ELECTRICAL ABBREVIATIONS

A	AMPERE
AC	ABOVE COUNTER
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFI	ARC FAULT CIRCUIT INTERRUPTER
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BMS	BUILDING MANAGEMENT SYSTEM
C	CONDUIT
CATV	CABLE TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CT	CURRENT TRANSFORMER
CU	COPPER
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
ELU	EMERGENCY LIGHTING UNIT
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
EX	EXISTING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTOR
GND	GROUND
HOA	HANDS-OFF-AUTOMATIC SWITCH
HP	HORSEPOWER
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
J-BOX	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT-AMPERE
KW	KILOWATT
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUGS ONLY
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOC.
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
N.O.	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
PH	PHASE
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE (CONDUIT)
RCPT	RECEPTACLE
RSC	RIGID STEEL CONDUIT
RTU	ROOF TOP UNIT
SS	STAINLESS STEEL
TYP	TYPICAL
UC	UNDER COUNTER
V	VOLT
VA	VOLT-AMPERES
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
WP	WEATHERPROOF
XFMR	TRANSFORMER
∠	ANGLE
@	AT
▲	DELTA
'	FEET
"	INCHES
#	NUMBER
Ø	PHASE
C	CENTER LINE
P	PLATE

GENERAL PLAN SYMBOLS

- # — PLAN REVISION NUMBER
- # / E# — DETAIL NUMBER ON SHEET; SHEET NUMBER WHERE DETAIL IS PLACED
- # — KEYNOTE SYMBOL
- CONTINUATION SYMBOL
- POINT WHERE NEW CONNECTS TO EXISTING
- ROOM 001 — ROOM NAME / NUMBER
- AREA BEING DEMOLISHED
- AREA NOT IN CONTRACT
- X — EQUIPMENT TAG

ELECTRICAL SYMBOL LEGEND

LIGHTING SYMBOLS

REFER TO LIGHT FIXTURE SCHEDULE FOR SPECIFICS DETAILS ABOUT EACH FIXTURE TYPE.

- RECTANGULAR CEILING MOUNT FIXTURES
- SQUARE CEILING MOUNT FIXTURE
- ROUND CEILING MOUNT FIXTURE
- PENDANT MOUNT FIXTURE
- WALL WASH FIXTURE
- WALL MOUNTED FIXTURES
- STRIP FIXTURE
- DIRECTIONAL LIGHT, TRACK LIGHT, FLOOD LIGHT
- LINEAR LIGHT, TAPE LIGHT
- EMERGENCY LIGHTING UNIT, WALL-MOUNTED, INTEGRAL BATTERY
- EXIT LIGHT, CEILING-MOUNTED. SHADING AND ARROWS INDICATE FACES AND DIRECTIONAL CHEVRONS.
- EXIT LIGHT, WALL-MOUNTED. SHADING AND ARROWS INDICATE FACES AND DIRECTIONAL CHEVRONS.
- EXIT/ELU COMBO
- POLE/AREA LIGHTS
- POST-TOP AREA LIGHT
- BOLLARD LIGHT
- DIAGONAL HATCH INDICATES LIGHT ON A CRITICAL CIRCUIT.
- SOLID HATCH INDICATES LIGHT ON AN EMERGENCY OR LIFE SAFETY CIRCUIT.

LIGHTING TAGS

B1
PP-26
a

- TOP VALUE: FIXTURE ID TYPE
- MIDDLE VALUE: UPPERCASE LETTER(S) INDICATES PANEL ID AND CIRCUIT NUMBER
- BOTTOM VALUE, LOWERCASE LETTER: SWITCH ID
  - ABSENCE OF A SWITCH DESIGNATION INDICATES IT IS CONTROLLED BY THE ONLY SWITCH IN THE SPACE.
  - AN "X" INDICATES IT IS UNSWITCHED.
  - AN 'NL' INDICATES IT IS UNSWITCHED.

LIGHTING & POWER DEVICE CONTROL SYMBOLS

- $ SINGLE-POLE SWITCH
- $ TWO-POLE SWITCH
- $ THREE-POLE SWITCH

SWITCH MODIFIERS:

3: 3-WAY	OS: OCCUPANCY SENSOR
4: 4-WAY	VS: VACANCY SENSOR
K: KEYED	AC: ABOVE-COUNTER
D: DIMMING	LV: LOW-VOLTAGE
T: TIMER	

- LIGHTING CONTACTOR
- LC LIGHTING CONTROL PANEL
- OS OCCUPANCY SENSOR
- DL DAYLIGHT HARVESTING SENSOR
- PHOTO CELL

LIGHTING & POWER DEVICE CONTROL TAGS

$ a
OS a
a

- SWITCH ID INDICATED BY LOWERCASE LETTER.
- SWITCH IDS ARE UNIQUE PER SPACE.
- A SWITCH WITH AN ID "A" CONTROLS ALL DEVICES WITHIN THE SPACE IN WHICH IT IS LOCATED TAGGED WITH "A".
- A SWITCH WITHOUT A TAGGED ID CONTROLS ALL LIGHTING FIXTURES WITHIN A SPACE.
- ID TAGS MAY BE USED ON LIGHTING CONTROL DEVICES OTHER THAN SWITCHES, SUCH AS OCCUPANCY SENSORS OR CONTACTORS.

SECURITY SYMBOLS

- SECURITY CAMERA
  PTZ: PAN/TILT/ZOOM
- CR CARD READER
- CK CARD READER WITH KEYPAD
- CC CLOSED CIRCUIT TV OUTLET
- DC DOOR CONTACT
- ES ELECTRIC STRIKE
- IC INTERCOM
- ML MAGNETIC LOCK
- RX REQUEST TO EXIT BUTTON
- REX REQUEST TO EXIT SENSOR
- MD MOTION DETECTOR
- XXX SECURITY CONTROL UNIT
  SCP: SECURITY CONTROL PANEL
  SPS: SECURITY POWER SUPPLY UNIT

POWER DEVICE SYMBOLS

WALL CEILING FLOOR

- SIMPLEX RECEPTACLE
- DUPLEX RECEPTACLE
- QUADRUPLEX RECEPTACLE
- SPECIAL RECEPTACLE, TYPE AS INDICATED
- SIDE SHADING INDICATES SPLIT WIRED
- CENTER SHADING INDICATES GFCI

RECEPTACLE MODIFIERS:

##:	HEIGHT (IN INCHES) AFF TO THE CENTER
AC:	ABOVE COUNTER MOUNTED HORIZONTALLY
C:	CONTROLLED RECEPTACLE
E:	EMERGENCY
WP:	WEATHERPROOF WHILE IN-USE COVER

- MULTIOUTLET ASSEMBLY; FILLED SQUARES INDICATE 120V OUTLET OPEN SQUARES INDICATE WITH USB
- CORD REEL, DEVICE VARIES
- DROP CORD, DEVICE VARIES
- J JUNCTION BOX
- J FLOOR BOX, SEE SCHEDULE FOR TYPE
- EMERGENCY POWER OFF
- DO DOOR OPENER PUSH PLATE
- M POWER METER
- M MOTOR RATED SWITCH
- SAFETY SWITCH, FUSED
- SAFETY SWITCH, UNFUSED
- MOTOR STARTER
- COMBINATION STARTER/DISCONNECT
- CONTACTOR

POWER DEVICE TAGS

PP-26
a

- UPPERCASE LETTER(S) INDICATES PANEL ID AND CIRCUIT NUMBER.
- LOWERCASE LETTER INDICATES DESIGNATION OF CONTROLLING SWITCH (WHERE APPLICABLE).

TELE/COMM SYMBOLS

WALL CEILING FLOOR

- DATA OUTLET
- TELEPHONE OUTLET
- DATA/TELEPHONE OUTLET

OUTLET MODIFIERS:
##": HEIGHT AFF OC
AC: ABOVE COUNTER

- WIRELESS ACCESS POINT
- TV TV OUTLET

POWER DISTRIBUTION EQUIPMENT

SB1(S)
MDP(A)
HP1A(B)
LP1A(C)

- HATCHED FILL INDICATES DISTRIBUTION PANEL OR SWITCHBOARD.
- SOLID FILL INDICATES BRANCH PANEL OR LOAD CENTER.
- DASHED BOX INDICATES CODE-REQUIRED CLEARANCE (WIDTH AND DEPTH).
- DOOR INDICATES FRONT OF RECESSED PANEL.

T1

TRANSFORMER
- TYPICALLY TRANSFORMER NAMES BEGIN WITH OR CONTAIN THE LETTER "T".
- SEE SINGLE-LINE DIAGRAM FOR DESCRIPTION AND REQUIREMENTS.

GROUNDING AND LIGHTNING PROTECTION SYMBOLS

- GROUND ROD
- GROUND ROD WITH TEST WELL
- STATIC GROUND RECEPTACLE
- LIGHTNING PROTECTION AIR TERMINAL
- LIGHTNING PROTECTION CONDUCTOR SPLICE

ELECTRICAL GENERAL NOTES

A. PROJECT DESIGN BASED ON DUPAGE COUNTY ELECTRICAL CODE 2020 (BASED ON NFPA 70, 2020 WITH AMENDMENTS).

B. REFER TO THE APPROPRIATE DOCUMENTS FOR THE EXACT LOCATION AND REQUIREMENTS OF EQUIPMENT INSTALLED BY OTHERS REQUIRING ELECTRICAL CONNECTIONS.

C. PENETRATIONS IN WALLS REQUIRING PROTECTED OPENINGS MUST BE FIRESTOPPED WITH AN APPROVED MATERIAL.
   A. CONDUITS MAY PENETRATE WALLS OR PARTITIONS, PROVIDED THEY ARE FIRE-STOPPED.
   B. OPENINGS FOR STEEL ELECTRICAL BOXES NOT EXCEEDING 16 SQUARE INCHES ARE PERMITTED PROVIDED OPENINGS DO NOT AGGREGATE MORE THAN 100 SQUARE INCHES FOR ANY 100 SQUARE FEET OF WALL OR PARTITION.

E. EQUIPMENT GROUNDING CONDUCTORS SHALL BE INCLUDED IN ALL RACEWAYS.

ELECTRICAL SHEET INDEX

E001	ELECTRICAL - LEGEND, SYMBOLS, AND ABBREVIATIONS
E002	ELECTRICAL - SPECIFICATIONS
E003	ELECTRICAL - SPECIFICATIONS
E100	ELECTRICAL - SITE PLAN

WOLF ENGINEERING

P.O. BOX 38 | DALTON, GA 30722

PROJECT NAME:

GUZMAN Y GOMEZ MEXICAN KITCHEN

844 ILLINOIS ROUTE 59
NAPERVILLE, IL
DUPAGE COUNTY

SEAL:

EDWARD MICHAEL WOLF 62066400 LICENSED PROFESSIONAL ENGINEER OF ILLINOIS

EXPIRES 11/30/2025
05/14/2025

NO	DATE	DESCRIPTION
	03/19/2025	ISSUED FOR PERMIT

DRAWING TITLE:

ELECTRICAL - LEGEND, SYMBOLS, AND ABBREVIATIONS

PROJ. NO: 20250064.0
DRAWN BY: YA
CHECKED BY: EW

SHEET NO:

E001

RELEASED FOR CONSTRUCTION

PART 1 GENERAL INSTRUCTIONS

1.1 GENERAL REQUIREMENTS

A. ALL REQUIREMENTS IN THE ARCHITECTURAL SPECIFICATIONS, ARCHITECTURAL GENERAL NOTES AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS APPLY TO THIS SECTION AND DIVISION. WHERE THE REQUIREMENTS OF THIS SECTION AND DIVISION EXCEED THOSE OF THE ARCHITECTURAL SPECIFICATIONS AND ARCHITECTURAL GENERAL NOTES, THIS SECTION AND DIVISION TAKE PRECEDENCE. BECOME THOROUGHLY FAMILIAR WITH ALL REQUIREMENTS THAT AFFECT THIS DIVISION, SECTION OR BOTH. WORK REQUIRED UNDER THIS DIVISION INCLUDES ALL MATERIAL, EQUIPMENT, APPLIANCES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE ELECTRICAL SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE EACH SYSTEM'S FUNCTIONALITY AS IMPLIED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.

B. THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE, SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED. DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UPON WHICH THE CONTRACT IS BASED. THEY SHOW THE MATERIALS AND THEIR RELATIONSHIP TO ONE ANOTHER, INCLUDING SIZES, SHAPES, LOCATIONS, AND CONNECTIONS. THEY ALSO CONVEY THE SCOPE OF WORK, INDICATING THE INTENDED GENERAL ARRANGEMENT OF THE EQUIPMENT, FIXTURES, OUTLETS AND CIRCUITS WITHOUT SHOWING ALL OF THE EXACT DETAILS AS TO ELEVATIONS, OFFSETS, CONTROL LINES, AND OTHER INSTALLATION REQUIREMENTS. USE THE DRAWINGS AS A GUIDE WHEN LAYING OUT THE WORK AND TO VERIFY THAT MATERIALS AND EQUIPMENT WILL FIT INTO THE DESIGNATED SPACES AND WHICH, WHEN INSTALLED PER MANUFACTURERS' REQUIREMENTS, WILL ENSURE A COMPLETE, COORDINATED, SATISFACTORY AND PROPERLY OPERATING SYSTEM.
   1. DRAWINGS ARE SCHEMATIC IN NATURE, SHOW THE VARIOUS COMPONENTS OF THE SYSTEMS APPROXIMATELY TO SCALE AND ATTEMPT TO INDICATE HOW THEY SHALL BE INTEGRATED WITH OTHER PARTS OF THE WORK. FIGURED DIMENSIONS TAKE PRECEDENCE TO SCALED DIMENSIONS. DETERMINE EXACT LOCATIONS BY JOB MEASUREMENTS, BY CHECKING THE REQUIREMENTS OF OTHER TRADES, AND BY REVIEWING ALL CONTRACT DOCUMENTS. CORRECT ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION, AT NO ADDITIONAL COST.
   2. SPECIFICATIONS DEFINE THE QUALITATIVE REQUIREMENTS FOR PRODUCTS, MATERIALS, AND WORKMANSHIP UPON WHICH THE CONTRACT IS BASED.

1.2 DEFINITIONS

A. FURNISH: TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLING, INSTALLING, AND SIMILAR OPERATIONS.
B. INSTALL: TO PERFORM ALL OPERATIONS AT THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO, AND AS REQUIRED: UNLOADING, UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.
C. PROVIDE: TO FURNISH AND INSTALL COMPLETE, AND READY FOR THE INTENDED USE.
D. FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION. INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.
E. ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF, THE ARCHITECT, AS DEFINED IN THE GENERAL AND SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, IT MEANS INCREASED INVOLVEMENT BY, AND OBLIGATIONS TO, THE ENGINEER, IN ADDITION TO INVOLVEMENT BY, AND OBLIGATIONS TO, THE "ARCHITECT".
F. AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY, AUTHORITY HAVING JURISDICTION OVER THE WORK.
G. NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 29 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.
H. THE TERMS "EQUIVALENT", OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED". "EQUIVALENT" OR "EQUAL" PRODUCTS SHALL BE LABELED, LISTED, CERTIFIED, ALL THREE, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

1.3 PRE-BID SITE VISIT

A. PERSONALLY INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED OF CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

1.4 MATERIAL AND WORKMANSHIP

A. PROVIDE ALL MATERIAL AND EQUIPMENT NEW AND IN FIRST CLASS CONDITION. PROVIDE MARKINGS OR A NAMEPLATE FOR ALL MATERIAL AND EQUIPMENT IDENTIFYING THE MANUFACTURER AND PROVIDING SUFFICIENT REFERENCE TO ESTABLISH QUALITY, SIZE AND CAPACITY. ALL WORKMANSHIP SHALL BE OF THE FINEST POSSIBLE BY EXPERIENCED MECHANICS OF THE PROPER TRADE. IN GENERAL, PROVIDE THE FOLLOWING QUALITY GRADE(S) FOR ALL MATERIALS AND EQUIPMENT (LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE)
B. COMMERCIAL SPECIFICATION GRADE.
C. PROVIDE ALL HOISTS, SCAFFOLDS, STAGING, RUNWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED FOR THE INSTALLATION AND PERFORMANCE OF THE ELECTRICAL WORK. STORE AND MAINTAIN MATERIAL AND EQUIPMENT IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE.
D. FURNISH ONLY MATERIAL AND EQUIPMENT THAT ARE LISTED, LABELED, CERTIFIED, OR ALL THREE, BY A NATIONALLY RECOGNIZED TESTING LABORATORY, WHENEVER ANY LISTING OR LABELING EXISTS FOR THE TYPES OF MATERIAL AND EQUIPMENT SPECIFIED. AT A MINIMUM, GENERAL WORK PRACTICES FOR ELECTRICAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH NECA 1 (LATEST EDITION), "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".

1.5 MANUFACTURERS

A. IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.
B. WHERE MANUFACTURERS ARE NOT LISTED, PROVIDE PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS FROM MANUFACTURERS THAT HAVE BEEN ACTIVELY INVOLVED IN MANUFACTURING THE SPECIFIED PRODUCT FOR NO LESS THAN 5 YEARS.

1.6 COORDINATION

A. COORDINATE ALL WORK WITH OTHER DIVISIONS AND TRADES SO THAT VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS ARE INSTALLED AT THE PROPER TIME, FIT THE AVAILABLE SPACE, AND ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. REFER TO ALL DRAWINGS, INCLUDING, BUT NOT LIMITED TO, CIVIL, ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND PLUMBING, AND TO RELEVANT EQUIPMENT SUBMITTALS AND SHOP DRAWINGS TO DETERMINE THE EXTENT OF CLEAR SPACES. MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS, AND TO FACILITATE CONCEALING RACEWAYS IN THE MANNER ANTICIPATED IN THE DESIGN. PROVIDE MATERIALS WITH TRIM THAT WILL FIT PROPERLY THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED.

1.7 ORDINANCE, CODES, AND CLIENT STANDARDS

A. COMPLY WITH NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS, STATE AND LOCAL BUILDING CODES, AND ALL OTHER APPLICABLE CODES AND ORDINANCES FOR PERFORMANCE, WORKMANSHIP, EQUIPMENT, AND MATERIALS, ADDITIONALLY, COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES.
B. WHERE CONFLICTS BETWEEN VARIOUS CODES, ORDINANCES, RULES, AND REGULATIONS EXIST, COMPLY WITH THE MOST STRINGENT. WHEREVER REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, EXCEED THOSE OF THE ABOVE ITEMS, THE REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, SHALL GOVERN. CODE COMPLIANCE, AT A MINIMUM, IS MANDATORY. CONSTRUE NOTHING IN THESE CONSTRUCTION DOCUMENTS AS PERMITTING WORK NOT IN COMPLIANCE, AT A MINIMUM, WITH THESE CODES.
C. BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS TO THE ENGINEER'S ATTENTION FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW
D. PROVIDE AND MAINTAIN ALL NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE SAFETY OF THE PUBLIC. OBTAIN AND PAY FOR ALL PERMITS FOR WORK IN THIS DIVISION.

1.8 PROTECTION OF EQUIPMENT AND MATERIALS

A. STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO JOB SITE, IN ACCORDANCE WITH MANUFACTURERS' A. RECOMMENDATIONS. FOR MATERIALS AND EQUIPMENT SUSCEPTIBLE TO CHANGING WEATHER CONDITIONS, DAMPNESS, OR TEMPERATURE VARIATIONS, STORE INSIDE IN PROPERLY CONDITIONED SPACES. FOR MATERIALS AND EQUIPMENT NOT SUSCEPTIBLE TO THESE CONDITIONS, COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL THAT HAS BEEN DAMAGED BY CONSTRUCTION ACTIVITIES WILL BE REJECTED, AND CONTRACTOR SHALL FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND.
B. PLUG OR CAP OPEN ENDS OF CONDUITS WHILE STORED AND INSTALLED DURING CONSTRUCTION WHEN NOT IN USE, TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS.
C. RE-ESTABLISH SERVICE TO EXISTING EQUIPMENT THAT MAY HAVE BEEN INTERRUPTED DUE TO REMODELING.

1.9 SUBSTITUTIONS

A. INCLUDE IN THE BASE BID THE PRODUCTS SPECIFICALLY NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS. SUBMIT, IN THE FORM OF A ALTERNATES, WITH THE BID, PRODUCTS OF ANY OTHER MANUFACTURERS FOR SIMILAR USE, PROVIDED THE DIFFERENCES IN COST, IF ANY, ARE INCLUDED FOR EACH PROPOSED ALTERNATE. PRIOR TO THE BID DATE, SUBSTITUTIONS WILL NOT BE CONSIDERED UNLESS SUBMITTED TO THE ARCHITECT, FOR ENGINEER'S REVIEW, AT LEAST TEN CALENDAR DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH IT IS TO BE SUBSTITUTED AND A COMPLETE DESCRIPTION OF THE PROPOSED SUBSTITUTE INCLUDING CUTSHEETS, PHOTOMETRIC DATA, AND ALL OTHER INFORMATION NECESSARY FOR AN EVALUATION FOR EACH SUCH REQUEST. PROVIDE FACTORY GENERATED POINT-BY-POINT CALCULATIONS FOR ALL EXTERIOR LIGHT FIXTURES (PHOTOMETRIC FILES SUPPLIED TO THE ENGINEER CAN GENERATE A POINT-BY-POINT DO NOT SUFFICE FOR THE POINT- BY-POINT CALCULATIONS). PROVIDE INTERIOR POINT-BY-POINT CALCULATIONS AT THE DISCRETION OF THE ENGINEER. SUBMIT A $100.00 REVIEW FEE TO THE ENGINEER WITH EACH SUCH POINT-BY-POINT CALCULATION FOR USE OF ELECTRONIC BASE FILES.
B. THE ENGINEER WILL HAVE THE FINAL AUTHORITY AS TO WHETHER THE PRODUCT IS AN ACCEPTABLE REPLACEMENT TO THE SPECIFIED ITEM. THE PROPOSED SUBSTITUTION MAY ALSO BE REJECTED BY THE ARCHITECT FOR AESTHETIC REASONS IF FELT NECESSARY OR DESIRABLE. IN B. THE EVENT THE PROPOSED SUBSTITUTIONS HEREIN DESCRIBED ARE REJECTED, FURNISH THE SPECIFIED ITEM.

