

ELECTRICAL GENERAL NOTES

1. CIRCUITS OF DIFFERENT PHASES SHALL SHARE THE SAME EQUIPMENT GROUNDING. THE EQUIPMENT GROUNDING CONDUCTOR SIZE SHALL NOT BE LESS THAN #12 AWG OR AS INDICATED ON THE DRAWINGS.
2. ALL CONDUCTORS SHALL BE COPPER THHN/THWN. ALL CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID COPPER. ALL CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED COPPER USING BOLTED LUGS AT TERMINALS.
3. ALL POWER CONDUCTORS SHALL BE ROUTED IN CONDUIT. CONDUITS SHALL BE CONCEALED UNLESS INDICATED OTHERWISE.
4. THE MINIMUM CONDUIT SIZE SHALL BE 3/4" INSIDE OF THE BUILDING. THE MINIMUM BELOW GRADE CONDUIT SHALL BE 1".
5. EMT CONDUIT SHALL BE USED INDOORS IN CONCEALED LOCATION. IMC CONDUIT SHALL BE USED IN LOCATIONS SUBJECT TO PHYSICAL DAMAGE. GRS CONDUIT SHALL BE USED ABOVE GRADE IN OUTDOOR LOCATIONS. SCH 40 PVB CONDUIT SHALL BE USED BELOW GRADE. MC CABLE SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY 19 CES/CENMP.
6. MINIMUM WIRE SIZE SHALL BE #12 AWG UNLESS OTHERWISE NOTED.
7. THE CONTRACTOR SHALL ADJUST CONDUCTOR SIZE BASED ON VOLTAGE DROP CALCULATIONS FOR ALL ELECTRICAL CIRCUITS IN EXCESS OF 100' OF LENGTH.
8. ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
9. ALL ELECTRICAL EQUIPMENT (CONDUIT, BOXES, SUPPORTS, ETC.) INSTALLED IN EXPOSED CEILING AREAS SHALL BE PAINTED AS DIRECTED BY THE ARCHITECT.
10. ELECTRICAL CONTRACTOR SHALL CLOSELY COORDINATE WITH MECHANICAL AND PLUMBING CONTRACTORS FOR EXACT LOCATION OF HVAC AND PLUMBING EQUIPMENT.
11. COMPRESSION FITTINGS SHALL BE USED ON ALL EMT CONDUIT. SET SCREW FITTINGS ARE NOT ALLOWED.
12. ALL CIRCUITS SHALL BE LABELED ON PANEL SCHEDULES. PANEL SCHEDULES SHALL BE TYPED. HAND WRITTEN PANEL SCHEDULES ARE NOT ACCEPTABLE.
13. FLEXIBLE CONNECTIONS AT EQUIPMENT AND TRANSFORMERS SHALL BE 6'-0" MAX. OUTDOOR CONNECTIONS SHALL BE WEATHERTIGHT FLEXIBLE CONDUIT. INDOOR CONNECTIONS SHALL BE STANDARD FLEXIBLE CONDUIT.
14. ANY PENETRATIONS MADE THROUGH FIRE RATED PARTITIONS SHALL BE FIRE STOPPED WITH APPROVED U.L. LISTED SYSTEM.
15. ALL DEVICES SHALL BE RATED 20A MINIMUM. 15A DEVICES ARE NOT ACCEPTABLE.
16. PROVIDE PULL STRING AND PROTECTIVE BUSHING IN ALL SPARE CONDUITS.
17. SCREW-IN TYPE FLEXIBLE CONDUIT FITTINGS SHALL NOT BE USED. FLEXIBLE CONDUIT FITTINGS SHALL BE SQUEEZE TYPE CONNECTORS WITH SINGLE SCREW CLAMP.
18. SNAP-IN CABLE FITTINGS SHALL NOT BE USED. CABLE FITTINGS SHALL BE CLAMP TYPE CONNECTORS WITH LOCKRING AT JUNCTION BOXES.
19. PROVIDE ALL LABOR AND MATERIALS REQUIRED TO PERFORM AND DOCUMENT AN ARC FAULT HAZARD ANALYSIS FOR ALL EQUIPMENT AND ELECTRICAL PANELS. ANALYSIS SHALL BE PERFORMED BY THE ELECTRICAL GEAR MANUFACTURER AND SHALL INCLUDE THE UTILITY SERVICE TRANSFORMER, ALL ELECTRICAL PANELBOARDS, AND MOTORS. FAULTS FOR BOTH UTILITY SOURCE AND EMERGENCY POWER SHALL BE ANALYZED. ARC FLASH HAZARD ANALYSIS SHALL BE PERFORMED PER NFPA 70E.
AT A MINIMUM, THE DELIVERABLES SHALL BE AS FOLLOWS:
 - EXECUTIVE SUMMARY EXPLAINING THE RESULTS AND ANY CONCLUSIONS OR RECOMMENDATIONS.
 - ARC FLASH INCIDENT ENERGY AND RESULTING PPE LEVELS
 - SINGLE-LINE SYSTEM DIAGRAM INCLUDING AMP RATINGS, AIC, FRAME SIZE, TRIP SETTINGS GROUND FAULT SETTINGS, AND CABLE INFORMATION (TYPE, SIZE, LENGTH)
 - SHORT CIRCUIT ANALYSIS
 - ANSI COMPLIANT EQUIPMENT WARNING LABELS INDICATING PPE LEVELS, INCIDENT ENERGY, FLASH BOUNDARY, AND AVAILABLE FAULT CURRENT.
20. AN UNSWITCHED HOT CONDUCTOR SHALL BE RUN TO ALL LIGHTING FIXTURES EQUIPPED WITH SELF-CONTAINED EMERGENCY BATTERY PACKS. LAMPS SHALL BE SWITCHED, BATTERY BACKS SHALL BE UNSWITCHED.
21. POWER ALL EXIT AND EMERGENCY FIXTURES FROM AN UNSWITCHED CIRCUIT SERVING THE SAME SPACE, UNLESS NOTED OTHERWISE.
22. FIELD ADJUST THE EXACT LOCATION OF ALL LIGHTING FIXTURES SHOWN CHAIN HUNG IN ELECTRICAL, MECHANICAL, AND SERVICES SPACES AS REQUIRED TO AVOID CONFLICTS WITH EXPOSED EQUIPMENT, DUCTWORK, PIPING, ETC. DO NOT ATTACH CHAINS OR MOUNT FIXTURES TO DUCTWORK OR PIPING.
23. FIELD VERIFY THE EXACT LOCATION AND ELEVATION OF ALL WALL MOUNTED FIXTURES AND DEVICES.
24. PROVIDE A FLEXIBLE WHIP TO EACH LAY-IN LIGHTING FIXTURE. WHIPS SHALL NOT EXCEED 6'-0" IN LENGTH.
25. THE CONTRACTOR SHALL VERIFY DIMMING CONTROLS COMPATIBILITY BETWEEN LIGHTING FIXTURES AND DIMMING SYSTEM PRIOR TO ORDERING FIXTURES OR CONTROLS.

