ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

1.01 COORDINATION OF TRADES: SCHEDULE AND COORDINATE WORK WITH THAT OF OTHER DIVISIONS AND SECTIONS.
1.02 GUARANTEE IN WRITING THE ELECTRICAL INSTALLATION, AND ALL WORK UNDER THIS SECTION, FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER AGAINST ALL EVIDENCE OF IMPERFECT WORKMANSHIP OR FAILURE OR MALFUNCTION OF MATERIALS.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT
A. MATERIAL FURNISHED UNDER THIS CONTRACT, UNLESS OTHERWISE NOTED, SHALL BE NEW, FREE FROM DEFECTS AND SHALL CONFORM WITH THE STANDARDS OF UL.
 B. VOLTAGE, AMPERE, AND OTHER RATINGS OF EQUIPMENT SHALL BE SUITABLE FOR USE INTENDED. DISCONNECT SWITCHES SHALL BE PROPERLY HORSEPOWER RATED AND SUITABLE FOR VOLTAGE, AND AMPERE RATING OF LOAD
 C. THE DRAWINGS GENERALLY INDICATE THE RACEWAY SIZE, THE NUMBER, SIZE, AND INSULATION TYPE OF CONDUCTORS TO BE PROVIDED AND INSTALLED. WHERE THESE ITEMS DO NOT MEET MINIMUM APPLICABLE CODES, FOR EQUIPMENT BEING SERVED, COMPLY AS REQUIRED AT NO ADDITIONAL COST.

2.02 RACEWAYS
 A. GALVANIZED RIGID CONDUIT (GRC); INCLUDING ELBOWS AND COUPLINGS.
 B. INTERMEDIATE METAL CONDUIT (IMC); INCLUDING ELBOWS AND COUPLINGS.
 C. ELECTRIC METALLIC TUBING (EMT) WITH FITTINGS OF PRESSED STEEL OR MALLEABLE IRON, COMPRESSION TYPE WITH INSULATED THROATS.
 D. RIGID NON-METALLIC CONDUIT: (PVC) U.L. LABELED SCHEDULE 40 P.V.C.

