FEEDER SCHEDULE (COPPER)		
FFFDFR TAG	FFEDER SIZE	
15 3 20 3		
15.4 20.4	4#12 #12G 3/4"C	
30.3	3#10, #10G, 3/4"C	
30.4	4#10, #10G, 3/4"C	
40.3	3#8. #10G. 3/4"C	
40.4	4#8, #10G, 3/4"C	
50.3	3#6, #10G, 3/4"C	
50.4	4#6, #10G, 1"C	
60.3	3#4, #10G, 1"C	
60.4	4#4, #10G, 1-1/4"C	
70.3	3#4, #8G, 1"C	
70.4	4#4, #8G, 1-1/2"C	
80.3	3#3, #8G, 1-1/4"C	
80.4	4#3, #8G, 1-1/4"C	
90.3	3#2, #8G, 1-1/4"C	
90.4	4#2, #8G, 1-1/4"C	
100.3	3#1, #8G, 1-1/4"C	
100.4	4#1, #8G, 1-1/2"C	
110.3	3#1, #8G, 1-1/4"C	
110.4	4#1, #8G, 1-1/2"C	
125.3, 150.3	3#1/0, #6G, 1-1/2"C	
125.4 150.4	4#1/0, #6G, 2"C	
175.3	3#2/0, #6G, 2"C	
175.4	4#2/0, #6G, 2"C	
200.3	3#3/0, #6G, 2"C	
200.4	4#3/0, #6G, 2"C	
225.3	3#4/0, #4G, 2"C	
225.4	4#4/0, #4G, 2-1/2"C	
250.3	3#250, #4G, 2-1/2"C	
250.4	4#250, #4G, 2-1/2"C	
300.3	3#350, #4G, 2-1/2"C	
300.4	4#350, #4G, 3"C	
350.3	3#500, #3G, 3"C	
350.4	4#500, #3G, 3-1/2"C	
400.3	2 SETS OF 3#3/0, #3G, 2"C	
400.4	2 SETS OF 4#3/0, #3G, 2-1/2"C	
500.3	2 SETS OF 3#250, #2G, 2-1/2"C	
500.4	2 SETS OF 4#250, #2G, 2-1/2"C	
600.3	2 SETS OF 3#350, #1G, 2-1/2"C	
600.4	2 SETS OF 4#350, #1G, 2-1/2"C	
700.3	2 SETS OF 3#1/0, #2G, 3"C	
700.4	2 SETS OF 4#500, #1/0G, 3-1/2"C	
800.3	2 SETS OF 3#600, #1/0G, 3-1/2"C	
800.4	2 SETS OF 4#600, #1/0G, 4"C	
1000.3	3 SETS OF 3#500, #2/0G, 3"C	
1000.4	3 SETS OF 4#500, #2/0G, 3"C	
1200.3	4 SETS OF 3#350, #3/0G, 3"C	
1200.4	4 SETS OF 4#350, #3/0G, 3-1/2"C	
1600.3	5 SETS OF 3#500, #4/0G, 3"C	
1600.4	5 SETS OF 4#500, #4/0G, 3"C	
2000.3	6 SETS OF 3#500, #4/0G, 3"C	
2000.4	6 SETS OF 4#500, #4/0G, 3"C	
2500.3	7 SETS OF 3#500, #4/0G, 3-1/2"C	
2500.4	7 SETS OF 4#500, #4/0G, 3-1/2"C	
3000.3	8 SETS OF 3#500, #4/0G, 3"C	
3000.4	8 SETS OF 4#500, #4/0G, 3-1/2"C	
3200.3	8 SETS OF 3#600, #4/0G, 4"C	
3200.4	8 SETS OF 4#600, #4/0G, 4"C	
4000.3	10 SETS OF 3#600, #4/0G, 4"C	
4000.4	10 SETS OF 4#600, #4/0G, 4"C	
NOTES		
1. BASED ON	30C AMBIENT AND 75C CONDUCTORS. RESIZE FEEDER PER NEC	
FOR OTHE	R AMBIENT TEMPERATURES.	
2. ALL FEEDE	RS SHALL BE THHN/THWN-2 COPPER, UNLESS NOTED OTHERWISE.	
.) BRANCH C		

<b>BRANCH CIRCUIT</b>	<b>WIRING SCHEDULE</b>
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BASED ON 3 CURRENT CARRYING CONDUCTORS IN RACEWAY.

BREAKER		
AMPERAGE	POLE	WIRE SIZE
20A	1P	2#12, #12G, 3/4"C
20A	2P	3#12, #12G, 3/4"C
20A	3P	4#12, #12G, 3/4"C
30A	1P	2#10, #10G, 3/4"C
30A	2P	3#10, #10G, 3/4"C
30A	3P	4#10, #10G, 3/4"C
40A	1P	2#8, #10G, 3/4"C
40A	2P	3#8, #10G, 3/4"C
40A	3P	4#8, #10G, 1"C
50A	2P	3#6, #10G, 1"C
50A	3P	4#6, #10G, 1-1/2"C
60A	2P	3#6, #10G, 1"C
60A	3P	4#6, #10G, 1-1/2"C
70A	2P	3#4, #8G, 1-1/2"C
70A	3P	4#4, #8G, 1-1/2"C
80A	2P	3#4, #8G, 1-1/2"C
80A	3P	4#4, #8G, 1-1/2"C
100A	2P	3#3, #8G, 1-1/2"C
100A	3P	4#3, #8G, 1-1/12"C
NOTES:		

BASED ON 30C AMBIENT AND 75C CONDUCTORS. RESIZE FEEDER PER NEC FOR OTHER AMBIENT TEMPERATURES. ALL FEEDERS SHALL BE THHN/THWN-2 COPPER, UNLESS NOTED OTHERWISE.

BRANCH CIRCUITS DO NOT ACCOUNT FOR VOLTAGE DROP. BASED ON 3 CURRENT CARRYING CONDUCTORS IN RACEWAY.