ELECTRICAL DEMOLITION NOTES

1. PROTECT THE EXISTING EQUIPMENT AND SYSTEMS TO REMAIN OPERATIONAL. IF DAMAGED OR DISTURBED IN THE COURSE OF THE DEMOLITION WORK, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE WITH NEW PRODUCT OF EQUAL CAPACITY, QUALITY AND FUNCTIONALITY.
2. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO ARRANGE THE SHUT OFF OF UTILITIES.
3. LRAFB RESERVES THE RIGHTS TO ALL DEMOLISHED MATERIALS. COORDINATE AND VERIFY EQUIPMENT INTENDED TO BE SALVAGED PRIOR TO DEMOLITION. MATERIALS THAT LRAFB REQUESTS TO BE RE-USED, THE MATERIALS SHALL BE REMOVED IN A NEAT WORKMAN LIKE METHOD TO ALLOW THEIR RE-USE. PROTECT THE SALVAGE MATERIALS FOR REUSE BY PROPERLY PACKAGING THE MATERIALS TO PROTECT SALVAGED MATERIALS FROM DAMAGE. SECURELY PACKAGE ALL SALVAGE MATERIALS INSTALLATION HARDWARE AND PARTS TO SALVAGED MATERIALS. REMOVE UNSELECTED ITEMS FROM THE SITE AT THE DIRECTION OF THE LRAFB.
4. CONTRACTOR SHALL NOT CONSIDER DEMOLITION AND ALTERATION NOTES TO BE ALL-INCLUSIVE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT AND ASSESS EACH AREA TO FULFILL THE INTENT OF THE COMPLETE DESIGN. REFER TO ARCHITECTURAL DOCUMENTS FOR DEFINITION OF SCOPE FOR DEMOLITIONS AREAS AND ADDITIONAL REQUIREMENTS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE TO CONFIRM THE EXTENT OF DEMOLITION AND RESOLVE ANY DISCREPANCIES WITH OWNER'S/LANDLORD'S CONSTRUCTION MANAGER.
5. FOR DEMOLITION AREAS, THE CONTRACTOR SHALL REVIEW THE ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, TELECOMMUNICATIONS, SECURITY AND FIRE SUPPRESSION DEMOLITION DRAWINGS AND REMOVE WIRING, RACEWAYS, AND ELECTRICAL EQUIPMENT ASSOCIATED WITH THE MECHANICAL, PLUMBING AND FIRE SUPPRESSION DEMOLITION.
6. ENSURE THAT ALL LIFE SAFETY SYSTEMS REMAIN OPERATIONAL AND MEET LIFE SAFETY CODE REQUIREMENTS FOR ALL OCCUPIED AREAS THAT REMAIN OPERATIONAL DURING/AFTER DEMOLITION. THIS INCLUDES, BUT IS NOT LIMITED TO, EGRESS PATHWAYS, FIRE ALARM SYSTEMS, EGRESS LIGHTING AND OTHER LIFE SAFETY SYSTEMS.
7. PROTECT EXISTING EQUIPMENT AND SYSTEMS INTENDED TO REMAIN OPERATIONAL. IF DAMAGED OR DISTURBED IN THE COURSE OF THE DEMOLITION WORK, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE WITH NEW PRODUCT OF EQUAL CAPACITY, QUALITY AND FUNCTIONALITY.
8. RE-ROUTE AND RE-CONNECT ANY CIRCUIT(S) ANY CIRCUITS THAT ARE TO REMAIN IN USE BUT INTERFERES WITH THE NEW CONSTRUCTION.
9. REMOVE UNUSED BRANCH CIRCUITS BACK TO BRANCH CIRCUIT OF ORIGIN, MARK BREAKER AS 'SPARE' AND MAKE ELECTRICALLY SAFE. REMOVE ALL ABANDONED CONDUITS ABOVE LAY-IN CEILING, EXPOSED CONDUITS, FLEXIBLE CONDUITS, SURFACE RACEWAY, SURFACE MOUNTED OUTLET/JUNCTION BOXES, AND EQUIPMENT UNLESS NOTED OTHERWISE.
10. REMOVE DEMOLISHED MATERIAL FROM PROJECT SITE IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS AND REGULATIONS. FOLLOW ALL STATE AND LOCAL REGULATIONS AND CODES FOR PROPER DISPOSAL.