2.03 DEVICE AND JUNCTION BOXES: INCLUDE PLASTER RINGS, COVERS, AND KO SEALS AS REQUIRED.
2.04 WIRE AND CABLE: UNLESS OTHERWISE NOTED, WIRE AND CABLE SHALL BE SOFT DRAWN, ANNEALED COPPER. WIRE SIZES NO. 8 AND LARGER AND CONDUCTORS SERVING MOTORS AND SUBJECT TO VIBRATIONS SHALL BE STRANDED CABLE. INSULATION TO BE THWN/THHN, JACKETED 90C INSULATED WIRE. PROVIDE WIRE COLOR IDENTIFICATION: NEUTRAL WIRE - WHITE, LIVE WIRE - BLACK, RED, BLUE ON 120/208 VOLT SYSTEM; NEUTRAL WIRE - GREY, LIVE WIRE - BROWN, ORANGE YELLOW ON 277/480 VOLT SYSTEM; GROUND - GREEN.
2.05 ADDED PANELS TO BE PANELBOARDS - LOAD CENTERS ARE NOT ACCEPTABLE UNLESS SPECIFICALLY APPROVED.
2.06 SERVICE ENTRANCE AND DISTRIBUTION GEAR BY G.E., SQUARE "D", CUTLER HAMMER/SIEMENS ONLY. INTERIOR PANELBOARDS SHALL BE RECESSED WITH FLANGED/REMOVABLE SCREW-ON COVER. SURFACE MOUNTED PANELBOARDS OR HINGED/FLUSH COVERS NOT ALLOWED.
2.07 SWITCHBOARDS: COPPER BUSSING WITH FULL CAPACITY NEUTRAL. ALUMINUM ALLOWED WHEN APPROVED BY ARCHITECT.
2.11 120/208 VOLT AND 277/480 VOLT PANELBOARDS: 3 PHASE, 4 WIRE, COPPER BUS, COMPOSED OF AN ASSEMBLY OF BOLT-IN-PLACE MOLDED CASE CIRCUIT BREAKERS WITH THERMAL AND MAGNETIC TRIP AND TRIP FREE POSITION SEPARATE FROM EITHER ON OR OFF POSITIONS.
2.13 SAFETY SWITCHES: FUSED, HEAVY DUTY, HORSEPOWER RATED.
2.14 STARTERS, CONTACTORS AND CONTROL DEVICES: PROVIDE AS SHOWN AND AS REQUIRED BY CODE. FURNISH COMPLETE WITH PILOT LIGHTS, AUXILIARY CONTACTS, PUSH BUTTONS, HAND-OFF-ON SWITCHES, CONTROL DEVICES, AND OVERLOAD RELAYS. THERMAL OVERLOADS TO BE SIZED PER MANUFACTURERS RECOMMENDATIONS. AMBIENT COMPENSATE ALL HEATERS EXPOSED TO HIGH TEMPERATURE OR INSTALLATION OUTSIDE.
2.16 NAMEPLATES: PROVIDE BLACK LAMICOID NAMEPLATES WITH 3/16" HIGH WHITE ENGRAVED LETTERS ON PANELS, SWITCHBOARDS, MAINS AND SUBMAINS, DISTRIBUTION EQUIPMENT, REMOTE SAFETY SWITCHES, CIRCUIT BREAKERS, TIME SWITCHES, CONTACTORS, AND STARTERS.
2.17 WIRING DEVICES
 A. HUBBELL OR COMPARABLE LEVITON OR BRYANT: WHITE AND GREY IN COLOR - AS NOTED ON DRAWINGS. 15 AMP DEVICES ALLOWED ONLY WHEN SPECIFICALLY DENOTED ON ELECTRICAL CONSTRUCTION DRAWINGS.
 B. TOGGLE SWITCHES: SINGLE POLE - HUBBELL 1221- 20A, 120/277V, THREE WAY - HUBBELL 1223- 20A, 120/277V, FOUR WAY - HUBBELL 1224- 20A, 120/277V.
 C. RECEPTACLES: DUPLEX GROUNDING TYPE, SPECIFICATION GRADE, 125 VOLT, 20 AMPERES, SINGLE PHASE, HUBBELL NO. 5262 OR COMPARABLE.
 D. GROUND FAULT INTERRUPTER TYPE RECEPTACLE: DUPLEX GROUNDING TYPE, SPECIFICATION GRADE, 125 VOLT, 20 AMPERES, SINGLE PHASE, 5 mA GROUND TRIP, FEED THROUGH CONSTRUCTION.
2.18 DEVICE PLATES: LEXAN (STA-KLEEN), SMOOTH FINISH IN STAINLESS STEEL AND WHITE - AS NOTED ON PLANS. MULTI-GANG OUTLET PLATES SHALL BE USED FOR MULTI-GANG BOXES.
2.19 NOT USED.
2.20 LIGHTING FIXTURES
 A. PROVIDE FIXTURES PER SCHEDULE WITH ALL PARTS INCLUDING PLASTER FRAMES FOR RECESSED FIXTURES AND FITTINGS NECESSARY TO COMPLETELY AND PROPERLY INSTALL FIXTURES.