ELECTRICAL LEGEND			
F	MANUAL FIRE PULL STATION		
SD	AREA SMOKE DETECTOR, CEILING MOUNTED		
(SD)	AREA SMOKE DETECTOR, WALL MOUNTED		
<u> </u>	SMOKE DETECTOR, MOUNTED IN DUCT		
	HEAT DETECTOR, CEILING MOUNTED		
	SPRINKLER WATER FLOW SWITCH		
(A)	AUDIBLE FIRE ALARM STROBE, CEILING MOUNTED		
A	AUDIBLE FIRE ALARM STROBE, WALL MOUNTED		
(AV)	AUDIO/VISUAL FIRE ALARM STROBE, CEILING MOUNTED		
AV	AUDIO/VISUAL FIRE ALARM STROBE WALL MOUNTED		
V	VISUAL FIRE ALARM STROBE, CEILING MOUNTED		
V	VISUAL FIRE ALARM STROBE, WALL MOUNTED		
FJ	FIREMAN'S JACK		
FB	FIRE ALARM BELL		
F/S	FIRE/SMOKE DAMPER		
S	SMOKE DAMPER		
FACP	FIRE ALARM CONTROL PANEL		
FAAP	FIRE ALARM REMOTE ANNUNCIATOR PANEL		
Φ	SIMPLEX RECEPTACLE, WALL MOUNTED		
$\Phi$	DUPLEX RECEPTACLE, WALL MOUNTED		
$\oplus$	DUPLEX RECEPTACLE, CEILING MOUNTED		
$\Phi$	DUPLEX RECEPTACLE, TOP HALF SWITCHED		
₽	QUADRUPLEX RECEPTACLE, WALL MOUNTED		
	SPECIAL PURPOSE RECEPTACLE, WALL MOUNTED, COORDINATE NEMA PLUG TYPE WITH OWNER		
₽GFI	DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTER		
∯IG	DUPLEX RECEPTACLE, ISOLATED GROUND		
₽WP	DUPLEX RECEPTACLE, WEATHERPROOF		
	COMBINATION POWER/TELECOM FLOOR BOX OR FIRE RATED POKE THRU DEVICE, REFER TO PLANS FOR SPECIFICATION		
$\nabla$	TELECOM OUTLET. PROVIDE BACK BOX/COVER PLATE. INSTALL 3/4"C W/BUSHING AND PULLSTRING, STUBBED TO ACCESSIBLE CEILING.		
$\overline{\mathbb{M}}$	TELEVISION OUTLET. PROVIDE BACK BOX/COVER PLATE. INSTALL 3/4"C W/BUSHING AND PULLSTRING, STUBBED TO ACCESSIBLE CEILING.		
\$	SINGLE POLE SWITCH		
\$ <sup>^</sup>	DOUBLE POLE SWITCH		
\$ \$			
¢ <sup>ĸ</sup>	KEY LOCKED SWITCH		
Ф С	MOMENTARY CONTACT SWITCH		
\$ <sup></sup>	TIMER SWITCH		
\$ <sup>□</sup>	WALL DIMMER		
\$	LOW VOLTAGE SWITCH		
<b>\$</b> °	OCCUPANCY SENSOR SWITCH		
\$	VACANCY SENSOR SWITCH		
PC	PHOTOCELL		
vs os	VACANCY OR OCCUPANCY SENSOR SWITCH WATTSTOPPER DW-100 SERIES		
vs os	CEILING MOUNTED VACANCY OR OCCUPANCY SENSOR WATTSTOPPER DT-300 SERIES		

## ELECTRICAL LEGEND

	SURFACE MOUNTED PANEL
	PANEL RECESSED IN WALL
TF	STEP DOWN TRANSFORMER
	GROUND BUS BAR
	HEAVY DUTY DISCONNECT SWITCH
Z	HEAVY DUTY FUSED DISCONNECT SWITCH
	COMBINATION MOTOR STARTER/DISCONNECT SWITCH
[VFD]-J	VFD WITH DISCONNECT, COORDINATE WITH MECHANICAL CONTRACTOR
EPO	EMERGENCY POWER OFF SWITCH
<b>\$</b> мs	MOTORIZED SHADE CONTROL
\$⊤	THERMAL OVERLOAD SWITCH
(10)	MOTOR CONNECTION, HP AS NOTED
M 1/2	SINGLE PHASE MOTOR CONNECTION, HP AS NOTED
J	JUNCTION BOX, CEILING MOUNTED
Q	JUNCTION BOX, WALL MOUNTED
P B	PULL BOX
	GROUND ROD
	GROUND WELL
	CIRCUIT BREAKER
	SWITCH AND FUSE
	ENCLOSED CIRCUIT BREAKER
 	NORMALLY OPEN CONTACT
<u>}/</u>	NORMALLY CLOSED CONTACT
$\bigcirc$	NUMBERED NOTE
Ť	EXIT SIGN; WALL MOUNTED
<b>X</b>	EXIT SIGN; CEILING MOUNTED
	FIXED CLOSED CIRCUIT CAMERA
MS	MOTION SENSOR
ML	MAGNETIC LOCK
KP	KEYPAD
DR	DOOR RELEASE
РВ	PUSH BUTTON
CR	CARD READER
EL	ELECTRIC LOCK
ES	ELECTRIC STRIKE
	CONDUIT CONCEALED IN CEILING OR WALL
	CONDUIT BELOW FLOOR OR IN SLAB
E	CONDUIT STUBBED OUT AND CAPPED W/PULLSTRING
	CONDUIT HOMERUN BACK TO PANEL

## ELECTRICAL ABBREVIATIONS

(E)/EXIST	EXISTING
(N)	NEW
(R)/RELOC	EXISTING TO BE RELOCATED
А	AMPERES
A/V	AUDIO/VISUAL
AF	AMPERE FUSE RATING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AL	
BKK	
BLDG	BUILDING
C	
CCIV	
CKT	CIRCUIT
CM	CEILING MOUNTED
CU	COPPER
DIA	DIAMETER
DPDT	DOUBLE POLE DOUBLE THROW
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FWF	
GC	GENERAL CONTRACTOR
GEI/GECI	
IG	
KVA	
KW	KILO-WATT
LIG	
MCB	
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
NC	NORMALLY CLOSED
NEUT	NEUTRAL
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
PB	PULL BOX
PNI	PANFI
PVC	
<u>сн</u>	SHIELDED
SWGK	
TS	
TVSS	TRANSIENT VOLTAGE SURGE SUPRESSOR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLT
WP	WEATHERPROOF

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## ELECTRICAL SHEET LIST

SHEET NUMBER

E0.01

E0.02

E2.01

SHEET NAME ELECTRICAL COVER SHEET

ELECTRICAL SPECIFICATIONS POWER PLAN

E3.01 E6.01 E1.ECTRICAL DETAILS E7.50 PANEL SCHEDUILS & RISER

## **CODE SUMMARY**

- APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO:
   A. NATIONAL ELECTRICAL CODE (2020 NEC) WITH LOCAL AMENDMENTS.
   B. INTERNATIONAL BLDG CODE 2015.
- C. LIFE SAFETY CODE (NFPA 101).
- D. ENERGY CONSERVATION CODE: ASHRAE 90.1 2013 OR IECC 2015. E. REFER TO BUILDING OWNER FOR ANY STANDARDS ABOVE CODE REQUIREMENT.