1.10 SUBMITTALS

A. ASSEMBLE AND SUBMIT TO THE ARCHITECT, FOR ENGINEER'S REVIEW, MANUFACTURERS' PRODUCT LITERATURE FOR ALL MATERIAL AND ALL EQUIPMENT TO BE FURNISHED, INSTALLED, OR BOTH, UNDER THIS DIVISION, INCLUDING SHOP DRAWINGS, MANUFACTURERS' PRODUCT DATA AND PERFORMANCE SHEETS, SAMPLES, AND OTHER SUBMITTALS REQUIRED BY THIS DIVISION. PROVIDE THE NUMBER OF SUBMITTALS REQUIRED BY THE ARCHITECTURAL SPECIFICATIONS; HOWEVER, AT A MINIMUM, SUBMIT SIX (6) SETS, OR SUBMIT ELECTRONIC PDF'S. BEFORE SUBMITTING, VERIFY THAT ALL MATERIALS AND EQUIPMENT SUBMITTED ARE MUTUALLY COMPATIBLE AND SUITABLE FOR THE INTENDED USE, FIT THE AVAILABLE SPACES, AND ALLOW AMPLE AND CODE-REQUIRED ROOM FOR ACCESS AND MAINTENANCE. SUBMITTALS SHALL CONTAIN THE FOLLOWING INFORMATION. SUBMITTALS NOT SO IDENTIFIED WILL BE RETURNED TO THE CONTRACTOR WITHOUT ACTION.
   1. THE PROJECT NAME AND LOCATION (STREET ADDRESS, FLOOR/SUITE NUMBER, CITY AND STATE).
   2. THE APPLICABLE SPECIFICATION SECTION AND PARAGRAPH.
   3. THE SUBMITTAL DATE.
   4. THE CONTRACTOR'S STAMP, WHICH SHALL CERTIFY THAT THE STAMPED DRAWINGS HAVE BEEN CHECKED BY THE CONTRACTOR, COMPLY WITH THE DRAWINGS AND SPECIFICATIONS, AND HAVE BEEN COORDINATED WITH OTHER TRADES.
   5. BLANK PAGE FOR PLACEMENT OF ENGINEERS REVIEW STAMP.
   6. TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW TWO WEEKS FOR ENGINEER REVIEW TIME, PLUS MAILING TIME, ALLOW AN ADDITIONAL TWO WEEKS FOR RE-SUBMITTALS, IF REQUIRED. TRANSMIT SUBMITTALS AS SOON AS POSSIBLE AFTER NOTICE TO PROCEED AND BEFORE CONSTRUCTION STARTS. THE ENGINEER'S SUBMITTAL REVIEWS WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES; OR FOR OMITTING COMPONENTS OR FITTINGS; OR FOR NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS.

1.11 ELECTRONIC DRAWINGS FILES

A. IN PREPARATION OF SHOP DRAWINGS, CONTRACTOR MAY, AT HIS OPTION, OBTAIN ELECTRONIC DRAWING FILES IN AUTOCAD DWG OR DXF FORMAT FROM THE ENGINEER FOR A NON-REFUNDABLE SHIPPING AND HANDLING FEE OF $200 FOR A DRAWING SET UP TO 12 SHEETS AND $15 PER SHEET FOR A DRAWING SET OF MORE THAN 12 SHEETS. CONTRACTOR SHALL CONTACT THE ENGINEER FOR THE WRITTEN AUTHORIZATION. CONTRACTOR SHALL INDICATE ON THE FORM THE DESIRED SHIPPING METHOD AND DRAWING FORMAT CONTRACTOR SHALL INCLUDE PAYMENT WITH THE SIGNED AUTHORIZATION FORM. THE SIGNED AUTHORIZATION FORM AND PAYMENT MUST BE RECEIVED BY THE ENGINEER BEFORE ANY ELECTRONIC FILES WILL BE SENT.

1.12 TRAINING

A. AT A TIME MUTUALLY AGREED UPON BETWEEN THE OWNER AND CONTRACTOR, TRAIN OWNER'S DESIGNATED PERSONNEL ON THE OPERATION AND MAINTENANCE OF THE EQUIPMENT PROVIDED FOR THIS PROJECT.
B. PROVIDE TRAINING TO INCLUDE BUT NOT BE LIMITED TO AN OVERVIEW OF THE SYSTEM AND/OR EQUIPMENT AS IT RELATES TO THE FACILITY AS A WHOLE; OPERATION AND MAINTENANCE PROCEDURES AND SCHEDULES RELATED TO STARTUP AND SHUTDOWN, TROUBLESHOOTING, SERVICING, PREVENTIVE MAINTENANCE AND APPROPRIATE OPERATOR INTERVENTION; AND REVIEW OF DATA INCLUDED IN THE OPERATION AND MAINTENANCE INSTRUCTIONS.
C. SCHEDULE TRAINING WITH OWNER WITH AT LEAST 30 DAYS IN ADVANCE NOTICE.

1.13 WARRANTIES

A. WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP. INSTALLATION, PRODUCT DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 1.
B. ALSO WARRANT THE FOLLOWING ADDITIONAL ITEMS:
   1. ALL RACEWAYS ARE FREE FROM OBSTRUCTIONS, HOLES, CRUSHING, OR BREAKS OF ANY NATURE.
   2. ALL RACEWAY SEALS ARE EFFECTIVE.
   3. THE ENTIRE ELECTRICAL SYSTEM IS FREE FROM ALL SHORT CIRCUITS AND UNWANTED OPEN CIRCUITS AND GROUNDS.
C. THE ABOVE WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.
D. PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.
E. AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING E. TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

1.14 MISCELLANEOUS REMODELING WORK

A. PROVIDE ALL DEMOLITION OF EXISTING ELECTRICAL SYSTEMS AND NEW ELECTRICAL SYSTEM MODIFICATIONS REQUIRED BECAUSE OF BUILDING REMODELING, AS NOTED ON THE DRAWINGS, OR NECESSARY FOR PROPER OPERATION AND NEW CONSTRUCTION. REMOVE ALL ABANDONED CABLES AND WIRING ABOVE ACCESSIBLE CEILINGS AND VENTILATION SHAFTS.
B. EXERCISE EXTREME CAUTION IN THE INSTALLATION OF THIS WORK TO AVOID AN ELECTRICAL SHOCK ACCIDENT. THE FACILITY IS EXISTING AND MAY REMAIN IN OPERATION DURING THIS WORK. COORDINATE ALL WORK SCHEDULES WITH THE BUILDING MANAGEMENT PRIOR TO DE-ENERGIZING ANY ELECTRICAL CIRCUITS TO AVOID CONFLICTS WITH ANY OTHER TENANT'S OPERATION. ALLOW 3 DAYS PRIOR CONFIRMED NOTIFICATION.
C. VERIFY THAT NEW AND EXISTING TO REMAIN INSTALLATIONS ARE CODE COMPLIANT, AND MAKE CORRECTIONS AS REQUIRED.
D. DEVELOP AND MAINTAIN A SET OF "RED-LINE AS-BUILT" DRAWINGS. THESE DRAWINGS SHALL BE MAINTAINED AT THE PROJECT CONSTRUCTION SITE AND AVAILABLE TO THE ENGINEER UPON REQUEST. THEY SHALL BE CURRENT AND SHALL REFLECT ALL ACTUAL ASPECTS OF THE ELECTRICAL INSTALLATION WHICH DEVIATED FROM THE PRESENT ELECTRICAL DESIGN DRAWINGS. THESE DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER WITHIN 10 DAYS OF SUBSTANTIAL COMPLETION OF THE WORK AND MUST INCLUDE ALL PUNCH LIST ITEMS.
E. VERIFY THE LOADING OF EACH CIRCUIT AFFECTED BY THE REMODELING. DO NOT LOAD CIRCUITS TO MORE THAN 80% OF ITS RATING.
F. PROVIDE UPDATED, TYPED DIRECTORY FOR EACH PANELBOARD BEING USED OR MODIFIED UNDER THIS CONTRACT. DESIGNATE NEW CIRCUITS AND SUITE BEING SERVED.
G. NO BX CABLE SHALL BE INSTALLED FOR THIS PROJECT.
H. FLEXIBLE STEEL CONDUIT SHALL BE USED TO WIRE ALL LIGHT FIXTURES AND EQUIPMENT CONNECTIONS REQUIRED FOR VIBRATION OR EASE OF MAINTENANCE IN LENGTHS FROM 18 INCHES TO 72 INCHES ONLY.
I. CONDUIT AND CABLE ABOVE CEILING SHALL BE SUPPORTED BY A UNISTRUT AND ALL-THREAD ROD TRAPEZE. EACH PIECE OF CONDUIT SHALL BE SECURED TO THE TRAPEZE WITH A COMPLIANT STRAP. THE TRAPEZE SUPPORTS SHALL BE INSTALLED PER CODE PLUS A MINIMUM OF 12" ABOVE THE CEILING.
J. PRIOR TO BID, THE EXISTING LIGHTING INSTALLATION SHALL BE INSPECTED TO VERIFY COMPATIBILITY WITH EXPANSION AND DUAL SWITCHING. NO CHANGE ORDER SHALL BE ISSUED DURING CONSTRUCTION FOR CHANGES DUE TO INCOMPATIBILITY.
K. NO CHANGES SHALL BE MADE TO THE CIRCUITING SHOWN WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER OF RECORD. CIRCUIT NUMBERS SHALL BE INDICATED ON EACH JUNCTION BOX.
L. AT THE TIME OF FINAL PUNCH LIST, (3) ELECTRICIANS SHALL BE PRESENT TO ASSIST IN THE REMOVAL OF PANEL COVERS, JUNCTION BOX COVERS, RECEPTACLES, SWITCHES, AND OTHER ELECTRICAL DEVICES.

(END OF PART 1)

PART 2 ELECTRICAL WORK

2.1 BUILDING OPERATION

A. COMPLY WITH THE SCHEDULE OF OPERATIONS AS OUTLINED IN THE ARCHITECTURAL PORTIONS OF THIS SPECIFICATION. BUILDING FACILITY SHALL BE MAINTAINED IN CONTINUOUS OPERATION. ACCOMPLISH WORK THAT REQUIRES INTERRUPTION OF BUILDING AND BUILDING TENANT OPERATIONS AT A TIME WHEN THE BUILDING IS NOT IN OPERATION, AND ONLY WITH WRITTEN APPROVAL OF BUILDING OWNER AND/OR AFFECTED TENANT(S). COORDINATE INTERRUPTION OF BUILDING OPERATION WITH THE OWNER AND/OR TENANT(S) A MINIMUM OF DAYS IN ADVANCE OF WORK

2.2 COINCIDENTAL DAMAGE

A. REPAIR ALL STREETS, SIDEWALKS, DRIVES, PAVING, WALLS, FLOORING, FINISHES, AND OTHER FACILITIES DAMAGED IN THE COURSE OF THIS WORK. REPAIR MATERIALS SHALL MATCH EXISTING CONSTRUCTION. ALL BACKFILLING AND REPAIRING SHALL MEET ALL REQUIREMENTS OF THE OWNER, CITY AND OTHERS HAVING JURISDICTION. REPAIR WORK SHALL BE FIRST CLASS UTILIZING THE BEST MATERIALS AND TRADESMEN TO PERFORM ALL NECESSARY REPAIR WORK. CONFORM TO ALL REQUIREMENTS OF DIVISION 2 OF THESE SPECIFICATIONS.