 B. LAMPS: INCANDESCENT LAMPS BY G.E., SYLVANIA, OR WESTINGHOUSE, 130 VOLT, EXTENDED LIFE LAMPS. FLUORESCENT LAMPS BY G.E., SYLVANIA, PHILLIPS, OR WESTINGHOUSE. MINIMUM CRI OF 80. WATTAGE AND TYPES AS REQUIRED BY FIXTURE.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION
 A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN A NEAT, APPROVED, FINISHED, AND SAFE MANNER.
 B. INSPECT AND MAKE TIGHT ALL CONNECTIONS FOR ALL EQUIPMENT, INCLUDING FACTORY CONNECTIONS. TORQUE ALL CONNECTIONS PER MANUFACTURER'S RECOMMENDATIONS.
 C. LIGHTING FIXTURES INSTALLED AND USED FOR LIGHTING DURING CONSTRUCTION SHALL BE RELAMPED WITH NEW LAMPS JUST PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.
 D. INSTALL SEISMIC RESTRAINT DEVICES FOR ALL CEILING MOUNTED EQUIPMENT, I.E. FLUORESCENT LAY-IN FIXTURES. PROVIDE GRID CLIPS AND #12 SLACK WIRES FROM FIXTURE CORNERS TO STRUCTURE.
3.02 RACEWAYS
 A. INSTALL COMPLETE RACEWAY SYSTEMS FOR ALL ELECTRICAL CONDUCTORS INCLUDING TELEPHONE, SIGNAL, CONTROL, AND OTHER SYSTEMS.
 B. UNLESS OTHERWISE NOTED, INSTALL ALL RACEWAYS CONCEALED. WHERE IT IS NOT FEASIBLE TO CONCEAL RACEWAYS, INSTALL AS DIRECTED BY ARCHITECT.
 C. INSTALL EXPOSED RACEWAYS TO RUN PARALLEL OR AT RIGHT ANGLES TO STRUCTURAL BUILDING LINES WITH NEAT BENDS AND NEATLY OFFSET INTO TERMINATIONS.
 D. IN EMPTY RACEWAY PROVIDE AND INSTALL A NO. 14 NYLON DRAG LINE.
 E. INSTALL RACEWAYS WITH APPROVED HEAVY DUTY SUPPORTS, STRAPS, HANGERS, CONNECTORS, AND COUPLINGS AS REQUIRED TO MAINTAIN AN APPROVED INSTALLATION.
 F. DO NOT INSTALL CONDUIT RACEWAYS IN CONCRETE SLABS.
 H. MINIMUM CONDUIT SIZE TO BE 3/4" U.N.O.
3.03 GALVANIZED RIGID CONDUIT (GRC) ALL RACEWAYS SHALL BE GRC EXCEPT AS NOTED OR SHOWN. CONDUIT, ELBOWS, STANDARD COUPLINGS SHALL BE HOT DIPPED GALVANIZED RIGID STEEL. IF PARTITIONS OR WALLS ARE SOLID CONCRETE OR ARE GROUTED SOLID WITH CONCRETE OR MORTAR, RIGID STEEL CONDUIT SHALL BE USED,
3.04 INTERMEDIATE METAL CONDUIT (IMC) IMC RACEWAY AND APPROVED FITTINGS WHERE PERMITTED BY APPLICABLE CODES AND REGULATIONS MAY BE USED IN LIEU OF RIGID STEEL CONDUIT, WHERE INSTALLED ABOVE FINISH GRADE AND ABOVE CONCRETE SLABS ON GRADE.
3.05 ELECTRIC METALLIC TUBING (EMT) EMT MAY BE USED WHERE CONCEALED IN AREAS ABOVE CEILINGS, FURRED SPACES, PARTITIONS OR WALLS. ALSO MAY BE EXPOSED, WHEN NOT IN HAZARDOUS AREAS, AREAS SUBJECT TO PHYSICAL DAMAGE, OR WHEN DIRECTLY EXPOSED TO RAIN OR WASH-DOWN.
3.06 FLEXIBLE METAL CONDUIT (FLEX) USE FLEXIBLE CONDUITS FOR CONNECTIONS TO MOTORS, WHERE SUBJECT TO MOVEMENT OR VIBRATION, AND LIQUID TIGHT WHERE EXPOSED TO MOISTURE OR OIL.
3.07 RIGID NONMETALLIC CONDUIT PVC SCHEDULE 40 MAY BE INSTALLED FOR DIRECT BURIAL RACEWAYS WHERE INSTALLED WITH MINIMUM COVERAGE PER NEC TABLE 300-5.
3.08 OUTLET, PULL AND JUNCTION BOXES
 A. UNLESS OTHERWISE SHOWN OR AS DIRECTED PRIOR TO INSTALLATION, OUTLET BOXES SHALL GENERALLY BE PLACED AT THE FOLLOWING HEIGHTS, CENTER OF BOX TO FINISHED FLOOR LEVEL.
 B. WALL SWITCHES: 44".
 C. CONVENIENCE RECEPTACLES: 18" (OR 4" ABOVE COUNTERS) AND/OR AS NOTED. (SIMILAR TYPE OUTLETS SHALL BE MOUNTED AT SAME HEIGHT IN EACH AREA). GROUNDING PIN AT TOP.