Date Issued: 02/23/24 06/26/24

Issue for Construction IFC Set Addendum 02



BUILDING INTENANCE R 4 0 S M M M Ζ Š FIN ONS LL ATI Y C R

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Sheet Content: ELECTRICAL COVER SHEET

SCALE:

NOT TO SCALE

Drawn By: Checked By: Plot Date: 01/29/2024 Project Number: H23233 Sheet:

E0.01

SECTION 26 00 00 - COMMON WORK RESULTS FOR ELECTRICAL

- PERMITS AND CODES: OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND REQUIRED INSPECTIONS. COMPLY WITH ALL NATIONAL. STATE AND MUNICIPAL LAWS, CODES AND ORDINANCES RELATING TO BUILDING AND PUBLIC SAFETY. TEMPORARY POWER: PROVIDE ANY REQUIRED TEMPORARY POWER AND UTILITIES FOR ALL TRADES AND ALL CONSTRUCTION
- TRAILERS. PROVIDE TEMPORARY CONSTRUCTION LIGHTING AND POWER. ELECTRICAL CONTRACTOR SHALL INCLUDE TEMPORARY ELECTRIC: ALL TEMPORARY ELECTRIC SHALL BE IN ACCORDANCE WITH OSHA CONSTRUCTION STANDARDS 29FCR, PART 1926 AND ARTICLE 590 OF THE 2020 NATIONAL ELECTRICAL CODE. TEMPORARY LIGHTING AND POWER SHALL BE PROVIDED IN ACCORDANCE WITH OSHA STANDARDS. THE OSHA MINIMUM ILLUMINATION IS 5 FOOTCANDLES IN GENERAL CONSTRUCTION AREAS, AND 10 FC IN MECHANICAL / ELECTRICAL ROOMS AND WORKROOMS. INCLUDED ARE CONNECTIONS TO ALL CONSTRUCTION TRAILERS. THE COST OF THIS WORK IS TO BE INCLUDED IN THE BASE ELECTRICAL BID FOR THE PROJECT
- TRENCHING REQUIREMENTS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS, AND NO PROVISION OF THESE DRAWINGS OR SPECIFICATIONS SHALL BE DEEMED TO EXCUSE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS FOR TRENCH SAFETY
- VISITING THE JOB SITE: VISIT THE SITE OF THE PROPOSED CONSTRUCTION IN ORDER TO FULLY UNDERSTAND THE FACILITIES. DIFFICULTIES AND RESTRICTIONS ATTENDING THE EXECUTION OF THE WORK. NO ADDITIONAL COMPENSATION WILL BE ALLOWED THIS CONTRACTOR FOR WORK OR ITEMS OMITTED FROM HIS ORIGINAL PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF REGARDING SUCH MATTERS AFFECTING THE PERFORMANCE OF THE WORK IN THIS CONTRACT OR NECESSARY FOR THE INSTALLATION AND COMPLETION OF THE WORK INCLUDED HEREIN.
- DRAWINGS: DRAWINGS ARE DIAGRAMMATIC; CONFIRM DIMENSIONS & LOCATIONS IN THE FIELD. IF CONFLICTING DIMENSIONS ARE SHOWN, USE LARGER DIMENSIONS AND VERIFY WITH ARCHITECT. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF FIXTURES AND WALL MOUNTED DEVICES.
- MATERIAL: ALL MATERIALS SHALL BE U.L. LISTED. MATERIAL INSTALLATION SHALL COMPLY WITH NEC REQUIREMENTS AND PERFORM BY CRAFTSMEN SKILLED IN THIS PARTICULAR WORK. EQUIPMENT PROTECTION: PROTECT EQUIPMENT AND WORK FROM DAMAGE DURING HANDLING AND INSTALLATION UNTIL
- COMPLETION OF CONSTRUCTION. COORDINATION WITH OTHERS: COOPERATION WITH TRADES OF ADJACENT, RELATED OR AFFECTED MATERIALS OR OPERATIONS, AND WITH TRADES PERFORMING CONTINUATIONS OF THIS WORK UNDER SUBSEQUENT CONTRACTS, IS CONSIDERED A PART OF THIS WORK IN ORDER TO EFFECT TIMELY AND ACCURATE PLACING OF WORK AND TO BRING TOGETHER, IN PROPER AND CORRECT SEQUENCE, THE WORK OF SUCH TRADES. PROVIDE OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS AND SHOP DETAILS FOR THE PROPER INSTALLATION OF THE WORK AND FOR THE PURPOSE OF COORDINATING ADJACENT WORK. ELECTRICAL POWER CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE IN THIS DIVISION UNLESS NOTED OTHERWISE. VERIFY ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT WITH DIVISION 15 AND OTHER SPECIAL DIVISIONS BEFORE ROUGHING IN THE ELECTRICAL CONNECTIONS AND ENERGIZING THE EQUIPMENT. REMOVE ANY IMPROPERLY INSTALLED ELECTRICAL EQPT AND CONDUIT THAT ARE LIMITING PROPER ACCESS FOR MECH/PLUMBING/SPECIAL EQPT SERVICE AND
- MAINTENANCE ACCESS DOORS: PROVIDE MILCOR OR APPROVED EQUAL AS REQUIRED FOR ACCESS FOR ALL DEVICES REQUIRING ADJUSTMENT. SIMILARLY FOR ALL JUNCTION BOXES, PULL BOXES, ETC. THAT ARE REQUIRED TO BE ACCESSIBLE PER CODE AND/OR THE LOCAL AUTHORITY HAVING JURISDICTION. APPEARANCE OF ACCESS PANELS/DOORS SHALL BE ACCEPTABLE TO ARCHITECT. DOORS SHALL
- MATCH WALL OR CEILING RATING. ARCHITECT MUST APPROVE LOCATION AND APPEARANCE OF ALL ACCESS DOORS. CLEAN UP: PROVIDE FOR ISOLATION OF WORK AREAS AND DAILY REMOVAL OF DEBRIS. CLEAN ALL EQUIPMENT AND FIXTURE LENSES. REPLACE ALL BURNED OUT LAMPS. TOUCH UP WITH PAINT WHERE REQUIRED. SHOP DRAWINGS: SUBMIT COMPLETE INFORMATION ON ALL EQUIPMENT, LIGHT FIXTURES, GENERATOR, FIRE ALARM SYSTEM.
- CONDUIT/FITTINGS, WIRE, AND DEVICES. OVERCURRENT (OC) & DISCONNECT DEVICES SHOWN ON PLANS ARE BASED ON A SPECIFIC HVAC EQUIPMENT MANUFACTURER. HVAC CONTRACTOR MAY SUBMIT OTHER MANUFACTURERS, DIFFERENT MODELS OR RATINGS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE OC/DISCONNECT DEVICES WITH THE HVAC CONTRACTOR PRIOR TO SUBMITTING SUCH DEVICES FOR ENGINEER'S REVIEW. SUBMIT DETAILED LAYOUT OF ELECTRICAL ROOMS. INCOMPLETE SUBMITTALS WILL BE RETURNED TO THE CONTRACTOR UNREVIEWED. NO TIME EXTENSIONS OR COST INCREASES WILL BE ALLOWED FOR DELAYS CAUSED BY RETURN OF INCOMPLETE SUBMITTALS.
- RECORD DRAWINGS: WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, PROVIDE RECORD DRAWINGS IN CAD/REVIT FORMAT (USING THE SAME SOFTWARE AND VERSION THE PROJECT WAS DESIGNED IN), PLUS FULL SIZE HARD COPY. ELECTRONIC DRAWINGS MAY BE AVAILABLE FROM ENGINEER FOR A FEE. RECORD DRAWINGS SHALL INCLUDE EXACT DIMENSIONS AND LOCATION FOR ALL UNDER-SLAB CONDUIT, SWITCHGEAR, PANELBOARDS, TRANSFORMERS, EQUIPMENT, AND REVISED HOMERUN CIRCUIT LOCATIONS.
- FINAL INSPECTION & TESTING: ALL ELECTRICAL SYSTEMS MUST BE CHECKED FOR PROPER POLARITY AND SEQUENCE, ALL MOTORS MUST BE CHECKED FOR PROPER ROTATION AND ALL EQUIPMENT CHECKED FOR PROPER VOLTAGE AND PHASING REQUIREMENTS. PRIOR TO THE APPLICATION OF ANY POWER, THE CONTRACTOR MUST CERTIFY THAT ALL CONNECTED EQUIPMENT MATCH THE CHARACTERISTICS OF THE SUPPLY CIRCUIT VOLTAGE, PHASING AND FEEDER REQUIREMENTS. AFTER ALL SYSTEMS HAVE BEEN COMPLETED AND PUT INTO OPERATION, SUBJECT EACH SYSTEM TO AN OPERATING TEST UNDER DESIGN CONDITIONS TO ENSURE PROPER SEQUENCE AND OPERATION THROUGHOUT THE RANGE OF OPERATION. MAKE ADJUSTMENTS AS REQUIRED TO ENSURE PROPER FUNCTIONING OF ALL SYSTEMS. SPECIAL TESTS ON INDIVIDUAL SYSTEMS ARE SPECIFIED UNDER INDIVIDUAL SECTIONS

### SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- ALL WIRING SHALL BE IN CONDUIT (EXCEPT PLENUM RATED LOW VOLTAGE CABLES). ALL WIRES MUST BE 75°C RATED OR BETTER, 60° C RATED WIRE SHALL NOT BE USED. 90°C RATED WIRE MAY BE USED BUT ONLY AT 75°C AMPACITY. EMERGENCY AND NORMAL CIRCUITS MUST BE INSTALLED IN SEPARATE CONDUIT AND DEVICE BOXES PER N.E.C. ARTICLE 700.9.(B).
- MINIMUM SIZE #12 EXCEPT CONTROLS MAY BE #14. USE #10 CONDUCTORS FOR 20 AMPERE, 120 VOLT BRANCH CIRCUITS LONGER THAN 100 FEET. USE #10 CONDUCTORS FOR 20 AMPERE, 277 VOLT BRANCH CIRCUITS LONGER THAN 200 FEET. TYPE THHN/THWN STRANDED COPPER THERMOPLASTIC IN DRY LOCATIONS.
- TYPE THWN IN WET LOCATIONS (OUTDOOR, UNDERGROUND, ON ROOF).
- ALL WIRE SHALL BE 98% CONDUCTIVITY COPPER, 600 VOLT. ALUMINUM WIRES MAY BE USED ONLY FOR FEEDERS 100 AMPS AND I ARGER WIRE #10 AND SMALLER MAY BE SOLID OR STRANDED. #8 OR LARGER SHALL BE STRANDED.
- COMMUNICATION WIRES (FIRE ALARM, TELEPHONE, HVAC THERMOSTAT, DATA ETC.): PLENUM RATED LOW-SMOKE CABLE MAY BE USED IN LIEU OF WIRE/CONDUIT TYPE INSTALLATION. ALL PLENUM RATED CABLE SHALL BE PROPERLY SUPPORTED BY BRIDAL RINGS, CABLE TIES, CLIPS ETC MADE BY ERICO (CADDY COMMUNICATION FASTENERS) OR APPROVED EQUAL. DO NOT USE SCRAP WIRE TO WRAP AND SUPPORT COMMUNICATION WIRES. HOMEMADE SUPPORT DEVICES ARE NOT ACCEPTABLE. DO NOT LAY COMMUNICATION CABLE DIRECTLY ON TOP OF CEILING TILES, INSTALL CABLES A MINIMUM OF 12" ABOVE CEILING TILES AND 12" FROM HVAC DUCTWORK. PROVIDE A MINIMUM 6" SEPARATION BETWEEN POWER CONDUIT AND COMMUNICATION WIRINGS.
- ALL CABLING IN EXPOSED CEILING AREAS SHALL BE INSTALLED CLEAN AND TIGHT TO STRUCTURE
- PROVIDE COMMON TRIP MULTI-POLE BREAKERS FOR ALL MULTI-WIRE CIRCUITS PER NEC 2020 ART. 210.4(B). VOLTAGE DROP SHALL NOT EXCEED 3% FOR ALL BRANCH CIRCUITS AND 2% FOR ALL FEEDERS. FIELD INSULATION TESTING: INSULATION RESISTANCE OF ALL CONDUCTORS SHALL BE TESTED. EACH CONDUCTOR SHALL HAVE ITS INSULATION RESISTANCE TESTED AFTER THE INSTALLATION IS COMPLETED AND ALL SPLICES, TAPS AND CONNECTIONS ARE MADE EXCEPT CONNECTION TO OR INTO ITS SOURCE AND POINT (OR POINTS) OF TERMINATION. INSULATION RESISTANCE OF CONDUCTORS WHICH ARE TO OPERATE AT 600 VOLTS OR LESS SHALL BE TESTED BY USING A BIDDLE MEGGER OF NOT LESS THAN 1000 VOLTS DC. INSULATION RESISTANCE OF CONDUCTORS RATED AT 600 VOLTS SHALL BE FREE OF SHORTS AND GROUNDS AND HAVE A MINIMUM RESISTANCE PHASE-TO-PHASE AND PHASE-TO-GROUND OF AT LEAST 10 MEGOHMS. CONDUCTORS THAT DO NOT EXCEED INSULATION RESISTANCE VALUES LISTED ABOVE SHALL BE REMOVED AT CONTRACTOR'S EXPENSE AND REPLACED AND TEST REPEATED. THE CONTRACTOR SHALL FURNISH ALL INSTRUMENTS AND PERSONNEL REQUIRED FOR TESTS, SHALL TABULATE READINGS OBSERVED, AND SHALL FORWARD COPIES OF THE TEST READINGS TO THE OWNER. THESE TEST REPORTS SHALL IDENTIFY EACH CONDUCTOR TESTED. DATE AND TIME OF TEST AND WEATHER CONDITIONS. EACH TEST SHALL BE SIGNED BY THE PARTY MAKING THE TEST.

### SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

- GROUNDING: ALL CONDUIT WORK AND ELECTRICAL EQUIPMENT SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED IN ACCORDANCE WITH NEC REQUIREMENTS. PROVIDE GREEN EQUIPMENT GROUNDING CONDUCTOR WITH ALL POWER AND RECEPTACLE AND LIGHTING CIRCUITS. GREEN EQUIPMENT GROUNDING CONDUCTOR SHALL BE ROUTED FROM PANEL GROUND BUS TO FINAL DEVICES.
- GROUNDING ELECTRODES: PROVIDE 3/4" X 10-FT LONG, COPPER-CLAD, STEEL GROUNDING ROD. FOR BELOW-GRADE CONNECTIONS PROVIDE EXOTHERMIC WELDED TYPE; FOR ABOVE GRADE CONNECTIONS PROVIDE MECHANICAL BOLTED-TYPE CONNECTIONS UTILIZING HIGH CONDUCTIVE COPPER ALLOY OR BRONZE LUGS OR CLAMPS. SERVICE GROUND RESISTANCE: MUST BE LESS THAN 25 OHMS. PROVIDE ADDITIONAL GROUND RODS AS REQUIRED TO OBTAIN 25 OHMS OR LESS.
- GROUNDING CONDUCTORS: ROUTE ALONG SHORTEST AND STRAIGHTEST PATHS POSSIBLE UNLESS OTHERWISE INDICATED OR REQUIRED BY CODE. AVOID OBSTRUCTING ACCESS OR PLACING CONDUCTORS WHERE THEY MAY BE SUBJECTED TO STRAIN, IMPACT, OR DAMAGE.
- GROUNDING AND BONDING FOR PIPING:
  - METAL WATER SERVICE PIPE: INSTALL INSULATED COPPER GROUNDING CONDUCTORS, IN CONDUIT, FROM BUILDING'S MAIN SERVICE EQUIPMENT, OR GROUNDING BUS, TO MAIN METAL WATER SERVICE ENTRANCES TO BUILDING. CONNECT GROUNDING CONDUCTORS TO MAIN METAL WATER SERVICE PIPES; USE A BOLTED CLAMP CONNECTOR OR BOLT A LUG-TYPE CONNECTOR TO A PIPE FLANGE BY USING ONE OF THE LUG BOLTS OF THE FLANGE. WHERE A DIELECTRIC MAIN WATER FITTING IS INSTALLED, CONNECT GROUNDING CONDUCTOR ON STREET SIDE OF FITTING. BOND METAL GROUNDING CONDUCTOR CONDUIT OR SLEEVE TO CONDUCTOR AT EACH END.
  - WATER METER PIPING: USE BRAIDED-TYPE BONDING JUMPERS TO ELECTRICALLY BYPASS WATER METERS. CONNECT TO PIPE WITH A BOLTED CONNECTOR. BOND EACH ABOVEGROUND PORTION OF GAS PIPING SYSTEM DOWNSTREAM FROM EQUIPMENT SHUTOFF VALVE.

### SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS: GALVANIZED-STEEL SLOTTED SUPPORT SYSTEMS WITH METALLIC COATINGS.
- ALUMINUM SLOTTED SUPPORT SYSTEMS WITH NONMETALLIC COATINGS.
- NONMETALLIC SLOTTED SUPPORT SYSTEMS. RACEWAYS AND CABLE SUPPORTS.
- STEEL CONDUITS AND CABLE HANGERS, CLAMPS, AND ASSOCIATED ACCESSORIES.
- SUPPORT FOR NONARMORED CONDUCTORS AND CABLES IN VERTICAL CONDUIT RISERS. STRUCTURAL STEEL FOR FABRICATED SUPPORTS AND RESTRAINTS.
- MOUNTING, ANCHORING, AND ATTACHMENT COMPONENTS:
- POWDER-ACTUATED FASTENERS. MECHANICAL-EXPANSION ANCHORS.
- CONCRETE INSERTS.
- CLAMPS FOR ATTACHMENT TO STEEL STRUCTURAL ELEMENTS. STEEL SPRINGHEAD TOGGLE BOLTS.
- THREADED HANGER RODS.
- FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES: WELDED OR BOLTED STEEL SHAPES.
- CONCRETE BASES: 3000-PSI. 28-DAY COMPRESSIVE-STRENGTH CONCRETE.
- MAXIMUM SUPPORT SPACING AND MINIMUM HANGER ROD SIZE FOR RACEWAY: SPACE SUPPORTS FOR EMTS, IMCS, AND RMCS AS REQUIRED BY NFPA 70. MINIMUM ROD SIZE SHALL BE 1/4 INCH IN DIAMETER. MULTIPLE RACEWAYS OR CABLES: INSTALL TRAPEZE-TYPE SUPPORTS FABRICATED WITH STEEL SLOTTED OR OTHER SUPPORT SYSTEM. SIZED SO CAPACITY CAN BE INCREASED BY AT LEAST 25 PERCENT IN FUTURE WITHOUT EXCEEDING SPECIFIED DESIGN LOAD LIMITS. ALL SUPPORTS SHALL BE INDEPENDENT OF FIRE, PLUMBING, MECHANICAL, AND TELECOM.