2.3 CUTTING AND PATCHING

A. FOLLOWING THE REQUIREMENTS IN DIVISION 1, CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO PERFORM WORK UNDER THIS DIVISION. OBTAIN PERMISSION OF THE ARCHITECT, OWNER, AND OWNER'S DESIGNATED STRUCTURAL ENGINEER BEFORE DOING ANY CUTTING. CUT ALL HOLES AS SMALL AS POSSIBLE. PATCH WALLS, FLOORS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED BY WORK UNDER THIS DIVISION. ALL PATCHING SHALL BE FIRST CLASS AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION. PATCH IN FIRE RATINGS IF APPLICABLE. DO NOT CUT OR PENETRATE MATERIAL AND CONSTRUCTION, INCLUDING FIRE RATINGS. DO NOT CUT OR PENETRATE STRUCTURAL ELEMENTS.
B. BEFORE ANY NEW FLOOR CORES ARE MADE, PROVIDE A LETTER FROM THE BUILDING OWNER'S STRUCTURAL ENGINEER APPROVING THE LOCATION OF EACH NEW FLOOR CORE. THE LETTER SHALL ADDRESS CORES FOR FOR CONDUIT AND POKE-THRUS. WHERE A LETTER IS NOT SUPPLIED TO THE ENGINEER AND ARCHITECT OF RECORD BEFORE ANY FLOOR CORES ARE MADE, THE CONTRACTOR ASSUMES ALL LIABILITY FOR ANY AND ALL ISSUES THAT MAY OR COULD ARISE FROM CORING THE FLOOR.

2.4 ROUGH-IN

A. COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH OTHER DIVISIONS. CONCEAL ALL RACEWAYS EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE INDICATED ON THE DRAWINGS.

2.5 SUPPORT SYSTEMS

A. STEEL SLOTTED SUPPORT SYSTEMS (SLOTTED CHANNEL): COMPLY WITH MFMA-3, FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY; 12-GAUGE, 1-5/8-INCH BY 1-5/8-INCH; COOPER B-LINE, ERICO INTERNATIONAL CORPORATION, POWER-STRUT, THOMAS & BETTS CORPORATION, UNISTRUT.
B. FINISHES:
   1. METALLIC COATINGS: HOT-DIP GALVANIZED AFTER FABRICATION AND APPLIED ACCORDING TO MFMA-3
   2. NONMETALLIC COATINGS: MANUFACTURER'S STANDARD PVC, POLYURETHANE OR POLYESTER COATING APPLIED ACCORDING TO MFMA-3.
   3. PAINTED COATINGS: MANUFACTURER'S STANDARD PAINTED COATING APPLIED ACCORDING TO MFMA-3.
   4. STAINLESS STEEL: TYPE 304, PER ASTM A240.
   5. ALUMINUM (EXTRUDED): TYPE 6063-T6, PER ASTM B221.
C. FIELD FABRICATION:
   1. WHERE FIELD CUTTING OF STANDARD LENGTHS OF CHANNEL ARE REQUIRED, MAKE CUTS STRAIGHT AND PERPENDICULAR TO MANUFACTURED SURFACES.
   2. FOR FIELD-CUT OR DAMAGED SURFACES OF COATED CHANNELS, DRESS CUT ENDS, DAMAGED SURFACES, OR BOTH, WITH AN ABRASIVE MATERIAL (E.G., FILE, GRINDING STONE, OR SIMILAR) AND CLEANSER TO REMOVE OILS, RUST, SHARP EDGES AND SHARDS.
   3. FOR CHANNEL WITH A FACTORY-APPLIED COATING, RE-FINISH CUT EDGES WITH A COATING PRODUCT COMPATIBLE WITH THE FACTORY FINISH AND AS RECOMMENDED BY THE MANUFACTURER (E.G., MANUFACTURER'S TOUCH-UP PAINT OR ZINC-RICH COLD-GALVANIZING COMPOUND, AS APPLICABLE).

2.6 PENETRATIONS

A. COORDINATE SLEEVE SELECTION AND APPLICATION WITH SELECTION AND APPLICATION OF FIRE-STOPPING MATERIALS. MAINTAIN FIRE AND UL RATING OF WALL AND FLOOR TYPE.
B. WALLS AND FLOORS:
   1. SLEEVES FOR RACEWAYS AND CABLES:
   2. STEEL PIPE SLEEVES: ASTM A 53/A 53M, TYPE E, GRADE B, SCHEDULE 40, GALVANIZED STEEL, PLAIN ENDS AND DRIP RINGS.
   3. CAST-IRON PIPE SLEEVES: CAST OR FABRICATED "WALL PIPE," EQUIVALENT TO DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED.
   4. SLEEVES FOR RECTANGULAR OPENINGS: GALVANIZED SHEET STEEL WITH MINIMUM 0.052-INCH THICKNESS AS INDICATED AND OF LENGTH TO SUIT APPLICATION.

2.7 FIRE STOPPING FLOOR AND WALL PENETRATIONS

A. FIRE RESISTANT PENETRATION SEALANTS: TWO PART, FOAMED IN PLACE, SILICONE SEALANT FORMULATED FOR USE IN THROUGH PENETRATION FIRE STOPPING AROUND ELECTRICAL RACEWAYS AND CABLE TRAY PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS. SEALANTS AND ACCESSORIES SHALL HAVE FIRE RESISTANCE RATINGS INDICATED, AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH ASTM E 814, BY UNDERWRITERS' LABORATORIES, INC., OR OTHER NRTL ACCEPTABLE TO AHJ.
B. PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
   1. "3M FIRE STOP FOAM #2001,"3M CORP.
   2. "METACAULK 835+," RECTORSEAL.
   3. "SPECSEAL PENSIL 200 SILICONE FOAM," SPECIFY TECHNOLOGY INC.
   4. "FIRE STOP SYSTEM," UNITED STATES GYPSUM COMPANY.

2.8 ACCESS DOORS

A. PROVIDE ACCESS DOORS IN CEILINGS AND WALLS, WHERE INDICATED OR REQUIRED FOR ACCESS OR MAINTENANCE TO CONCEALED EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, AND ANCHOR STRAPS. MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE ORDERING.

2.9 EQUIPMENT FURNISHED BY OTHERS

A. PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE EQUIPMENT SUPPLIER OR OWNER TO COMPLETE INSTALLATION OF EQUIPMENT FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS, SPECIFIED HEREIN, OR BOTH. EQUIPMENT AND ACCESSORIES NOT PROVIDED BY THE EQUIPMENT SUPPLIER MAY INCLUDE SUCH ITEMS AS FLEXIBLE CORDS AND PLUGS, AS REQUIRED FOR PROPER OPERATION OF THE COMPLETE SYSTEM, IN ACCORDANCE WITH THE MANUFACTURERS'

4.1.5 INSTALLATION OF CONDUCTORS AND CABLES

G. WHEN MULTIPLE HOME RUNS ARE COMBINED INTO A SINGLE RACEWAY SUCH THAT THE NUMBER OF CONDUCTORS EXCEEDS FOUR (CONDUCTOR COUNT IS MADE UP OF ANY COMBINATION OF PHASE AND NEUTRAL CONDUCTORS), THE FOLLOWING RESTRICTIONS APPLY, WHICH ARE IN ADDITION TO THOSE IN NFPA 70:
   1. EMERGENCY POWER CIRCUITS - INCLUDES ALL CIRCUITS COVERED UNDER ARTICLES 700, 701 AND 702.
   2. MAXIMUM OF 16 CONDUCTORS IN A SINGLE RACEWAY. FOR UP TO EIGHT CONDUCTORS IN A RACEWAY, MINIMUM RACEWAY SIZE: 3/4-INCH. FOR GREATER THAN EIGHT CONDUCTORS, MINIMUM RACEWAY SIZE: 1- INCH. DO NOT INSTALL ANY OTHER TYPE OF CIRCUIT IN THIS RACEWAY.
   3. THE MINIMUM WIRE SIZE FOR ALL CONDUCTORS IN THIS RACEWAY: NO. 10 AWG.
   4. ONLY 15A AND 20A BRANCH CIRCUIT HOMERUNS MAY BE COMBINED INTO ONE RACEWAY.
   5. GFCI CIRCUITS:
      A. DO NOT USE MULTI-CONDUCTOR CIRCUITS, WITH A SHARED NEUTRAL, FOR ANY GFCI CIRCUIT BREAKER OR RECEPTACLE CIRCUIT.

H. FOR BRANCH CIRCUITS FED FROM GFCI CIRCUIT BREAKERS, LIMIT THE ONE-WAY CONDUCTOR LENGTH TO 100 FEET BETWEEN THE PANELBOARD AND THE MOST REMOTE RECEPTACLE OR LOAD ON THE GFCI CIRCUIT.

I. WIRING SHALL HAVE INSULATION OF THE PROPER COLOR TO MATCH COLOR CODE SYSTEM IN THE TABLE BELOW. IN LARGER SIZES, WHERE PROPERLY COLORED INSULATION IS NOT AVAILABLE, USE VINYL PLASTIC ELECTRICAL TAPE OF THE APPROPRIATE COLOR AROUND EACH CONDUCTOR AT ALL TERMINATION POINTS, JUNCTION AND PULL BOXES.

REFERENCE TABLE 1 FOR SYSTEM VOLTAGE TABLE 1 (4-1-5-9)

SYSTEM VOLTAGE	CONDUCTOR TYPE	COLOR
120/240	PHASE A PHASE B NEAUTRAL EQUIPMENT GROUND	BLACK RED WHITE GREEN
240Δ/120	PHASE A PHASE B (HIGH LEG) PHASE C NEUTRAL EQUIPMENT GROUND ISOLATED GROUND	BLACK ORANGE RED WHITE GREEN GN W/ YELLOW STRIPE
208Y/120	PHASE A PHASE B PHASE C NEUTRAL EQUIPMENT GROUND ISOLATED GROUND	BLACK RED BLUE WHITE GREEN GN W/ YELLOW STRIPE
480Y/277	PHASE A PHASE B PHASE C NEUTRAL EQUIPMENT GROUND	BROWN ORANGE YELLOW GRAY GREEN

J. PROPERLY IDENTIFY ALL TERMINAL BLOCKS AND WIRE TERMINALS FOR CONTROL WIRING WITH VINYL STICK-ON MARKERS OR EQUIVALENT. PROVIDE ENGINEER WITH A LIST OF PROPOSED IDENTIFYING NUMBERS FOR REVIEW PRIOR TO INSTALLING MARKERS.

K. PROVIDE AN EQUIPMENT-GROUNDING CONDUCTOR, OR BONDING JUMPER, AS APPLICABLE, IN ALL BRANCH CIRCUITS AND FEEDERS, SIZED IN ACCORDANCE WITH NFPA 70 TABLES 250.66 OR 250.122, AS APPLICABLE, UNLESS INDICATED AS LARGER ON THE DRAWINGS.

L. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 2 PERCENT.