3.09 CONDUCTORS (COPPER ONLY)
 A. USE SPECIFIED COLOR SCHEDULE FOR ALL WIRING. WHERE LARGE CONDUCTORS ARE NOT AVAILABLE IN COLORS, IDENTIFY WITH PERMANENT COLORED TAPE AT ALL TERMINATIONS, JUNCTION BOXES, ETC. COLOR CODING PER NEC.
 B. MAKE TAPS, JOINTS, SPLICES, AND OTHER CONNECTIONS WITH FIXTURE CONNECTORS.
 C. DO NOT INSTALL WIRING OR PULL WIRES, IN RACEWAYS UNTIL RACEWAY SYSTEM IS COMPLETE, CLEAN AND DRY AND FREE OF ALL FOREIGN MATERIALS. LUBRICATE AS REQUIRED WITH SPECIFIED LUBRICANT.
 D. MINIMUM CONDUCTOR SIZE TO BE #12 CU. THWN.
3.10 LIGHTING FIXTURES
 A. LEAVE FIXTURES AND LAMPS CLEAN OF ALL DIRT, DUST, GREASE SPOTS AND DEBRIS AND ALL GLASS, PLASTIC AND OTHER COMPONENTS, UNSCRATCHED AND UNBROKEN.
 B. FIT AND ADJUST ALL FIXTURES. WHERE STRUCTURAL CONDITIONS, PARTITIONS, FURNITURE, SHELVING, AND AIR CONDITIONING DIFFUSERS INTERFERE WITH THE LIGHTING FIXTURES AT LOCATIONS SHOWN, NOTIFY ARCHITECT IN WRITING AND RELOCATE AT NO ADDITIONAL COST AS DIRECTED.
 C. FIXTURES WITH FINISH TRIM OR LENS FRAMES SHALL BE GASKETED AND BAFFLED TO PREVENT LIGHT LEAKS. INSTALL SO THAT NO LIGHT LEAKS EXIST. D. FIXTURES MOUNTED DIRECTLY ON COMBUSTIBLE LOW-DENSITY CEILINGS SHALL BE UL APPROVAL FOR THIS CONDITION AND BE PLAINLY MARKED SO INDICATING.
3.11 GROUNDING
 A. GROUNDING FOR DISTRIBUTION EQUIPMENT, EQUIPMENT AND MATERIALS WITH ELECTRICAL CONNECTIONS, ELECTRIC MOTOR FRAMES, ELECTRIC RACEWAY AND RELATED EQUIPMENT, SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED IN ACCORDANCE WITH PERTINENT SECTIONS OF ARTICLE 250 OF NEC. RESISTANCE TO GROUND SHALL NOT EXCEED 10 OHMS.
 B. ALL RACEWAYS SHALL HAVE AN APPROVED SIZED, INSULATED, STRANDED COPPER GROUNDING TYPE CONDUCTOR.
 C. WHERE RACEWAYS CONNECT TO A CONCENTRIC K.O. PROVIDE GROUNDING LOCKNUT OR BUSHING AND BOND WIRE EXTENDED AND BONDED TO ENCLOSURE, SIZE AS PER NEC.
3.12 DITCHING, EXCAVATION AND BACKFILLING: PERFORM ALL DITCHING, EXCAVATION AND BACKFILLING REQUIRED FOR THE ELECTRICAL WORK. PROVIDE AND MAINTAIN ALL SHEATHING, BRACING AND PROPER GUARDS FOR PREVENTION OF ACCIDENTS.
3.13 UTILITY COMPANY SERVICE CONTRACTOR TO BE RESPONSIBLE FOR COORDINATING AND PROVIDING REQUIRED WORK FOR SUPPLYING ELECTRICAL POWER AND COMMUNICATIONS UTILITIES TO THE PROJECT.
3.14 FINAL INSPECTION TESTS TEST SYSTEM FOR SHORTS AND GROUNDS. FAULTY WIRING SHALL BE REMOVED AND REPLACED. AFTER SYSTEM IS CONNECTED COMPLETE, TEST FOR INSULATION RESISTANCE. RESISTANCE LOWER THAN OUTLINED IN THE NEC, MANUFACTURER'S DATA, ETC., SHALL BE REMOVED AND REPLACED. ANY DEVICE, APPARATUS OR FIXTURE UNDER THIS CONTRACT SHOWING SUBSTANDARD READINGS SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ARCHITECT.
3.15 LABEL ALL RECEPTACLES WITH 3/16" HIGH BLACK LETTERING ON CLEAR TAPE. IF THE RECEPTACLE IS BLACK OR BROWN, PROVIDE WHITE LETTERING ON CLEAR TAPE. LABEL TO BE NEATLY CENTERED IN THE TOP SPACE OF THE COVERPLATE, AND INDICATE THE SERVING PANEL AND CIRCUIT ORIGIN.