- ALLIED, TRIANGLE OR WHEATLAND OR APPROVED EQUAL. BOTH STEEL AND DIECAST FITTINGS ARE APPROVED FOR USE WITH ALUMINUM EMT. DO NOT USE FLAT STEEL USE POLYPROPYLENE STYLE ROPE. DAMAGE: RGS, IMC.
- UNDER SLAB: RGS, SCHEDULE 80 PVC.

- ROOF PENETRATIONS, FLASHINGS OR DAMAGE TO ROOF MEMBRANE.
- CONDUIT. 10. ACCESSIBLE
- 12
- THE AMPACITY OF ALL CURRENT CARRYING CONDUCTORS PER NEC 2020 ART. 310.15(B)(2)(A).
- SECTION 26 05 44 SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

## SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

- BRANCH CONDUIT IN CEILING PLENUM JUST ABOVE PANELS. COLOR CODE: CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS: 240/120V 1PH, 3W Α. PHASE A: BLACK PHASE B: RED NEUTRAL: WHITE
- GROUND: GREEN ISOLATED GROUND: GREEN/YELLOW STRIPE ALL PANELS SHALL BE IDENTIFIED USING NAMEPLATES WITH 4 ROWS OF TEXT (LETTER HEIGHT SHALL BE 1/4" MINIMUM), FXAMPI F
- PANEL "XX" 225 AMPS MCB, SECTION #1 OF 2-SECTION PNL 208Y/120V, 3 PHASE, 4 WIRE FEEDER SIZE 4 # 4/0 THWN, 1 # 4 G, 2 1/2" C.
- FED FROM DIST PANEL "XXX". 1ST FLOOR
- EQUIPMENT USING SCREWS OR RIVETS.
- CABINETS, JUNCTION AND PULL BOXES ETC. SHALL BE SIMILARLY IDENTIFIED.

### SECTION 26 09 23 – LIGHTING CONTROL DEVICES BE TOGGLE SWITCHES. FACE PLATES SHALL BE WHITE UNLESS NOTED OTHERWISE. SWITCHES MAY BE USED ONLY WHERE SPECIFICALLY APPROVED BY ENGINEER. CARRYING CONDUCTOR. 4. OCCUPANCY SENSORS: Α.

- TO INSTALLATION SUPPLY/RETURN VENTS. CONTROL AND SHALL BE CONNECTED WITH THE NEUTRAL CONDUCTOR PER NEC ARTICLE 404.2.
- ONE SWITCH PACK IS REQUIRED FOR EACH CIRCUIT TO BE CONTROLLED.
- SENSOR DESIGN AND SPECIFICATIONS.

- Μ.
- LIGHT FIXTURES, REGARDLESS OF VOLTAGE, WITHIN THAT ZONE.

## **ELECTRICAL SPECIFICATIONS**

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS CONDUIT: SHALL BE RIGID GALVANIZED STEEL (RGS) OR ELECTRICAL METALLIC TUBING (EMT) AS MANUFACTURED BY INDOORS ABOVE GRADE: EMT OR RGS. AMERICAN CONDUIT PULLEASE ALUMINUM EMT IS ACCEPTABLE. PER UL 514B.

FISHTAPES WITH ALUMINUM EMT. FOR SMALLER SIZES USE ONLY ROUND FIBERGLASS FISHTAPES. FOR LARGER SIZES INDOORS OR OUTDOORS ABOVE GRADE, STUB-UPS, ON ROOF, MECHANICAL ROOMS, OR WHERE SUBJECT TO PHYSICAL

BELOW GRADE: SCHEDULE 40 OR 80 PVC OR RGS. PROVIDE TRANSITION FITTINGS FROM PVC SCH 40 OR 80 TO RGS FOR ALL ABOVE GRADE CONDUIT. ALL UNDERGROUND METALLIC CONDUIT SHALL HAVE 40-MIL THICK EXTERNAL PVC COATING FOR CORROSION PROTECTION. UNDERGROUND CONDUIT MINIMUM SIZE 3/4". MINIMUM 24" BURIAL DEPTH FROM FINISHED GRADE TO TOP OF CONDUIT, PROVIDE DEEPER BURIAL DEPTH IF REQUIRED BY LOCAL CODES. PROVIDE CONCRETE ENCASEMENT FOR ALL INCOMING SERVICE CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE. PROVIDE RED DETECTABLE WARNING TAPE OVER ENTIRE RUN OF SERVICE AND MAJOR CONDUIT RUNS.

INSTALL GROUND WIRES WHERE SHOWN ON THE DRAWINGS. COMPRESSION OR SET-SCREW TYPE FITTINGS MAY BE USED FOR EMT. MINIMUM CONDUIT SIZE 1/2 INCH, HOWEVER HOMERUN TO PANEL SHALL BE MINIMUM 3/4 INCH. TYPE "MC" METAL CLAD CABLE IS ACCEPTABLE. MC CABLE MAY BE USED ONLY FOR DROPS FROM CEILING PLENUM JUNCTION BOXES TO RECEPTACLES AND LIGHT SWITCHES IN WALLS. MC CABLE MAY ALSO BE USED AS FIXTURE WHIPS FROM CEILING PLENUM JUNCTION BOXES TO LIGHT FIXTURES, WHIPS MUST BE 6-FT OR LESS. HOMERUN CIRCUITS TO PANELS SHALL BE IN CONDUIT, MC HOMERUN TO PANELS ARE NOT ACCEPTABLE. TYPE "AC" ARMORED CABLE (COMMONLY REFERRED TO AS "BX") IS NOT ACCEPTABLE AND SHALL NOT BE USED. KAF-TECH ATKORE MC GLIDE-LITE ALUMINUM MC CABLE IS ACCEPTABLE. IF USED, AN ALUMINUM CABLE ARMOR SHALL HAVE A CONTINUOUS LOW-PROFILE CONVOLUTION MINIMIZING LOW SPOTS TO PREVENT INSTALLATION DAMAGE IN ACCORDANCE WITH MC GLIDE-LITE. THE LOW-PROFILE ARMOR SHALL BE APPLIED OVER THE CABLED WIRE ASSEMBLY WITH AN INTERLOCK IN COMPLIANCE WITH