4.1.6 JUNCTION BOXES, PULL, BOXES, CABINETS, AND WIREWAYS

A. PROVIDE JUNCTION BOXES, PULL BOXES, CABINETS AND WIREWAYS WHEREVER NECESSARY FOR PROPER INSTALLATION OF VARIOUS ELECTRICAL SYSTEMS ACCORDING TO NFPA 70 AND WHERE INDICATED ON THE DRAWINGS. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY NFPA 70, WHICHEVER IS LARGER. CONSTRUCTION SHALL BE OF A NEMA DESIGN SUITABLE FOR THE ENVIRONMENT INSTALLED. INSTALL ENGRAVED NAMEPLATES ON ALL J-BOXES, PULL BOXES, CABINETS AND WIREWAYS THAT PROVIDE NAME OF CIRCUITS EITHER TERMINATED, SPLICED, OR PASSING THRU AND THE NAME OF THE PANELBOARD THE CIRCUITS ORIGINATE.

4.1.7 UTLET BOXES

A. ALL OUTLETS INCLUDING LIGHT FIXTURE, SWITCH, RECEPTACLE, AND SIMILAR OUTLETS: NATIONAL ELECTRICAL, APPLETON, STEEL CITY, RACO, OR APPROVED EQUAL, GALVANIZED STEEL KNOCKOUT BOXES, SUITABLE IN DESIGN TO THE PURPOSE THEY SERVE AND THE SPACE THEY OCCUPY. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY NFPA 70, WHICHEVER IS LARGER. SET ALL OUTLET BOXES IN WALLS, COLUMNS, FLOORS, OR CEILINGS SO THEY ARE FLUSH WITH THE FINISHED SURFACE, ACCURATELY SET, AND RIGIDLY SECURED IN POSITION. PROVIDE PLASTER RINGS, EXTENSION RINGS AND/OR MASONRY RINGS AS REQUIRED FOR FLUSH MOUNTING. PROVIDE APPROVED CAST OUTLET BOXES, WITH HUBS AND WEATHERPROOF COVERS, IN ALL AREAS SUBJECT TO DAMP, WET, OR HARSH CONDITIONS.

B. EACH OUTLET AND/OR FIXTURE SHALL BE PROVIDED WITH 4 INCH SQUARE DEEP OUTLET BOX WITH APPROPRIATE COVER AND WIRING TO SUIT FIELD CONDITIONS.

C. ELECTRICAL MATERIALS USED ON THIS PROJECT SHALL BE UL LISTED AND LABEL.

4.1.8 OUTLET LOCATIONS

A. COORDINATE LOCATIONS OF OUTLET BOXES. OUTLETS ARE ONLY APPROXIMATELY LOCATED ON THE SMALL SCALE DRAWINGS. USE GREAT CARE IN THE ACTUAL LOCATION BY CONSULTING THE VARIOUS LARGE SCALE DETAILED DRAWINGS USED BY OTHER DIVISION TRADES, AND BY SECURING DEFINITE LOCATIONS FROM THE ARCHITECT.

4.1.9 MOUNTING HEIGHTS

A. UNLESS OTHERWISE NOTED, INSTALL WIRING DEVICES AS INDICATED BELOW (NOTE: ALL DIMENSIONS ARE TO THE BOTTOM OF THE OUTLET BOX UNLESS OTHERWISE NOTED):
   1. RECEPTACLES:
      A. GENERAL
         A. VERTICALLY WITH THE GROUND SLOT MOUNTED AT THE TOP: 16 INCHES ABOVE FINISHED FLOOR.
         B. HORIZONTALLY, WITH NEUTRAL SLOT MOUNTED AT THE TOP: 16 INCHES ABOVE FINISHED FLOOR.
      B. ABOVE COUNTERS
         A. FOR 36-INCH HIGH COUNTER TOPS: 44 INCHES ABOVE FINISHED FLOOR, VERTICALLY.
         B. FOR 34-INCH HIGH COUNTER TOPS: 40 INCHES ABOVE FINISHED FLOOR, VERTICALLY.
      C. MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS AND JANITORS CLOSETS: 44 INCHES ABOVE FINISHED FLOOR, VERTICALLY.
      D. WEATHERPROOF EXTERIOR RECEPTACLES: 24 INCHES ABOVE FINISHED GRADE OR ROOF, OR AS INDICATED ON DRAWINGS, VERTICALLY.
      E. GFCI RECEPTACLES: SAME AS GENERAL RECEPTACLES.
      F. ISOLATED GROUND RECEPTACLES: SAME AS GENERAL.
      G. CONCRETE BLOCK WALLS: DIMENSIONS ABOVE MAY BE ADJUSTED SLIGHTLY, AS REQUIRED TO COMPENSATE FOR VARIABLE JOINT DIMENSIONS, SUCH THAT BOTTOM OR TOP OF BOXES, AS APPLICABLE, ARE AT BLOCK JOINTS.

4.1.10 WIRING DEVICES

A. PROVIDE THE FOLLOWING WIRING DEVICES WHERE SHOWN ON DRAWINGS OR REQUIRED. MINOR CHANGES RELATIVE TO THE LOCATION OF ELECTRICAL EQUIPMENT MAY BE MADE TO COMPLY WITH STRUCTURAL AND BUILDING REQUIREMENTS AS DETERMINED IN THE COURSE OF CONSTRUCTION. PROVIDE ALL WIRING DEVICES OF THE SAME MANUFACTURER AND NOT MIXED ON THE PROJECT, TO THE MAXIMUM EXTENT POSSIBLE. PROVIDE COLOR OF TOGGLES AND RECEPTACLES AS REQUESTED BY THE ARCHITECT: REFER TO TABLE 2 SHOWING RECEPTACLES TABLE.

TABLE 2 (4-1-10)

TYPE OF DEVICE	HUBBELL	PASS & SEYMOUR	LEVITON	COOPER
SIMPLEX REC.	HBL-2161-I	2624I-I	5891	5351
DUPLEX REC.	HBL-2162-I	5362WSR	5352	5352
GFCI REC.	GF5362	2091	6898/6598	XGF20
ISOLATED GROUND REC.	IG5362	IG6300	8300-IG	IG5362
QUAD/4-PLEX	HBL-420	420	2125/4	NA
CLOCK REC.	HBL-5235	S3733-SS (15A)	5361-CH	93632 (15A)
SINGLE POLE SWITCH	CS1221	PS 20 AC1	1221-2	2221
THREE-WAY SWITCH	CS1223	PS 20 AC3	1223-2	2223
FOUR-WAY SWITCH	CS1224	PS 20 AC4	1224-2	2224
PILOT LIGHT SWITCH	HBL-1221PL	PS20 AC1-RPL	1221-(7)PLR	2221PL
KEY SWITCH	HBL-1221L	PS20 AC1-L	1221-2L	2221L
WALL-BOX DIMMER (1.5KW), SP3W, INCAND	AS153	PS20 AC1-RPL	81500-3	NA
MOMENTARY SPDT, CENTER OFF SWITCH	HBL-1557	1251	1257	1995

4.1.11 SWITCH AND OUTLET COVER PLATES

A. SWITCH AND OUTLET PLATES: COLORED, SMOOTH NYLON; BY THE SAME MANUFACTURER AS THE WIRING DEVICES, WHERE EVER POSSIBLE. VERIFY SPECIFIED MATERIALS AND COLORS WITH ARCHITECT BEFORE INSTALLATION INSTALLATION. SWITCH PLATES IN UNFINISHED ROOMS AND SPACES: STAMPED STEEL, CADMIUM PLATED. INSTALL GROUPS OF SWITCHES UNDER ONE GANGED-PLATE, USUALLY HORIZONTALLY; OR, WHERE REQUIRED BY DETAILS, VERTICALLY. SET ALL COVER PLATES PLUMB, PARALLEL, AND FINISHED FLUSH WITH THE WALL.

4.1.12 WEATHERPROOF COVER PLATES

A. PROVIDE GFCI RECEPTACLES FOR DESIGNATED WEATHERPROOF RECEPTACLES, UNLESS INDICATED OTHERWISE ON THE DRAWINGS.

B. FOR UNATTENDED, WET LOCATIONS: IN-USE NEMA 3R, UL-LABELED PLATES MOLDED FROM A CLEAR HIGH IMPACT ULTRAVIOLET STABILIZED POLYCARBONATE MATERIAL FOR EASY VERIFICATION THAT CORDS ARE PLUGGED IN AND THAT THE GFCI IS FUNCTIONING.

C. COVER PLATES: BY THE SAME MANUFACTURER AS THE WIRING DEVICES; COMPLYING WITH NFPA 70 406.8 (A) OR (B) REQUIREMENTS FOR ATTENDED OR UNATTENDED USE AS APPLICABLE.

4.2 ELECTRICAL SERVICE AND GROUNDING

4.2.1 CONNECTION TO SERVING UTILITIES

A. PROVIDE RACEWAYS, TERMINATIONS, METERING PROVISIONS, AND MISCELLANEOUS EQUIPMENT, AS REQUIRED, FOR ELECTRICAL AND TELEPHONE SERVICES FOR CONNECTION BY THE SERVING UTILITY, IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF ALL APPLICABLE CODES AND OF THE SERVING UTILITY INVOLVED. VERIFY ALL SERVICE TERMINATIONS AND CONNECTION POINTS IN THE FIELD AND WORK IN CONJUNCTION WITH THE UTILITY INVOLVED IN THE INSTALLATION OF ALL SERVICES. PROVIDE ALL MATERIALS AND EQUIPMENT REQUIRED FOR COMPLETE UTILITY CONNECTION BUT NOT FURNISHED BY THE SERVING UTILITY. NOTIFY THE UTILITY COMPANIES INVOLVED WITHIN TWO WEEKS AFTER NOTICE TO PROCEED, OF ALL REQUIRED INFORMATION NECESSARY FOR THE UTILITY TO SUPPLY THE PROJECT WITHOUT DELAY. PAY ALL CHARGES OF THE SERVING UTILITY FOR THE ELECTRICAL SERVICE(S).

4.2.2 GROUNDING

A. PERMANENTLY AND EFFECTIVELY GROUND AND BOND THE ELECTRICAL INSTALLATION IN A THOROUGH AND EFFICIENT MANNER, AND IN CONFORMANCE, AT A MINIMUM, WITH NFPA 70, OR THESE DOCUMENTS, WHERE THEY EXCEED CODE REQUIREMENTS. USE BARE OR INSULATED CONDUCTORS, AS SPECIFIED HEREIN, AND OTHER MATERIALS INDICATED ON THE DRAWINGS.

4.3 DISTRIBUTION AND CONTROL EQUIPMENT

4.3.1 LIGHTING AND APPLIANCE PANELBOARDS

A. PANELBOARDS: SQUARE D TYPE NQOD (FOR 240/208Y SERVICE) OR NF (FOR 480V SERVICE) OR APPROVED EQUAL BY SIEMENS, CUTLER HAMMER, OR ABB - GENERAL ELECTRIC, AS SCHEDULED ON THE DRAWINGS; COMPLETE WITH BOLT-ON THERMAL MAGNETIC, MOLDED CASE CIRCUIT BREAKERS ASSEMBLED IN A DEAD-FRONT FINISHED CABINET CONTAINING A TYPEWRITTEN CARD DIRECTORY INDICATING EXACTLY WHAT EACH CIRCUIT BREAKER CONTROLS; FULLY-RATED OR SERIES-RATED AND WITH THE INTEGRATED SHORT CIRCUIT CURRENT RATINGS INDICATED ON THE DRAWINGS. PLUG-IN TYPE BREAKERS WILL NOT BE ACCEPTABLE. ALL TWO AND THREE POLE BREAKERS: COMMON TRIP TYPE. BREAKERS USED AS SWITCHES FOR 120V OR 277V LIGHTING CIRCUITS: APPROVED FOR THE PURPOSE AND MARKED "SWD". BREAKERS USED FOR THE PROTECTION OF HVAC AND REFRIGERATION EQUIPMENT: HACR TYPE. PANELBOARDS SHALL HAVE DOOR-IN-DOOR COVERS, TIN PLATED COPPER BUSES, AND FEED THRU LUGS.