ELECTRICAL SPECIFICATIONS 3
NOT TO SCALE E-000

GENERAL NOTES

1. THE ELECTRICAL DRAWINGS, SPECIFICATIONS AND GENERAL NOTES DESCRIBE THE RECOMMENDED SCOPE OF WORK AND THE DOCUMENTS SHALL BE USED FOR THE PURPOSE OF BIDDING, BUILDING DEPARTMENT REVIEW, AND TO SECURE THE NECESSARY CONSTRUCTION PERMIT ONLY.
2. BRANCH CONTROL CIRCUITING AND WIRE COUNT MAY NOT BE INDICATED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE TO COMPLETE THE BRANCH CIRCUIT WIRING IN ACCORDANCE WITH PLAN NOTES AND AS PERMITTED BY AUTHORITY. CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AS A PART OF RECORD DRAWING SUBMITTAL TO ARCHITECT AND AUTHORITY HAVING JURISDICTION (ANJ).
3. ELECTRICAL INSTALLATION SHALL COMPLY WITH THE LOCALLY ADOPTED, AS NATIONAL ELECTRICAL CODE ADAPTED BY THE JURISDICTION AND ANY LOCAL SUPPLIMENTS.
4. ALL EQUIPMENT SHOWN IS NEW, CONTRACTOR FURNISHED AND INSTALLED, UNLESS OTHERWISE NOTED. IF CONTRACTOR PROPOSED TO SUBSTITUTE SPECIFIC EQUIPMENT SPECIFIED, HE SHALL SUBMIT HIS REQUEST FOR CONSIDERATION TO THE OWNER AND ENGINEER PRIOR TO THE BID IN WRITING. ALL SUBSTITIONS MUST BE REVIEWED BY THE ENGINEER. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR FROM COMPLYING WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE AT HIS OWN EXPENSE FOR ANY CHANGE RESULTING FROM HIS PROPOSED SUBSTITIONS WHICH AFFECT OTHER PARTS OF HIS OWN WORK, OR SUBSTITUTIONS WHICH AFFECT OTHER PARTS OF HIS OWN WORK OR THE WORK OF OTHER CONTRACTORS.
5. THE ELECTRICAL DRAWINGS, CONDUIT RUNS, WIRING AND ELECTRICAL INFORMATION ARE DIAGRAMMATIC ONLY. DO NOT SCALE THE ELECTRICAL DRAWINGS TO DETERMINE THE LOCATION OF EQUIPMENT OR OUTLETS.
6. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF ALL LIGHTING FIXTURES, CEILING MOUNTED OUTLETS AND EQUIPMENT.
7. ALL DEVICE MOUNTING HEIGHTS AND EXACT LOCATIONS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS AND ELEVATIONS PRIOR TO ROUGH-IN.
8. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY TYPES OF CEILING SYSTEM. FIXTURES LOCATED IN DAMP OR WET LOCATIONS SHALL BE LISTED AND LABELED FOR USE IN SUCH LOCATIONS.
9. ALL RECESSED LIGHTING FIXTURES, PANELBOARDS, SWITCHES, ETC., MOUNTED IN FIRE RATED STRUCTURES SHALL BE ENCLOSED WITH AN APPROVED ENCLOSURE CARRYING THE SAME FIRE RATING AS THE STRUCTURE.
10. PORTIONS OF THE CEILING SYSTEMS MAY BE INACCESSIBLE, THEREFORE, THE CONTRACTOR SHALL STRATEGICALLY LOCATE ACCESS BOXES, ETC., WHICH SHALL BE READILY ACCESSIBLE. ALL LIGHTING FIXTURE WIRING, BALLASTS, J-BOXES, ETC. SHALL BE ACCESSIBLE FROM FIXTURE OPENING.
11. ALL WIRING AND ELECTRICAL EQUIPMENT INSTALLED FOR MECHANICAL AND PLUMBING EQUIPMENT SHALL BE IN ACCORDANCE WITH MECHANICAL AND PLUMBING SPECIFICATIONS AND ASSOCIATED DRAWINGS. CONTRACTOR SHOULD OBTAIN THE REQUIRED MECHANICAL AND PLUMBING DRAWINGS AND PROVIDE ALL EQUIPMENT, RACEWAYS, WIRING, ETC., AS INDICATED THEREON AS PROVIDED UNDER THE ELECTRICAL WORK.
12. ALL FINAL CONNECTIONS TO OWNER FURNISHED EQUIPMENT SHALL BE MADE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED. VERIFY ELECTRICAL CHARACTERISTICS AND U.L. LISTING PRIOR TO CONNECTION.
13. THE CONTRACTOR SHALL VERIFY THE LOAD INPUT VOLTAGE OF ALL EQUIPMENT PRIOR TO INSTALLATION. ACCEPTING ANY EQUIPMENT RESULTING IN A LOAD INCREASE SHALL BE THE RESPONSIBILITY OF CONTRACTOR.
14. ELECTRICAL OUTLETS ON OPPOSITE SIDES OF FIRE RATED WALLS AND PARTITIONS MUST BE SEPARATED BY DISTANCE OF 24 IN. HORIZONTALLY, IN ACCORDANCE WITH I.B.C. SEC. 711.3.2. OPENINGS IN FIRE RATED WALLS GREATER THAN 16 SQ. IN. MUST BE FIRE STOPPED.
15. PROVIDE AN ADDITIONAL JUNCTION BOX (SIZE AS REQUIRED) WHERE THE NUMBER OF CONDUCTORS EXCEEDS THE MAXIMUM ALLOWED FOR A GIVEN JUNCTION POINT OR OUTLET.
16. CONDUCTORS SHALL BE COPPER THHN/THWN 600 VOLT INSULATION UNLESS OTHERWISE NOTED. USE PROPER TEMPERATURE RATING OF CONDUCTORS BASED ON THE AMBIENT AIR TEMPERATURE WHERE CONDUCTORS ARE BEING USED. HIGHER AMPACITY CONDUCTOR AND LARGER RACEWAY SHALL BE PROVIDED TO OFFSET THE AMPACITY CORRECTION FACTORS AS INDICATED IN NEC TABLE 310 AND ELSEWHERE IN CODE.
17. ALL FLUORESCENT BALLASTS AND LAMPS SHALL BE CALIFORNIA ENERGY COMMISSION(CEC) CERTIFIED ENERGY SAVING TYPE.
18. DO ALL DRILLING, CUTTING, CHANNELING AS REQUIRED FOR ELECTRICAL WORK AND INDICATED OR HEREIN SPECIFIED. ALL HOLES, CURBS, ETC., IN FLOORS, CEILINGS AND WALLS SHALL BE PATCHED, UNLESS INDICATED OTHERWISE. PAINT ALL EXPOSED ELECTRICAL RACEWAYS, CABINETS, ENCLOSURES AND FITTING TO MATCH IN COLOR TO ADJACENT SURFACES IN FINISHED AREAS. (PROTECT UL LISTINGS LABELS FROM PAINT).
19. SEAL ALL PENETRATIONS THROUGH FIRE RATED WALLS, CEILINGS, FLOORS, ETC., TO MAINTAIN THE FIRE RATING. FURNISH AND INSTALL FIRE RATED ENCLOSURE FOR ALL EQUIPMENT PENETRATING INTO FIRE RATED ENVELOPS, SPACES ETC.
20. EMERGENCY LIGHTING SHALL BE PROVIDED PER U.B.C. AND SHALL BE DESIGNED TO PROVIDE MINIMUM REQUIRED FOOTCANDLES AND LUMENS. PROVIDE ADDITIONAL EMERGENCY ILLUMINATION AS REQUIRED BY INSPECTION AUTHORITIES HAVING JURISDICTIONS.
21. ALL ELECTRICAL EQUIPMENT SHALL BE BRACED OR ANCHORED TO RESIST A HORIZONTAL FORCE ACTING IN ANY DIRECTION USING THE FOLLOWING CRITERIA. □NON HEALTH CARE FACILITY INCLUDE OSHPD NOTES FOR HEALTH CARE FACILITY□

FIXED EQUIPMENT ON GRADE: OPERATING WEIGHT	33% OF
FIXED EQUIPMENT ON STRUCTURE: OPERATING WEIGHT	50% OF
EMERGENCY POWER AND COMMUNICATION □ EQUIPMENT ON GRADE: OPERATING WEIGHT	50% OF
EMERGENCY POWER AND COMMUNICATION ON STRUCTURE: OPERATING WEIGHT	75% OF

FOR FLEXIBLE MOUNTED EQUIPMENT USE 2 X THE ABOVE VALUES.
SIMULTANEOUS VERTICAL FORCE - USE 1/3 X HORIZONTAL FORCE.

CONDUIT, BUSDUCT, CABLE TRAY, WIREWAYS, ETC., SHALL BE BRACED IN ACCORDANCE WITH "GUILDELINES", PUBLISHED BY SMACNA AND PPIC.