SECTION 5 OF UL 1569. INSTALLATION SHALL BE PER MANUFACTURER RECOMMENDATIONS. ELECTRICAL NONMETALLIC TUBING (ENT, NEC ARTICLE 362) SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. FLEXIBLE CONDUIT SHALL BE UTILIZED AS FINAL CONNECTIONS (3'-5' ONLY) AT THE FOLLOWING EQUIPMENT: MOTORS, LIGHTING FIXTURES, HEATER, POWER SUPPLIES, AND ANY OTHER VIBRATION PRODUCING EQUIPMENT. UTILIZE 1/2" FLEXIBLE METALLIC CONDUIT MINIMUM AND INCLUDE A GREEN GROUND WIRE. USE SEALTITE IN WET LOCATIONS SUCH AS OUTDOOR CONDENSING UNITS, ETC. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE EVERY 5 FEET AND WITHIN 3 FEET OF ALL BOXES. USE LOCKNUTS INSIDE AND OUT AT BOXES. MAINTAIN MINIMUM 12" SEPARATION FROM ALL HIGH TEMPERATURE PIPES. ALL CONDUIT RUNS SHALL BE INSTALLED EITHER PARALLEL OR PERPENDICULAR TO BUILDING LINES. ROUTE CONDUIT AS DIRECTLY AS POSSIBLE WITH LARGEST RADIUS BENDS POSSIBLE. MAKE BENDS WITH STANDARD ELBOWS OR BENDS PER NEC. PROVIDE EXPANSIONS FITTINGS IF CONDUIT CROSSES STRUCTURAL EXPANSION JOINT. ALL CONDUITS ON ROOF SHALL BE SUPPORTED BY AN ENGINEERED, PREFABRICATED PORTABLE PIPE SYSTEM SPECIFICALLY DESIGNED TO BE INSTALLED ABOVE FINISHED ROOF WITHOUT

SUPPORT AT INTERVAL NOT TO EXCEED 10' ON CENTER, AND WITHIN 5' OF ANY DEFLECTION OF CONDUIT. CLEAN CONDUIT INTERIOR AFTER INSTALLATION; COAT SCRATCHES WITH ZINC PAINT. PROVIDE PULL WIRE IN ALL CONDUIT (POWER, FIRE ALARM, TELEPHONE AND OTHER COMMUNICATION CONDUIT). PULL WIRE ALSO REQUIRED IN ALL SPARE

OUTLET BOXES: SHALL BE GALVANIZED STEEL SUITABLE FOR LOCATION. CEILING OUTLET BOXES SHALL BE 4" OCTAGON. WALL OUTLET BOXES SHALL BE PROPER DESIGN TO ACCOMMODATE THE DEVICES REQUIRED - 4 INCH SQUARE WITH RAISED COVER. PROVIDE RACO, STEEL CITY OR APPLETON. ALL J-BOXES / SPLICE BOXES MUST BE

JUNCTION /PULL BOXES: FOR EACH CONDUIT RUN: PROVIDE ONE JUNCTION/PULL BOX FOR EACH EQUIVALENT THREE QUARTER BENDS (270°). UNDERGROUND FEEDERS: MINIMUM ONE PULL BOX FOR EACH 350 FEET OF CONDUIT RUN. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CIRCUITS IN SAME CONDUIT UNLESS OTHERWISE NOTED. WHEN INSTALLING MORE THAN THREE CURRENT CARRYING CONDUCTORS IN SAME CONDUIT, CONTRACTOR SHALL DERATE

ALL PENETRATIONS THROUGH FIRE RATED FLOORS AND WALLS SHALL BE SEALED WITH 3M FIRE RESISTANT FOAM SEALANT OR CAULK, TO PREVENT THE SPREAD OF SMOKE, FIRE, TOXIC GAS OR WATER THROUGH THE PENETRATION EITHER BEFORE, DURING OR AFTER A FIRE. THE FIRE RATING OF THE PENETRATION SEAL SHALL BE AT LEAST THAT OF THE FLOOR OR WALL INTO WHICH IT IS INSTALLED, SO THAT THE ORIGINAL FIRE RATING OF THE FLOOR OR WALL IS MAINTAINED AS REQUIRED BY ARTICLE 300.21 OF THE NATIONAL ELECTRICAL CODE.

IDENTIFICATION: LABEL ALL JUNCTION AND PULL BOXES WITH PANELS AND CIRCUIT NUMBERS. MARK ALL BRANCH CONDUIT WITH CIRCUIT NUMBERS AT EACH SURFACE MOUNTED PANEL LOCATION. FOR RECESSED PANELS, MARK

PANEL NAMEPLATES SHALL BE ENGRAVED THREE-LAYER LAMINATED PLASTIC, WHITE LETTERS ON BLACK BACKGROUND FOR NORMAL POWER, RED LETTER/BLACK BACKGROUND FOR EMERGENCY POWER. SECURE NAMEPLATES TO

ALL DISCONNECTS, STARTERS, COMBINATION STARTER/DISCONNECT, TRANSFORMERS, WIREWAYS, COMMUNICATION

PROVIDE AS PER DRAWINGS AND DETAILS. ALL FACEPLATES SHALL BE DECORA STYLE. BACK OF HOUSE AREAS SHALL DIMMER SWITCHES: PROVIDE DEDICATED NEUTRAL FOR DIMMER CONTROLLED LIGHTING CIRCUIT. DO NOT SHARE NEUTRAL WITH 2 OR MORE BRANCH CIRCUITS. DO NOT BREAK FINS (HEAT SINKS) ON DIMMER SWITCH. DERATED DIMMER OCCUPANCY SENSOR SWITCHES SHALL HAVE NEUTRAL WIRE. GROUND WIRE SHALL NOT BE USED AS CURRENT

ALL SENSOR LOCATIONS ARE APPROXIMATE. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS PRIOR

ULTRASONIC CEILING MOUNT SENSORS SHOULD BE LOCATED A MINIMUM OF SIX (6) FEET FROM HVAC WALL MOUNTED OCCUPANCY SENSORS SHALL BE PROVIDED WITH INTEGRAL "TOUCH PLATE" MANUAL OFF

CONTRACTOR IS RESPONSIBLE FOR PROPER SENSITIVITY AND TIME DELAY SETTINGS, RECOMMENDED PLACEMENT AND FIELD VERIFICATION OF CIRCUITS WITH RESPECT TO POWER PLACEMENT. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF REQUIRED NUMBER OF SWITCH PACKS.

ONE SWITCH PACK IS REQUIRED FOR EVERY FIVE SENSORS IN THE ZONE.