4.3.2 CIRCUIT BREAKERS IN EXISTING PANELBOARDS

A. PROVIDE NEW CIRCUIT BREAKERS, FOR INSTALLATION IN EXISTING PANELBOARDS OF THE SAME MANUFACTURER, TYPE AND SHORT CIRCUIT CURRENT INTERRUPTING RATINGS AS THE EXISTING PANELBOARD CIRCUIT BREAKERS.

4.3.3 SERIES RATINGS ON PANELBOARDS

A. LABEL PANELBOARDS WITH A UL INTEGRATED SHORT CIRCUIT CURRENT RATING. WHEN SERIES RATINGS ARE APPLIED WITH INTEGRAL OR REMOTE UPSTREAM DEVICES, PROVIDE LABELS COMPLYING WITH NFPA 70 ARTICLES 240.86 AND 110.22. IN ADDITION TO THE WARNING LABEL, INCLUDE, AT A MINIMUM, THE FOLLOWING CONDITIONS OF THE UL 67 SERIES RATINGS:
   1. SIZE AND TYPE OF UPSTREAM DEVICE.
   2. BRANCH DEVICES THAT CAN BE USED.
   3. UL SERIES SHORT CIRCUIT CURRENT RATING.
   4. WHEN THERE IS NOT ENOUGH ROOM IN THE EQUIPMENT TO SHOW ALL THE LEGITIMATE SERIES RATED COMBINATIONS, REFERENCE A BULLETIN SUPPLIED WITH THE PANELBOARD, PER UL 67.
   5. SERIES RATINGS SHALL COVER ALL TRIP RATINGS OF INSTALLED FRAMES.

4.3.4 DISCONNECT (SAFETY) SWITCHES

A. DISCONNECT (SAFETY) SWITCHES: SQUARE D, SIEMENS, CUTLER HAMMER, OR ABB - GENERAL ELECTRIC FUSED OR NON-FUSED (AS INDICATED ON DRAWINGS OR REQUIRED) NEMA KS1, HEAVY DUTY, EXTERNALLY OPERATED, VISIBLE-BLADE SAFETY SWITCHES; NEMA ENCLOSURE TYPE INDICATED ON THE DRAWINGS OR SUITABLE FOR THE ENVIRONMENT IN WHICH INSTALLED. BASED ON FUSIBLE SWITCH AND FUSE SIZES INDICATED, INCLUDE CLASS R, J, OR L FUSE PROVISIONS AS APPLICABLE.

B. WHERE INDICATED, PROVIDE FUSIBLE SWITCHES PERMANENTLY LABELED AS SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT, WITH INTEGRAL AND SEPARATE NEUTRAL AND GROUND ASSEMBLIES, SUITABLE FOR THE SIZES OF CONDUCTORS INDICATED. DO NOT DOUBLE-LUG ANY TERMINATIONS NOT SPECIFICALLY LISTED AS SUITABLE FOR MORE THAN ONE CONDUCTOR.

C. PROVIDE SWITCHES WHERE NOT FURNISHED WITH THE STARTING EQUIPMENT, AT ALL OTHER POINTS REQUIRED BY NFPA 70, AND WHERE INDICATED ON THE DRAWINGS.

4.3.5 FUSES

A. PROVIDE EACH CIRCUIT AND SET OF FUSE CLIPS THROUGHOUT THE WORK WITH BUSSMANN, FERRAZ SHAWMUT, OR LITTLEFUSE FUSES, SIZES AND TYPES AS REQUIRED OR INDICATED. ALL FUSES LARGER THAN 600A: UL CLASS L, SIMILAR TO TYPE KRP-C BUSSMANN LOW PEAK OR EQUAL. FUSES USED TO PROTECT MOTORS: UL CLASS RK5, BUSSMANN FUSETRON OR EQUAL. FUSES USED TO PROTECT ALL OTHER ELECTRICAL EQUIPMENT: UL CLASS RK1, DUAL ELEMENT, BUSSMAN LPS/LPN OR EQUAL. ALL FUSED DEVICES SHALL BE LABELED AS TO TYPE AND SIZE OF FUSE REQUIRED.

4.3.6 DRY-TYPE TRANSFORMERS

A. TRANSFORMERS: GENERAL PURPOSE, UL-LISTED/LABELED 150 DEGREES C TEMPERATURE RISE ABOVE 40 DEGREES C AMBIENT. INSULATING MATERIALS: EXCEED NEMA ST-020 STANDARDS, RATED FOR 220 DEGREES C, UL-COMPONENT RECOGNIZED INSULATION SYSTEM. PHASES, VOLTAGES, AND SIZES: AS INDICATED ON THE DRAWINGS. SOUND LEVEL: NOT EXCEEDING NEMA STANDARDS FOR THE SIZES INDICATED. FULL- CAPACITY PRIMARY TAPS: BELOW 25 KVA - MINIMUM OF TWO 5 PERCENT (2-); 25 KVA TO 300 KVA - MINIMUM OF SIX 2.5 PERCENT (2+, 4-); ABOVE 300 KVA - FOUR 2.5 PERCENT (2+, 2-). TRANSFORMER CORE AND COIL ASSEMBLIES: MOUNTED ON INTEGRAL VIBRATION-ABSORBING PADS. MAKE FINAL CONDUIT CONNECTIONS TO TRANSFORMERS WITH FLEXIBLE CONDUIT, WITH AT LEAST 6 INCHES OF SLACK IN ALL DIRECTIONS. TRANSFORMER ENCLOSURES: FULLY ENCLOSED (EXCEPT FOR VENTILATION OPENINGS), NEMA 2, DRIP-PROOF, FABRICATED OF HEAVY GAUGE SHEET STEEL CONSTRUCTION. WINDING SHALL BE MADE OF COPPER.

B. ENERGY-EFFICIENT TRANSFORMERS: COMPLYING WITH NEMA TP-1, WHEN TESTED IN ACCORDANCE WITH NEMA TP-2. PROVIDE ENERGY-EFFICIENT TRANSFORMERS WHEN REQUIRED BY LOCAL CODE.

C. MANUFACTURERS: SQUARE D, ABB - GENERAL ELECTRIC, ACME, SIEMENS.

4.4 LIGHT FIXTURES, LAMPS AND BALLASTS

4.4.1 LIGHT FIXTURE LOCATIONS

A. LIGHT FIXTURES SHOWN ON THE ELECTRICAL DRAWINGS REPRESENT GENERAL ARRANGEMENTS ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR MORE EXACT LOCATIONS. COORDINATE LOCATION WITH ALL OTHER TRADES BEFORE INSTALLATION TO AVOID CONFLICTS. COORDINATE LIGHT FIXTURE LOCATIONS IN MECHANICAL ROOMS WITH FINAL INSTALLED PIPING AND DUCTWORK LAYOUTS.

4.4.2 LIGHT FIXTURES

A. LIGHT FIXTURES FURNISHED BY OWNER WHERE INDICATED ON SCHEDULE. COMPLY WITH ALL NOTES AND SPECIFICATION AS INDICATED IN SCHEDULE. INSTALL AND PROVIDE AS NEEDED ALL LIGHT FIXTURES AS SCHEDULED ON DRAWINGS, INCLUDING ALL LAMPS, ALL NECESSARY ACCESSORIES, MATERIAL AND LABOR TO SECURELY HANG, CLEAN, AND MAKE LIGHT FIXTURES COMPLETELY READY FOR USE. LIGHT FIXTURE MODEL NUMBERS SCHEDULED ON THE DRAWINGS SHOW ONLY THE MANUFACTURER, GRADE AND STYLE OF LIGHT FIXTURES REQUIRED. PROVIDE: ALL HANGERS, SUPPORTS, AND MISCELLANEOUS HARDWARE REQUIRED TO INSTALL LIGHT FIXTURES; PROPER TRIM TO FIT EACH CEILING CONDITION ACTUALLY ENCOUNTERED; ADDITIONAL TIE WIRES CONNECTED TO STRUCTURE TO CONFORM TO SEISMIC REQUIREMENTS AND WHERE REQUIRED BY THE APPLICABLE BUILDING CODE.

B. ONLY THOSE FIXTURES LISTED IN THE LIGHT FIXTURE SCHEDULE, OR APPROVED IN ACCORDANCE WITH SUBSTITUTIONS OF THESE SPECIFICATIONS, WILL BE ACCEPTED UNLESS FIXTURE IS SUPPLIED BY OWNER. WHERE THE LIGHT FIXTURE SCHEDULE INDICATES AN ALLOWANCE FOR A SPECIFIC LIGHT FIXTURE, THE PRICE IS A CONTRACTOR PRICE. INCLUDE ALL ADDITIONAL COSTS FOR FREIGHT, LAMPS, AND INSTALLATION OF LIGHT FIXTURE AND LAMPS.

C. SURFACE-MOUNT ALL FLUORESCENT LIGHT FIXTURES LOCATED IN AREAS WITHOUT SUSPENDED CEILINGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

D. INSTALL FLUORESCENT LIGHT FIXTURES HUNG IN CONTINUOUS ROWS ON CHANNEL STRUTS SPECIFICALLY DESIGNED FOR THIS PURPOSE.

E. INSTALL ALL FLUORESCENT LIGHT FIXTURES LOCATED IN AREAS WITHOUT CEILINGS IMMEDIATELY BELOW THE ROOF-FRAMING MEMBERS, OR SUSPENDED FROM CHAIN HANGERS SUITABLE IN LENGTH TO PROVIDE THE INDICATED MOUNTING HEIGHT. HANGERS: "HYDEE" HANGER TYPE FOR OUTLET BOX MOUNTING, COMPLETE WITH GROUNDING RECEPTACLE, PLUG, 3-WIRE CORD AND NECESSARY CHAIN.

F. THROUGH WIRING OF RECESSED LIGHT FIXTURES, IN SUSPENDED CEILINGS, IS NOT PERMITTED. CONNECT EACH LIGHT FIXTURE BY A WHIP TO A JUNCTION BOX. THE WHIP SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE LIGHT FIXTURE TO BE RELOCATED WITHIN A 6-FOOT RADIUS.

4.4.3 LAMPS

A. PROVIDE LAMPS AS INDICATED ON THE DRAWINGS FOR ALL LIGHT FIXTURES UNLESS PROVIDED BY OWNER; OR, IF NOT INDICATED, PROVIDE LAMPS AS RECOMMENDED BY THE LIGHT FIXTURE MANUFACTURER. IN ALL CASES, LAMPS SHALL BE COMPATIBLE WITH THE SPECIFIED LIGHT FIXTURE. ACCEPTABLE LAMP MANUFACTURERS: ABB - GENERAL ELECTRIC, OSRAM/SYLVANIA, PHILIPS, OR VENTURE.