NOTICE
THESE DRAWINGS ARE SUBJECT TO AN APPROVAL OF THE BUILDING DEPARTMENT, FIRE MARSHAL, UTILITY COMPANY AND OTHER AGENCIES AUTHORITY HAVING JURISDICTION (AHJ). BY THE ACT OF SUBMITTING A BID PROPOSAL FOR WORK, THE CONTRACTOR HAS REVIEWED THE PLANS THOROUGHLY AND ACCEPT FULL RESPONSIBILITY OF PLAN CORRECTIONS AND ASSOCIATED CONSTRUCTION COSTS REQUIRED BY AHJ.

GENERAL NOTES 2
NOT TO SCALE E-000

CONDUIT AND CONDUCTORS SCHEDULE

Mark No.	OCP Device (A/P)	Rating in Amperes	Conductors Phase & Neutral Qty	Size	Type	Equip Grd Qty	Size	No. Sets	Raceway Size (nominal inches) Phase, Neutral & Eq Grd EMT	IMC	RIGID	PVC	With IG EMT	IMC	PVC
1	20/1	20	2	12	THHN	1	12	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
2	20/2	20	3	12	THHN	1	12	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
3	20/3	20	4	12	THHN	1	12	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
4	25/1	17 – 20	2	10	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
5	25/2	17 – 20	3	10	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
6	25/3	17 – 20	4	10	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
7	30/1	21 – 24	2	10	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
8	30/2	21 – 24	3	10	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
9	30/3	21 – 24	4	10	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
10	40/1	25 – 32	2	8	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
11	40/2	25 – 32	3	8	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	0.75
12	40/3	25 – 32	4	8	THHN	1	10	One	0.75	0.75	0.75	0.75	0.75	0.75	1
13	50/1	33 – 40	2	6	THHN	1	10	One	0.75	0.75	0.75	1	1	1	1
14	50/2	33 – 40	3	6	THHN	1	10	One	1	1	1	1	1.25	1	1.25
15	50/3	33 – 40	4	6	THHN	1	10	One	1.25	1	1	1.25	1.25	1.25	1.25
16	60/1	41 – 48	2	4	THW	1	8	One	1	1	1	1	1.25	1	1.25
17	60/2	41 – 48	3	4	THW	1	8	One	1.25	1	1.25	1.25	1.25	1.25	1.25
18	60/3	41 – 48	4	4	THW	1	8	One	1.25	1.25	1.25	1.25	1.25	1.25	1.25
19	70/1	49 – 56	2	4	THW	1	8	One	1	1	1	1	1.25	1	1.25
20	70/2	49 – 56	3	4	THW	1	8	One	1.25	1	1.25	1.25	1.25	1.25	1.25
21	70/3	49 – 56	4	4	THW	1	8	One	1.25	1.25	1.25	1.25	1.25	1.25	1.25
22	80/2	57 – 64	3	3	THW	1	8	One	1.25	1.25	1.25	1.25	1.25	1.25	1.25
23	80/3	57 – 64	4	3	THW	1	8	One	1.25	1.25	1.25	1.25	1.25	1.25	1.25
24	90/2	65 – 72	3	2	THW	1	6	One	1.25	1.25	1.25	1.25	1.50	1.25	1.50

Mark No.	OCP Device (A/P)	Load in Amperes	Conductors Phase & Neutral Qty	Size	Type	Equip Grd Qty	Size	No. Sets	Raceway Size (nominal inches) Phase, Neutral & Eq Grd EMT	IMC	RIGID	PVC	With IG EMT	IMC	PVC
25	90/3	65 – 72	4	2	THW	1	6	One	1.50	1.25	1.50	1.50	1.50	1.50	1.50
26	100/2	73 – 80	3	1	THW	1	6	One	1.50	1.50	1.50	1.50	2	2	2
27	100/3	73 – 80	4	1	THW	1	6	One	2	2	2	2	2	2	2
28	110/2	81 – 88	3	1	THW	1	6	One	1.50	1.50	1.50	1.50	2	2	2
29	110/3	81 – 88	4	1	THW	1	6	One	2	2	2	2	2	2	2
30	125/2	89 – 100	3	1	THW	1	6	One	1.50	1.50	1.50	1.50	2	2	2
31	125/3	89 – 100	4	1	THW	1	6	One	2	2	2	2	2	2	2
32	150/2	101 – 120	3	1/0	THW	1	6	One	2	2	2	2	2	2	2
33	150/3	101 – 120	4	1/0	THW	1	6	One	2	2	2	2	2	2	2
34	175/2	121 – 140	3	2/0	THW	1	6	One	2	2	2	2	2	2	2
35	175/3	121 – 140	4	2/0	THW	1	6	One	2	2	2	2	2.50	2.50	2.50
36	200/2	141 – 160	3	3/0	THW	1	6	One	2	2	2	2	2.50	2.50	2.50
37	200/3	141 – 160	4	3/0	THW	1	6	One	2.50	2.50	2.50	2.50	2.50	2.50	2.50
38	225/2	161 – 180	3	4/0	THW	1	4	One	2.50	2	2.50	2.50	2.50	2.50	2.50
39	225/3	161 – 180	4	4/0	THW	1	4	One	2.50	2.50	2.50	2.50	2.50	3	3
40	250/3	181 – 200	4	250	THW	1	4	One	2.50	3	3	3	3	3	3
41	300/3	210 – 240	4	350	THW	1	4	One	3	3	3	3	3	3.50	3.50
42	350/3	241 – 280	4	500	THW	1	3	One	3.50	3.50	3.50	3.50	3.50	4	4
43	400/3	281 – 320	4	3/0	THW	2	3	Two	2.50	2.50	2.50	2.50	2.50	2.50	2.50
44	600/3	321 – 480	4	350	THW	2	1	Two	3	3	3	3	3	3.50	3.50
45	800/3	481 – 640	4	500	THW	2	1/0	Two	3.50	3.50	3.50	3.50	3.50	4	4
46	1000/3	641 – 800	4	400	THW	3	2/0	Three	3	3.50	3.50	3.50	3.50	3.50	3.50
47	1200/3	801 – 960	4	350	THW	4	3/0	Four	3	3	3	3	3	3.50	3.50
48	1600/3	961 – 1280	4	400	THW	5	4/0	Five	3	3.50	3.50	3.50	3.50	3.50	3.50