ABBREVIATIONS

AC	ABOVE COUNTER OR ALTERNATING CURRENT
ACP	ACCESS CONTROL PANEL
AFP	ABOVE FINISH FLOOR
AFCI	ARC FAULT CIRCUIT INTERRUPTING
AFG	ABOVE FINISH GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
A/V	REFERS TO AUDIO/VIDEO
AWG	AMERICAN WIRE GAUGE
C -----	
C	CONDUIT
CCTV	CLOSED CIRCUIT TELEVISION
CKT or CIR	CIRCUIT
CU	COPPER
D -----	
db	DECIBEL
DC	DIRECT CURRENT
DIA	DIAMETER
E -----	
EF	EXHAUST FAN
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
EPO	EMERGENCY POWER OFF
ERV	ENERGY RECOVERY VENTILATOR
F -----	
FA	FIRE ALARM
FLA	FULL LOAD AMPS
G -----	
GFCI	GROUND FAULT CIRCUIT INTERRUPTING
GRD	GROUND
GRS	GALVANIZED RIGID STEEL
I -----	
IMC	INTERMEDIATE METAL CONDUIT
K -----	
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPS
L -----	
LTG	LIGHTING
LRA	LOCKED ROTOR AMPS
M -----	
MCC	METAL CLAD CABLE
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
N -----	
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NF	NON-FUSED
NPFA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NORMALLY OPEN
NS	NON-SWITCHED
P -----	
P	POLE
PC	PHOTOELECTRIC CELL
PNL	PANELBOARD
PWR	POWER
Q -----	
QTY	QUANTITY
R -----	
REQ	REQUIRED
RMS	ROOM MEAN SQUARED
RTU	ROOF TOP UNIT
S -----	
SD	SMOKE DAMPER
SP	SURGE PROTECTION
ST	SHUNT TRIP
SPD	SURGE PROTECTIVE DEVICE
SW	SWITCH
T -----	
TC	TIME CLOCK
TEL	TELEPHONE
TYP	TYPICAL
U -----	
UC	DENOTES UNDER COUNTER - VERIFY LOCATION
UL	UNDERWRITERS LABORATORY
UNO	UNLESS OTHERWISE NOTED
V -----	
V	VOLTAGE
VA	VOLT AMPS
VEP	VOICE EVACUATION PANEL
VFD	VARIABLE FREQUENCY DRIVE
W -----	
W	WATT OR WIRE
WH	WATER HEATER
WP	WEATHERPROOF
X -----	
XFMR	TRANSFORMER