B. ALL FLUORESCENT LAMPS SHALL BE MINIMUM OF 3500 DEGREES K, WITH A MINIMUM COLOR-RENDERING INDEX OF 70, UNLESS NOTED OR DIRECTED OTHERWISE. ALL FLUORESCENT LAMPS IN SALES AREAS SHALL BE 3000 DEGREES K WITH A COLOR-RENDERING INDEX OF 80. ALL METAL HALIDE LAMPS IN SALES AREAS SHALL BE COATED, 3000 DEGREES K WITH A COLOR-RENDERING INDEX OF 70.

C. INCANDESCENT LAMPS: TYPE AND WATTAGE AS SHOWN ON THE DRAWINGS; RATED 130V UNLESS OTHERWISE SCHEDULED OR SPECIFIED.

4.5 MISCELLANEOUS ELECTRICAL

4.5.1 TELEPHONE SYSTEM PROVISIONS

A. PROVIDE INCOMING TELEPHONE SERVICE RACEWAYS AS INDICATED ON DRAWINGS OR AS REQUIRED BY THE SERVING TELEPHONE COMPANY. PROVIDE 3/4-INCH THICK PLYWOOD BOARD, FIRE RETARDANT TREATED AND STAMPED FRT, SECURELY ANCHORED TO THE WALL AT THE LOCATION AND OF THE SIZE AS INDICATED ON THE DRAWINGS. PROVIDE FLUSH MOUNTED TELEPHONE OUTLET BOXES WITH 1-INCH EMT STUB-UP CONCEALED TO ACCESSIBLE CEILING SPACE AT LOCATIONS AS INDICATED ON THE DRAWINGS.

4.5.2 DATA SYSTEM

A. PROVISIONS PROVIDE FLUSH MOUNTED DATA OUTLET BOXES WITH 1-INCH CONDUIT STUB-UP CONCEALED TO ACCESSIBLE CEILING SPACE AT LOCATIONS AS INDICATED ON THE DRAWINGS. INSTALL A PULL STRING IN THE CONDUIT.

4.5.3 TIME SWITCHES

A. TIME SWITCHES: MECHANICAL TYPE, WITH MANUAL BYPASS SWITCH, NEMA ENCLOSURE SUITABLE FOR THE ENVIRONMENT INSTALLED; NUMBER AND TYPES OF CONTACTS, SEQUENCE, AND VOLTAGE AS INDICATED ON THE DRAWINGS, OR AS REQUIRED, BASED ON THE TIME SWITCH FUNCTION AND THE NUMBER OF BRANCH CIRCUITS OR CONTRACTORS CONTROLLED. PROVIDE WIRING TO PHOTOCELLS, CONTRACTORS, RELAYS OR OTHER CONTROL POINTS AS REQUIRED. MANUFACTURERS: INTERMATIC, PARAGON OR TORK.

4.5.4 MISCELLANEOUS EQUIPMENT AND CONNECTIONS

A. PROVIDE WIRING AND CONNECTIONS TO ILLUMINATED CASES.

B. ALL WIRING AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS.

C. ALL RACEWAYS, AND ALL WIRING AND CONNECTIONS OF DEVICES TO ENERGY MANAGEMENT SYSTEM THAT ARE NOT THE RESPONSIBILITY OF DIVISION 15.

4.5.5 SEISMIC PROTECTION

A. SEISMIC PROTECTION OF LIGHT FIXTURES, AND RACEWAYS, PANELBOARDS AND SWITCHGEAR SHALL MEET REQUIREMENTS OF LOCAL CODE IN EFFECT.

(END OF PART 4)

WOLF ENGINEERING

P.O. BOX 38 | DALTON, GA 30722

PROJECT NAME:

GUZMAN Y GOMEZ MEXICAN KITCHEN

844 ILLINOIS ROUTE 59
NAPERVILLE, IL
DUPAGE COUNTY

SEAL:

EXPIRES 11/30/2025
05/14/2025

NO	DATE	DESCRIPTION
	03/19/2025	ISSUED FOR PERMIT

DRAWING TITLE:

ELECTRICAL - SPECIFICATIONS

PROJ. NO: 20250064.0
DRAWN BY: YA
CHECKED BY: EW

SHEET NO:

E003

RELEASED FOR CONSTRUCTION

LIGHT FIXTURE SCHEDULE

ID	MANUFACTURER	MODEL NUMBER	LAMP	VOLTS	LUMENS	WATTS	LLF	DESCRIPTION	REMARKS
T2	LITHONIA LIGHTING	DSX1 LED P6 40K 80CRI T2M HS EGS-F	LED	120	10579	165	0.8	LED AREA LIGHT WITH ONE TYPE II HEAD, MOUNTED ON A 22'-6" ROUND POLE. PROVIDE POLE COMPATIBLE WITH FIXTURE IN SAME FINISH	1, 2
T3	LITHONIA LIGHTING	DSX1 LED P6 40K 80CRI T3M HS EGS -F	LED	120	10294	165	0.8	LED AREA LIGHT WITH ONE TYPE III HEAD, MOUNTED ON A 22'-6" ROUND POLE. PROVIDE POLE COMPATIBLE WITH FIXTURE IN SAME FINISH	1, 2
T4	LITHONIA LIGHTING	DSX1 LED P6 40K 80CRI BLC4 EGS	LED	120	13026	165	0.8	LED AREA LIGHT WITH ONE TYPE IV HEAD, MOUNTED ON A 22'-6" ROUND POLE. PROVIDE POLE COMPATIBLE WITH FIXTURE IN SAME FINISH	1, 2

REMARKS:
1. EQUAL MANUFACTURER'S MAY BE SUBSTITUTED.
2. PROVIDE POLE BASE PER DETAIL ON THIS SHEET.

IESNA PARKING LOT LEVELS OF ACTIVITY	IESNA MAINTAINED HORIZONTAL ILLUMINANCE STANDARDS (FOOT-CANDLES)		
	GENERAL PARKING AND PEDESTRIAN AREA		
COMMUNITY SHOPPING CENTERS (RETAIL SPACE TO 299,999 SQUARE FEET)	AVE.	MIN.	UNIFORMITY RATIO (AVG/MIN)
	2.4	0.6	4:1

CALCULATION SUMMARY					
LABEL	UNITS	AVG	MAX	MIN	AVG/MIN
PARKING AND DRIVEWAY AREAS	FC	2.29	4.6	0.6	3.82
WHOLE SITE	FC	0.22	2.7	0.0	N.A

1

GENERAL NOTES

A. ALL EXTERIOR LIGHTING CIRCUITS TO BE ROUTED THROUGH A TIMECLOCK.

B. ALL EXTERIOR LIGHT FIXTURE TO BE FED WITH #6 COPPER, UNLESS NOTED OTHERWISE.

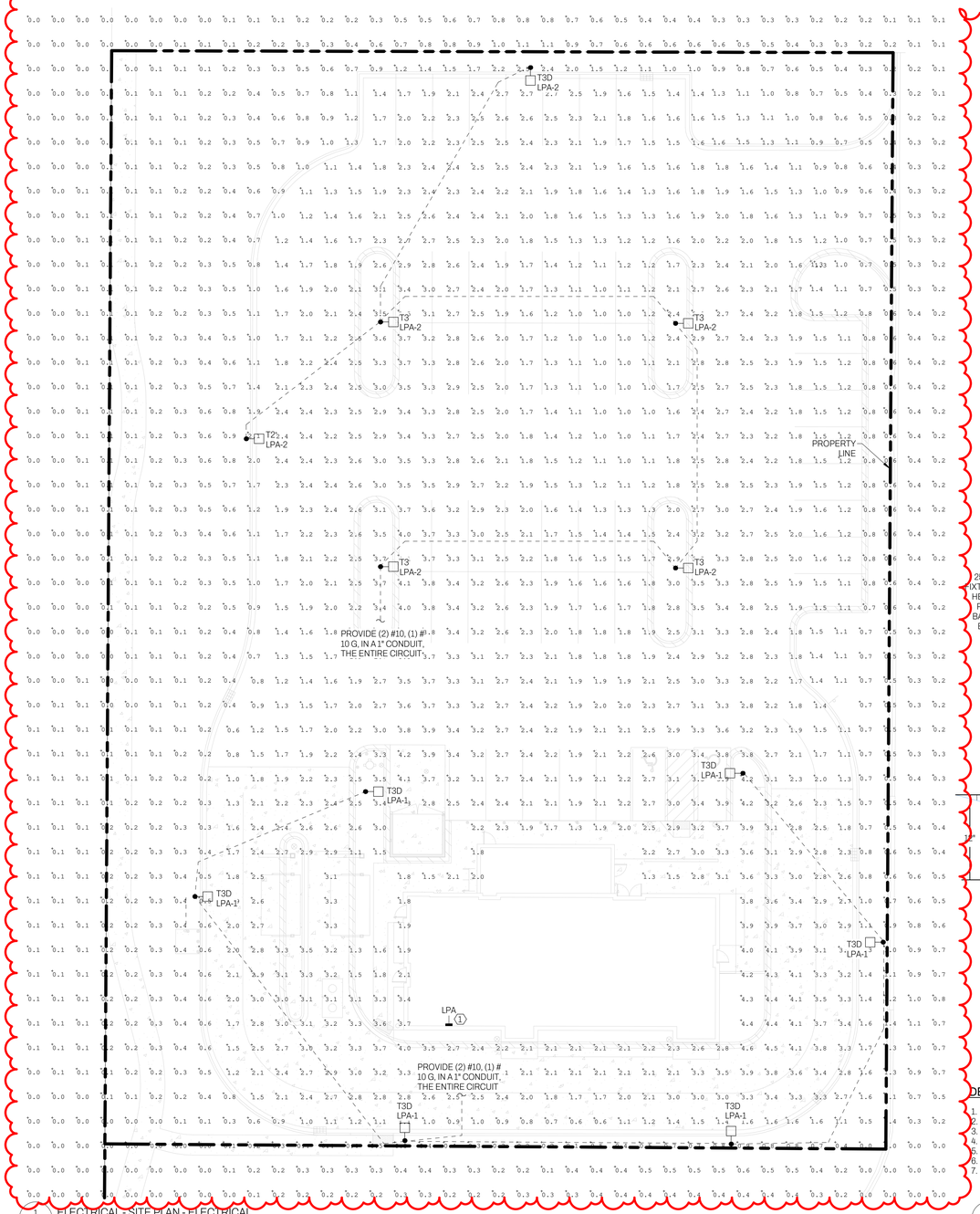
C. ALL PVC CONDUITS MUST HAVE A MINIMUM OF #12 COPPER GROUND CONDUCTOR INSTALLED.

D. ALL EXTERIOR ELECTRICAL EQUIPMENT TO BE NEMA-3R RATED.

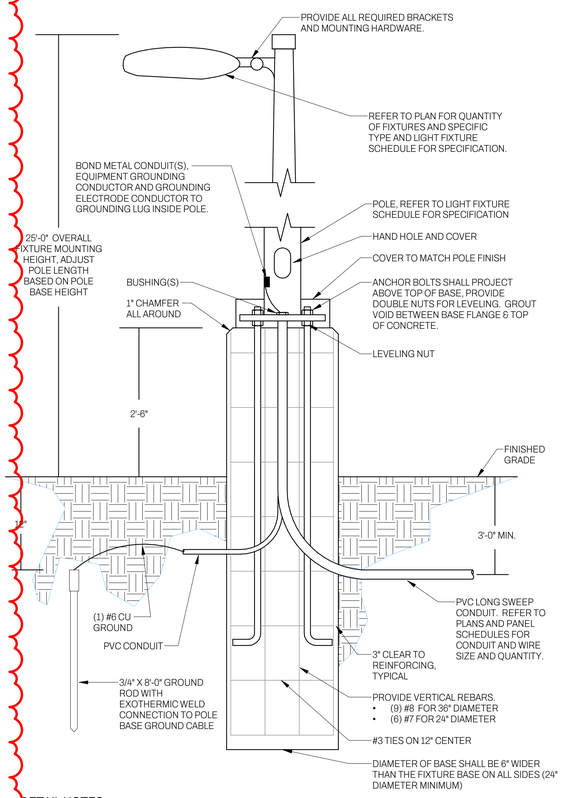
E. CONTRACTOR TO COORDINATE EXACT SITE LIGHTING FIXTURE LOCATIONS WITH CIVIL/LANDSCAPE DRAWINGS.

