATERIALS:

1) NAMEPLATES: PROVIDE BLACK LAMINATED SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.

2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.

3) INSERTS AND SUPPORTS:

a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.

1. USE THREADED RODS AND UNISTRUT TYPE SUPPORTS DESIGNED TO CARRY THE WEIGHT REQUIRED.

b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR VERIFY SUPPORT TYPES WITH OTHER MEANS. THE ARCHITECT AND/OR STRUCTURAL ENGINEER. IF A STRUCTURAL ENGINEER IS NOT ON THE PROJECT THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIRING A QUALIFIED LICENSED STRUCTURAL ENGINEER.

c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGELS OR CHANNELS

d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW

H. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. RED LEAD OR ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARKED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC CHROMATE PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRON WORK.

I. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

J. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES, AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT PRIOR TO ROUGH IN.

K. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

6. CUTTING AND PATCHING:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF THE NEW CONSTRUCTION WORK, WHICH MAY BE REQUIRED FOR THE PROPER INSTALLATION OF THE ELECTRICAL WORK. ALL PATCHING SHALL BE OF THE SAME MATERIALS, WORKMANSHIP, AND FINISH AND SHALL ACCURATELY MATCH ALL SURROUNDING WORK.

B. CORE BORING OF CONCRETE FLOORS AND/OR WALLS IF REQUIRED, IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

A. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EQUIPMENT WITH THE ARCHITECTURAL DRAWINGS, IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, VARIATIONS IN FIRE PROOFING AND PLASTERING. WINDOW AND DOOR TRIM, PANELING HUNG CEILINGS AND THE LIKE AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSES TO THE OWNER.

7. EQUIPMENT FURNISHED BY OTHERS:

A. THE CONTRACTOR SHALL FURNISH AND INSTALL WIRING FOR EQUIPMENT FURNISHED BY OTHERS, AS SHOWN ON DRAWINGS, COORDINATE WITH ALL OTHER TRADES OR DETAILS FOR INSTALLATION. THE TERM "WIRING" AS USED HEREIN, INCLUDES BUT IS NOT LIMITED TO, FURNISHING AND INSTALLING CONDUIT, WIRE, JUNCTION BOXES, DISCONNECTS AND MAKING CONNECTIONS. CONTRACTOR SHALL CHECK ARCHITECTURAL, MECHANICAL AND PLUMBING. DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT TO BE INSTALLED BY OTHERS, CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER WIRING AND NECESSARY ELECTRICAL ADJUSTMENTS TO EQUIPMENT TO CONFORM TO SPECIFIED REQUIREMENTS OF THE EQUIPMENT.

8. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS FROM ONE OF THE FOLLOWING APPROVED MANUFACTURE'S: SQUARE D, SIEMENS, CUTLER HAMMER, GE AND BUSSMAN.

B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.

C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS.

KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE-QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA, TYPE 1 EXCEPT AS NOTED.

ACCEPTABLE MANUFACTURES ARE SQUARE D, SIEMENS, CUTLER HAMMER AND GE.

D. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, AS NOTED.

E. DISTRIBUTION PANELS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT-BREAKER TYPE UNLESS OTHERWISE NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98 PERCENT CONDUCTIVITY, SILVER, OR TIN-PLATED JOINTS. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME-PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEG OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. PROVIDE DOOR-IN-DOOR CONSTRUCTION. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5-3/4 IN SIDES, TOP AND BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

F. BALANCE THE LOAD OVER PHASES WHEN NEW CIRCUITS ARE ADDED TO NEW PANELS. PROVIDE MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING SHALL NOT BE PERMITTED, MOUNTING HEIGHT SHALL BE A MAXIMUM OF 6 FT-6 IN FROM FLOOR TO TOP SWITCH UNIT. UPDATE DIRECTORIES ON PANELBOARDS WHERE CIRCUITING IS CHANGED.

G. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.

9. GROUNDING:

A. AN EQUIPMENT GROUNDING CONDUCTOR COMMONLY DESCRIBED AS A "GREEN WIRE" SHALL BE PROVIDED FOR ALL BRANCH CIRCUITS PROTECTED BY OVERCURRENT DEVICES EXCEPT FOR LIGHTING BRANCH CIRCUITS. "GREEN GROUND" WIRE SHALL ALSO BE PROVIDED FOR FLEXIBLE CONDUIT AND MOTOR CIRCUITS.

10. RACEWAYS:

A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4IN.

B. MATERIALS

1. RACEWAYS:

a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED THREADED.

b. ELECTROMETALLIC TUBING (EMT) THIN WALL PIPE, GALVANIZED THREADLESS. USE EXCESSIVELY FOR EMERGENCY BRANCH CKT WIRING.

c. FLEXIBLE STEEL CONDUIT: CONTINUOUS STEEL STRIP, GALVANIZED.

d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NUMBER 16GA STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW ON.

2. FITTING AND ACCESSORIES:

a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.

b. ELECTROMETALLIC TUBING: COMPRESSION TYPE FOR 2" AND UNDER. SET SCREW TYPE FOR 2" AND LARGER. GALVANIZED RIGID STEEL ELBOWS FOR 2" OR LARGER.

c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.

3. BOXES:

a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION. DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3" DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4" DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH A MINIMUM 6 IN. SEPARATION.

b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES IN BETWEEN 120/208 VOLT AND 277/480 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL LIGHTING.

c. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

d. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

e. PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OR RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH -FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

f. SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED ON OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAW PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISH PLATES.

g. EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

h. MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

i. EMPTY RACEWAYS OVER 10' LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON PVC.

j. RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED.

k. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY. IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS. HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS.

l. FLEXIBLE STEEL CONDUIT SMALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL- FROM OUTLET BOX TO RECESSED FIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

m. CUT CONDUIT ENDS SQUARE REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

n. ALL COUPLINGS ON EMT RACEWAYS SHALL BE COMPRESSION TYPE UP TO AND INCLUDING 2' CONDUIT. SET SCREW TYPE FITTINGS SHALL BE USED ON 2 IN. EMT CONDUIT AND LARGER.

–	–	Issued For Permit & Construction	6/03/09
–	–	Issued For Client Review	3/24/09
no.	by	description	date

revisions

New Shop & Office Building for
Shupper-Brickle Equipment Co.
11 Burnt Tavern Road
Millstone Township, NJ 08535
Block: 57
Lot: 14.01

BRIAN D. TANNENHAUS

NJ PROFESSIONAL ENGINEER
NO. GE 45801

DATE: June 3, 2009

BD engineering

NJ CERTIFICATE OF AUTHORIZATION – 24GA28116100
BD Engineering, LLC 732-886-5432
1825 Swarthmore Ave. Lakewood, NJ 08701
Project No. 080056

DRAWN BY:	CHECKED BY:	SCALE:
LEF	BT	NONE

DRAWING TITLE
ELECTRICAL SPECIFICATIONS

DRAWING NO.
E1.2