Notes:

Conductors are rated at 600 volt or below and are to be copper.

NEC Table 310.15(B)(16) – formerly Table 310.16 – is used for the basis of the conductor ampacities, which is not more than three current carrying conductors in a raceway at an ambient temperature of 30 deg C with 60 deg C rated conductors and connectors per 110.14–C–1 for up to 100 amp rated and up to #1 AWG conductors for equipment terminations and 75 deg C rated conductors and termination connectors for larger than 100 amp or above #1 AWG conductors.

NEC Appendix C is used for the basis of the conduit sizes. Table C1 for EMT, Table C4 for IMC, Table C8 for Rigid, and Table C10 for PVC (Sch 40).

All Branch Feeders and Branch Circuits shall include a green Equipment Ground.

Omit Grounding conductor on Service Entrance Feeders and Neutral on Delta Primary xfmr Feeders.

The above conductors are not calculated for Voltage Drop. Circuits that exceed 100 feet shall be calculated by the Installer to have less than a 3 percent voltage drop on feeders and 5 percent on branch circuits per the NEC.

TESTING FOR EMERGENCY RESPONSE RADIO COVERAGE SHALL BE CONDUCTED IN ACCORDANCE WITH IFC 510

MC CABLE SHALL NOT BE USED. PREWIRED MC CABLE WHIPS FROM LIGHTING FIXTURES ARE ACCEPTABLE WHEN SUPPLIED WITH THE FIXTURE AND NO LONGER THAN 72".

ELECTRICIAN TO PROVIDE STAINLESS STEEL COVER PLATES FOR ALL LOW VOLTAGE JUNCTION BOXES.

NO UNDER SLAB ELECTRICAL WORK ALLOWED UNLESS OTHERWISE NOTED ON PLAN.

ELECTRICAL SYMBOLS LIST

NOTE: ALL DIMENSIONS GIVEN ARE TO DEVICE CENTERLINES. CONTRACTOR TO COORDINATE ALL INSTALLATIONS.

POWER DISTRIBUTION

- S_M SINGLE-POLE SWITCH, MANUAL MOTOR STARTER
- J-BOX (WITH FLEX CONNECTION TO EQUIPMENT.)
- DISCONNECT SWITCH, WITH RATING AS SHOWN ON PLANS
- COMBINATION DISCONNECT SWITCH / MOTOR STARTER FURNISHED BY ELECTRICAL CONTRACTOR.
- BRANCH CIRCUITRY CONCEALED IN WALL OR CEILING WITH ADDITIONAL #12 INSULATED GND. U.N.O. HACHURES INDICATE NUMBER OF CURRENT CARRYING CONDUCTORS. 'X' INDICATES ADDITIONAL INSULATED, ISOLATED GROUND CONDUCTORS.
- BRANCH CIRCUITRY HOMERUN TO PANEL AS NOTED ON PLANS
- INDICATES EXTERIOR UNDERGROUND WIRE RUNS.

LIGHTING □ LIGHTING CONTROLS

- L1 LIGHTING FIXTURE. SUBSCRIPT LETTER DENOTES FIXTURE TYPE AS DESCRIBED IN LIGHT FIXTURE SCHEDULE.
- S□ SINGLE-POLE SWITCH □ 44" A.F.F. U.N.O. LOWER CASE LETTER DENOTES FIXTURE CONTROL. 300V. 20A.
- S_2 TWO-POLE SWITCH □ 44" A.F.F. U.N.O. LOWER CASE LETTER DENOTES FIXTURE CONTROL. 300V. 20A.
- S_P SINGLE-POLE LIGHT SWITCH WITH PILOT LIGHT □ 44" A.F.F. U.N.O. 300V. 20A.
- S OCCUPANCY SENSOR SWITCH WITH OFF CONTROL, AND ADJUSTABLE SETTINGS FOR TIME OFF DELAY, FOOTCANDLE LEVEL, AND MASKING. WATTSTOPPER OR EQUAL, MOUNT AT 44" A.F.F. U.N.O. USE PW-100 FOR OFFICES/CONF/ETC., WI-200 FOR CLASSROOMS/LARGE ROOMS/ETC.
- CEILING MOUNT DUAL TECHNOLOGY ULTRASONIC / P.I.R. MOTION SENSOR TO CONTROL POWER TO ROOM SWITCHES - WATTSTOPPER #DT-300 (WITH POWER PACK) OR EQUAL.