LIGHTING AND POWER SYMBOLS LEGEND

ANNOTATION

	KEYNOTE TAG
	PANEL/EQUIPMENT NAME
	PANEL-CIRCUIT NUMBER
	MOUNTING HEIGHT
	BRANCH CIRCUIT HOMERUN, PANEL AND CIRCUIT NUMBER INDICATED ON PLAN
	CONNECTION POINT OF NEW WORK TO EXISTING
	EXTENTS OF DEMO (DIRECTIONAL)
	DETAIL/SECTION REFERENCE
	INDICATES DETAIL NUMBER
	INDICATES SHEET NUMBER
	SECTION CUT DESIGNATION
<u>POWER</u>	
	SIMPLEX RECEPTACLE
	DUPLEX RECEPTACLE AT 18" A.F.F.
AC	- MOUNTED 1" ABOVE COUNTER, TYPICALLY 42" A.F.F.
COPY	- DEDICATED COPIER RECEPTACLE
DIS	- DEDICATED GARBAGE DISPOSER RECEPTACLE BELOW COUNTER, SWITCHED ABOVE COUNTER (SWITCHES NOT SHOWN)
EWC	- DEDICATED WATER COOLER RECEPTACLE FED FROM GFCI CIRCUIT BREAKER, COORDINATE EXACT MOUNTING WITH COOLER PROVIDED
GFI	- GROUND FAULT CIRCUIT INTERRUPTER
ICE	- DEDICATED ICE MAKER RECEPTACLE
RANGE	- DEDICATED RANGE RECEPTACLE
REF	- DEDICATED REFRIGERATOR RECEPTACLE
TR	- TAMPER RESISTANT RECEPTACLE
TV	- DEDICATED TELEVISION RECEPTACLE, COORDINATE EXACT MOUNTING HEIGHT WITH OWNER, TYPICALLY 60" A.F.F.
W	- DEDICATED WASHING MACHINE RECEPTACLE
WP	- PROVIDED WITH WEATHERPROOF IN-USE TYPE COVER
	QUADRUPLEX RECEPTACLE
	CEILING MOUNTED RECEPTACLE
	SPECIAL PURPOSE RECEPTACLE, NEMA CONFIGURATION AS INDICATED.
	FLOOR DUPLEX RECEPTACLE
	FLOOR QUADRUPLEX RECEPTACLE
	FLOOR DATA RECEPTACLE
	FLOOR DATA QUAD RECEPTACLE
	JUNCTION BOX

EQUIPMENT

	PANELBOARD
	DISCONNECT SWITCH
	MOTOR STARTER/DISCONNECT SWITCH
	MOTOR STARTER
	VARIABLE FREQUENCY DRIVE
	DRY-TYPE TRANSFORMER
	ELECTRIC METER
	EMERGENCY PUSH BOTTON SWITCH

LIGHTING

	SINGLE POLE TOGGLE SWITCH AT 48" A.F.F
2	- INDICATES 2-POLE TOGGLE
3	- INDICATES 3-WAY TOGGLE
4	- INDICATES 4-WAY TOGGLE
D	- INDICATES DIMMER
K	- INDICATES KEY OPERATED
LV	- LOW VOLTAGE, CONFIGURATION INDICATED ON PLAN
M	- MOTOR RATED TOGGLE
OC	- DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH
WP	- WEATHERPROOF COVER
	CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
	DAYLIGHTING SENSOR
	OCCUPANCY SENSOR POWER PACK
	LIGHTING ROOM CONTROLLER
	1'x4' RECESSED LIGHTING FIXTURE
	2'x4' RECESSED LIGHTING FIXTURE
	2'x2' RECESSED LIGHTING FIXTURE
	EMERGENCY RECESSED LIGHTING FIXTURE (1'x4', 2'x2', 2'x4')
	STRIP LIGHTING FIXTURE
	EMERGENCY STRIP LIGHTING FIXTURE
	LINEAR SUSPENDED FIXTURE
	DOWNLIGHT / EMERGENCY DOWNLIGHT
	PENDANT LIGHT
	WALL MOUNTED LINEAR LIGHTING FIXTURE
	EMERGENCY WALL MOUNTED LINEAR LIGHTING FIXTURE
	WALL MOUNTED LIGHTING FIXTURE
	CEILING MOUNTED EXIT SIGN, SHADING INDICATES FACES
	WALL MOUNTED EXIT SIGN, SHADING INDICATES FACES
	WALL MOUNTED EXIT SIGN WITH EMERGENCY LIGHTING
	EMERGENCY LIGHTING FIXTURE

TELECOMMUNICATION AND SECURITY SYMBOLS LEGEND

	WALL MOUNTED CAMERA
	CEILING MOUNTED CAMERA
	CEILING MOUNTED PUBLIC ADDRESS
	KEY CARD READER
	PUSH BUTTON SWITCH
	MOTION DETECTOR
	DATA OUTLET WITH DROPS AT 18" A.F.F., TWO CAT6A CABLE AT EACH LOCATION UNLESS INDICATED OTHERWISE
	COAXIAL TV OUTLET AT 5'-0" A.F.F. UNLESS INDICATED OTHERWISE.
	WIRELESS ACCESS POINT