KEY NOTES

1. CONTRACTOR TO COORDINATE EXACT ELECTRICAL PANEL LOCATION, VOLTAGE, AND NAME .



1 E100 ELECTRICAL - SITE PLAN - ELECTRICAL
1/16" = 1'-0"



DETAIL NOTES

1. THE POLE BASE IS TO BE DESIGNED BY STRUCTURAL ENGINEER, REFER TO STRUCTURAL DRAWINGS.
2. THE CONTRACTOR IS TO PROVIDE A REINFORCED CONCRETE POLE BASE FOR EACH POLE SHOWN ON THE PLANS.
3. GROUND CONDUCTOR SHALL BE IN PVC RACEWAY WITHIN THE CONCRETE BASE.
4. LEVELING NUTS SHALL BE USED. POLE BEARING PLATE SHALL NOT BE SHIMMED AGAINST PIER CONCRETE.
5. CONCRETE: AIR ENTRAINED, 5000 PSI AFTER 28 DAYS, MAX AGGREGATE 3/4".
6. REINFORCEMENT: TYPE A-615 NEW BILLET STOCK A.S.T.M. GRADE 60.
7. IF THE ANTICIPATED FORECAST TEMPERATURE IS 35° OR LESS, THE BASE SHALL BE INSULATED WITH EITHER BLANKETS OR POLY AND STRAW FOR A MINIMUM OF 3 DAYS.

2 E100 LIGHT POLE BASE - RAISED BASE DETAIL
NOT TO SCALE

1

D-Series Size 1
LED Area Luminaire

Catalog Number
Notes
Type

d series

Specifications

EPA: 0.69 ft² (0.06 m²)
Length: 32.75" (83.1 cm)
Width: 14.26" (36.2 cm)
Height H1: 7.88" (20.0 cm)
Height H2: 2.73" (6.9 cm)
Weight: 34 lbs (15.4 kg)

Design Select options indicated by this color background.

Introduction

The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

design select

Items marked by a shaded background qualify for the Design Select program and ship in 15 days or less. To learn more about Design Select, visit www.acuitybrands.com/designselect. *See ordering tree for details

Ordering Information

EXAMPLE: DSX1 LED P7 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX1 LED

Series	LEDs	Forward optics	Color temperature[1] (this section 70CRI only)	Color Rendering Index[1]	Distribution	Voltage	Mounting
DSX1 LED	P1 P2 P3 P4 P5 P6	P7 P8 P9 P10 P11	30K 3000K 40K 4000K 50K 5000K	70CRI 70CRI 70CRI 70CRI	AFR Automotive front row T1S Type I short T2M Type II medium T2H Type II high T3LG Type III low glare T3M Type III medium T4LG Type IV low glare TFTM Forward throw medium BLC4 Type IV backlight control RCCO Right corner cutoff	MVOLT (120V-277V)[2] HVOLT (347V-480V)[2] XVOLT (277V - 480V)[2] 120 208 240 277 347 480	Shipped included SPA Square pole mounting (#3 drilling) RPA Round pole mounting (#3 drilling) SPM5 Square pole mounting (#5 drilling)[3] RPM5 Round pole mounting (#5 drilling)[3] SPA2IN Square narrow pole mounting (#3 drilling) NA Mast arm adapter (mounts on 2 3/8" OD horizontal tenon)

Control options	Other options	Finish (required)
Shipped installed NLTAIR2 PIRHN nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 8–40' mounting height, ambient sensor enabled at 25, 1[5,6,7,8,9] PIR High/low, motion/ambient sensor, 8–40' mounting height, ambient sensor enabled at 25, 1[5,6,7,8,9] PER NEMA twist-lock receptacle only (controls ordered separately)[10] PER5 Five-pin receptacle only (controls ordered separately)[10,11]	PER7 Seven-pin receptacle only (controls ordered separately)[10,11] FAO Field adjustable output[12,13] BL30 Bi-level switched dimming, 30%[12,13] BL50 Bi-level switched dimming, 50%[12,13] DMG 0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately)[12] DS Dual switching[10,11,12]	Shipped installed SPD20KV 20KV surge protection PE Photocell, dusk to dawn, field installed (Photocell ordered separately)[14] L90 Left retarded optics[15] R90 Right retarded optics[15] CCE Coastal Construction[16] HA 50°C ambient operation[16] BAA Buy America(n) Act and/or Build America Buy America Qualified SF Single fuse (120, 277, 347V)[12] DF Double fuse (208, 240, 480V)[12] Shipped separately EGS1 External Glare Shield (reversible, field install required, matches housing finish) BSDB Bird Spikes (field install required)	DDBXD Dark Bronze DBLXD Black DNAXD Natural Aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white

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DSX1 LED
Rev. 01/28/25
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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of configurations shown within the tolerances described within LM-79. Contact factory for performance data on any configurations not shown here.

Forward Optics

Performance Package	System Watts	LED Count	Drive Current (mA)	Distribution Type	30K (70CRI, T5 CB)				40K (70CRI, T5 CB)				50K (70CRI, T5 CB)			
					Lumens	B	U	G	Lumens	B	U	G	Lumens	B	U	G
P4	124W	30	1250	T1S	16,416	2	0	3	152	17,109	2	0	3	158	17,442	2	0	3	161
				T2M	15,267	2	0	4	122	15,849	2	0	3	126	16,158	2	0	3	130
				T3M	15,383	2	0	4	124	16,032	2	0	4	129	16,345	2	0	4	132
				T3LG	15,742	2	0	2	111	16,121	2	0	2	116	16,408	2	0	2	118
				T4M	15,613	2	0	4	126	16,272	2	0	4	131	16,589	2	0	4	134
				T4LG	14,200	2	0	2	115	14,799	2	0	2	119	15,087	2	0	2	122
				TFTM	15,721	2	0	4	127	16,384	2	0	4	132	16,703	2	0	4	135
				T5M	16,063	4	0	2	130	16,741	4	0	2	135	17,067	4	0	2	138
				T5W	16,524	5	0	3	132	17,013	5	0	3	137	17,344	5	0	3	140
				BLC3	15,108	1	0	3	98	15,462	1	0	3	100	15,817	1	0	3	102
				BLC4	15,700	0	0	3	99	15,964	0	0	3	99	15,889	0	0	3	98
				RCCO	15,291	1	0	3	95	15,767	1	0	3	97	15,979	1	0	3	98
				LCCO	15,291	1	0	3	95	15,767	1	0	3	97	15,996	1	0	3	97
				AFR	16,416	2	0	3	152	17,109	2	0	3	158	17,442	2	0	3	161
P5	138W	30	1400	T1S	18,052	2	0	3	131	18,814	2	0	3	136	19,180	2	0	3	139
				T2M	16,723	2	0	4	121	17,428	2	0	4	126	17,768	2	0	4	129
				T3M	16,917	3	0	4	122	17,630	3	0	4	128	17,974	3	0	4	130
				T3LG	15,173	2	0	2	109	15,749	2	0	2	114	16,055	2	0	2	116
				T4M	17,169	3	0	5	124	17,893	3	0	5	130	18,242	3	0	5	132
				T4LG	15,615	2	0	2	113	16,214	2	0	2	118	16,591	2	0	2	120
				TFTM	17,288	2	0	4	125	18,017	2	0	5	130	18,368	1	0	5	133
				T5M	17,664	5	0	3	128	18,410	5	0	3	133	18,768	5	0	3	136
				T5W	17,953	5	0	3	130	18,708	5	0	3	135	19,073	5	0	3	138
				T5LG	17,776	4	0	2	128	18,463	4	0	2	134	18,825	4	0	2	136
				BLC3	12,305	0	0	3	89	12,824	0	0	3	93	13,074	0	0	3	95
				BLC4	12,709	0	0	4	92	13,245	0	0	3	96	13,503	0	0	3	98
				RCCO	12,436	1	0	3	90	12,940	1	0	3	94	13,192	1	0	3	95
				LCCO	12,436	1	0	3	90	12,940	1	0	3	94	13,192	1	0	3	95
				AFR	18,052	2	0	3	131	18,814	2	0	3	136	19,180	2	0	3	139
P6	165W	40	1250	T1S	21,011	2	0	3	127	21,918	2	0	3	133	22,345	2	0	3	135
				T2M	19,482	3	0	4	118	20,303	3	0	4	123	20,699	3	0	4	125
				T3M	19,708	3	0	5	119	20,539	3	0	5	124	20,939	3	0	5	127
				T3LG	17,684	2	0	2	107	18,347	2	0	2	111	18,704	2	0	2	113
				T4M	20,000	3	0	5	121	20,848	3	0	5	126	21,258	3	0	5	129
				T4LG	18,191	2	0	2	110	18,959	2	0	2	115	19,328	2	0	2	117
				TFTM	20,140	3	0	5	122	20,989	3	0	5	127	21,398	3	0	5	129
				T5M	20,579	5	0	3	125	21,447	5	0	3	130	21,865	5	0	3	132
				T5W	20,912	5	0	3	127	21,795	5	0	3	132	22,219	5	0	3	134
				T5LG	20,628	4	0	2	125	21,509	4	0	2	130	21,928	4	0	2	133
				BLC3	14,155	0	0	3	87	14,940	0	0	3	90	15,231	0	0	3	92
				BLC4	14,805	0	0	4	90	15,430	0	0	4	93	15,731	0	0	4	95
				RCCO	14,464	1	0	3	88	15,074	1	0	3	91	15,368	1	0	3	93
				LCCO	14,464	1	0	3	88	15,074	1	0	3	91	15,368	1	0	3	93
				AFR	21,011	2	0	3	127	21,918	2	0	3	133	22,345	2	0	3	135

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DSX1 LED
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WOLF ENGINEERING
P.O. BOX 38 | DALTON, GA 30722

PROJECT NAME:

GUZMAN Y GOMEZ MEXICAN KITCHEN

844 ILLINOIS ROUTE 59
NAPERVILLE, IL
DUPAGE COUNTY

SEAL:

MICHAEL WOLF 62066400
STATE OF ILLINOIS
PROFESSIONAL ENGINEER

EXPIRES 11/30/2025
05/14/2025

NO	DATE	DESCRIPTION
	03/19/2025	ISSUED FOR PERMIT
1	05/15/2025	PUD RESUBMISSION

DRAWING TITLE:

ELECTRICAL - SITE PLAN

PROJ. NO: 20250064.0
DRAWN BY: YA
CHECKED BY: EW

SHEET NO:

E100

RELEASED FOR CONSTRUCTION