ABBREVIATIONS

A	AMPERES	M.C.B.	MAIN CIRCUIT BREAKER
AL	ALUMINUM	M.L.O.	MAIN LUGS ONLY
A.F.F.	ABOVE FINISHED FLOOR	MTD.	MOUNTED
A.F.G.	ABOVE FINISHED GRADE	P.	POLE
C.	CONDUIT	SW.	SWITCH
C/B	CIRCUIT BREAKER	T.M.B.	TELEPHONE MOUNTING BOARD
CU.	COPPER	TYP.	TYPICAL
DISC.	DISCONNECT	U.N.O.	UNLESS NOTED OTHERWISE
F.	FUSE	V.	VOLTS
GFI	GROUND FAULT CURRENT INTERRUPTER	W.	WIRE
		W.P.	WEATHERPROOF
GND.	GROUND	XFMR	TRANSFORMER
H.P.	HORSE POWER	Ø	PHASE
k	1000		

RECEPTACLES □ COMMUNICATIONS OUTLETS

- DUPLEX CONVENIENCE OUTLET, 20A, 125V, MTD □ 18" A.F.F. U.N.O.
- SIMPLEX CONVENIENCE OUTLET, 20A, 125V, MTD □ 18" A.F.F. U.N.O.
- DUPLEX CONVENIENCE OUTLET MOUNTED 3" ABOVE COUNTERTOP BACKSPLASH OR APPROXIMATELY 44" A.F.F.
- GFCI DUPLEX CONVENIENCE OUTLET, 20A, 125V, 5 mA TRIP, MTD □ 18" A.F.F. U.N.O.
- GFCI DUPLEX CONVENIENCE OUTLET MOUNTED 3" ABOVE COUNTERTOP BACKSPLASH OR APPROXIMATELY 44" A.F.F.
- TELEPHONE OUTLET. PROVIDE FLUSH J-BOX □ □18" AFF U.N.O W/ 1" CONDUIT W/ PULL WIRE TO MANAGER'S STATION. '□' SUBSCRIPT INDICATES WALL PHONE AT 54" AFF.
- DATA OUTLET. PROVIDE FLUSH J-BOX □ □18" A.F.F. U.N.O W/ 1" CONDUIT WITH PULL WIRE TO MANAGER'S STATION.
- COMBINATION TEL/DATA OUTLET. PROVIDE FLUSH J-BOX □ □18" AFF U.N.O W/ 1" CONDUIT WITH PULL WIRE TO MANAGER'S STATION.
- T.V. SYSTEM DATA OUTLET. PROVIDE FLUSH J-BOX □ □18" A.F.F. U.N.O W/ 1" CONDUIT WITH PULL WIRE TO MANAGER'S STATION. WHEN SHOWN ADJACENT RECEPTACLE, MOUNT AT RECEPTACLE HEIGHT. REFER TO RECEPTACLE FOR MOUNTING HEIGHT.
- SPECIAL PURPOSE RECEPTACLE MTD. □ 18" A.F.F. U.N.O., AMPERAGE AND PHASE AS NOTED ON PLANS, NEMA CONFIGURATION AS REQ'D.
- ISOLATED GROUND DUPLEX CONVENIENCE OUTLET (ORANGE), 20A.,125V., MTD □ □18" A.F.F.
- DOUBLE DUPLEX CONVENIENCE OUTLETS UNDER COMMON COVER
- ISOLATED DOUBLE DUPLEX CONVENIENCE OUTLETS (ORANGE) 20A.,125V.
- SPK SPEAKER

FIRE ALARM

- MANUAL PULL STATION WITH KEYED RESET. MOUNT UNIT AT 44" A.F.F. ALIGN WITH LIGHT SWITCH IF APPLICABLE.
- XENON STROBE UNIT MOUNTED AT 80" A.F.F. OR 6" BELOW CEILING (WHICHEVER IS LOWER). MUST MEET OR EXCEED A.D.A. REQUIREMENTS.
- COMBINATION XENON STROBE AND HORN/CHIME UNIT MOUNTED AT 80" A.F.F. OR 6" BELOW CEILING (WHICHEVER IS LOWER). UNIT MUST MEET OR EXCEED A.D.A. REQUIREMENTS.
- FACP FIRE ALARM CONTROL PANEL. MOUNT TOP OF UNIT AT 72" A.F.F.
- FAAP FIRE ALARM ANNUNCIATION PANEL. MOUNT TOP OF UNIT AT 72" A.F.F.
- PHOTO ELECTRIC TYPE SMOKE DETECTOR.
- DUCT MOUNTED PHOTO ELECTRIC SMOKE DETECTOR.
- RATE OF RISE HEAT DETECTOR.

ELECTRICAL SYMBOLS 1
NOT TO SCALE E-000

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2-21-2017

PANDA EXPRESS
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3276 LAWRENCEVILLE-SUWANEE RD
SUWANEE, GA

2200 TRUE WARM & WELCOME

E-000

ELECTRICAL SYMBOLS
SPECIFICATIONS, NOTES

TRUE WARM & WELCOME 2200