SENSORS MOUNTED OVER THE DOOR MUST BE PLACED ONE FOOT INSIDE THE THRESHOLD. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE SENSOR BILL OF MATERIALS COMPLIES WITH THE

CONTRACTOR IS RESPONSIBLE FOR INSTALLING EQUIPMENT IN COMPLIANCE WITH LOCAL CODE. WALL MOUNTED OCCUPANCY SENSORS SHALL BE GANGED UNDER A COMMON COVERPLATE WHERE LOCATED ADJACENT TO DIMMERS OR SWITCHES (I.E. IN A CONFERENCE ROOM). FOR ALL AREAS INDICATED WITH OCCUPANCY SENSORS, FURNISH AND INSTALL SWITCHES, DIMMERS, MOTION SENSORS, AND SWITCH PACKS AS NECESSARY TO PERFORM THE FOLLOWING FUNCTIONS: ACTIVATION OF ANY MOTION SENSING DEVICE WITHIN THE INDICATED ZONE OF CONTROL SHALL ENERGIZE ALL WALL MOUNTED SWITCHES AND DIMMERS SHALL WORK IN CONJUCTION WITH MOTION SENSOR(S) TO PROVIDE

MANUAL OPERATION OF SWITCHED FIXTURES WITHIN THE ZONE (UPON MOTION SENSOR ACTIVATION).

- SECTION 26 09 43.23 RELAY BASED LIGHTING CONTROLS THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS OF THE LIGHTING RELAY PANELS WITH THE BUILDING CONTROLS CONTRACTOR AND BUILDING ENGINEERING STAFF TO ASSURE PROPER OPERATION (ON, OFF, TIME OF DAY PROGRAMMING) OF THE LIGHTING RELAY SYSTEM AND ITS COMPONENTS PRIOR TO FINAL DELIVERY OF THE FLOOR. THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY REPORT ANY OBSERVED DEFICIENCIES TO THE BUILDING ENGINEERING STAFF. REPAIR OF EXISTING NON-FUNCTIONAL DEVICES OR INSTALLATION OF MISSING DEVICES SHALL BE PERFORMED ON A CHANGE ORDER BASIS OR UNDER SEPARATE CONTRACT. IN AS MUCH AS IS POSSIBLE, THE CONTRACTOR SHALL DELIVER TO THE OWNER A COMPLETE AND FUNCTIONING SYSTEM FOR EACH RENOVATED FLOOR LIGHTING CONTROL RELAY PANELS: STANDALONE LIGHTING CONTROL PANEL USING MECHANICALLY LATCHED RELAYS TO CONTROL LIGHTING AND APPLIANCES. SINGLE ENCLOSURE WITH INCOMING LIGHTING BRANCH CIRCUITS, CONTROL CIRCUITS, SWITCHING RELAYS, AND
  - ON-BOARD TIMING AND CONTROL UNIT. CONTROL UNIT: POWER SUPPLY AND ELECTRONIC CONTROL FOR OPERATING AND MONITORING INDIVIDUAL RELAYS.
  - TIMING UNIT: 365-DAY CALENDAR; ASTRONOMICAL CLOCK; SEVEN INDEPENDENT SCHEDULES, EACH HAVING 24 TIME PERIODS.
  - SEQUENCING CONTROL WITH OVERRIDE. OVERRIDE CONTROL "BLINK WARNING" APPROXIMATELY FIVE MINUTES BEFORE OFF SEQUENCE.
  - NONVOLATILE MEMORY RETAINS SETUP CONFIGURATIONS. RELAYS: ELECTRICALLY OPERATED, MECHANICALLY HELD SINGLE-POLE SWITCH, RATED AT 20 A AT 277а.
  - VAC. OPERATOR INTERFACE: INTEGRAL KEYPAD AND DIGITAL DISPLAY.

### SECTION 26 24 16 - PANELBOARDS

- ALL PANELBOARDS SHALL HAVE COPPER OR ALUMINUM BUSES. LOAD CENTER TYPE PANELBOARDS ARE NOT ACCEPTABLE AND SHALL NOT BE USED. PROVIDE BREAKERS WHICH ARE QUICK-MAKE AND QUICK-BREAK ON BOTH MANUAL AND AUTOMATIC OPERATION. USE A TRIP-FREE BREAKER WHICH IS TRIP INDICATING. INCORPORATE INVERSE TIME CHARACTERISTIC BY BIMETALLIC OVERLOAD ELEMENTS AND INSTANTANEOUS CHARACTERISTIC BY MAGNETIC TRIP FOR 2-POLE AND 3-POLE BREAKERS, USE THE COMMON-TRIP TYPE SO THAT AN OVERLOAD OR FAULT ON ONE POLE WILL TRIP ALL POLES SIMULTANEOUSLY. HANDLE TIES ARE NOT ACCEPTABLE. ALL BREAKERS SHALL BE BOLT-ON THERMAL MAGNETIC TYPE. STAB-ON BREAKERS ARE NOT ACCEPTABLE. DO NOT USE TANDEM CIRCUIT BREAKERS. ALL CIRCUIT BREAKERS RATED 100 AMP OR LESS SHALL BE SUITABLE FOR TERMINATING 75°C WIRE (BREAKERS RATED FOR ONLY 60° C WIRE ARE NOT ACCEPTABLE.
- PANELBOARD DIRECTORIES: PROVIDE A STEEL DIRECTORY FRAME MOUNTED INSIDE THE DOOR WITH A HEAT-RESISTANT TRANSPARENT FACE AND A DIRECTORY CARD FOR IDENTIFYING THE LOADS SERVED. IDENTIFY EACH CIRCUIT WITH LOAD AND LOCATIONS (ROOM NAMES AND ROOM NUMBERS) AND INDICATE WITH TYPED DIRECTORIES.
- INSTALL THE PANELBOARDS SUCH THAT THE CENTER OF THE SWITCH OR CIRCUIT BREAKER IN THE HIGHEST POSITION WILL NOT BE MORE THAN 6 1/2 FEET ABOVE THE FLOOR OR WORKING PLATFORM. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON, AND SIEMENS OR APPROVED EQUAL

## SECTION 26 27 26 – WIRING DEVICES

WIRING DEVICES: PROVIDE ALL WIRING DEVICES SHOWN ON DRAWINGS COMPLETELY AND PROPERLY WIRED INCLUDING A SECURE GROUND CONNECTION. ALL DEVICES SHALL BE INSTALLED IN OUTLET BOXES OF REQUIRED SIZE AND VOLUME. GENERAL PURPOSE RECEPTACLES SHALL BE HUBBELL 5262 SERIES OR APPROVED EQUAL. ISOLATED GROUND RECEPTACLES SHALL BE HUBBELL IG-5362-ORANGE WITH ISOLATED GROUND CONNECTION OR APPROVED EQUAL. GROUND FAULT INTERRUPT RECEPTACLES (MARKED GFCI) SHALL BE HUBBELL GF-5262 OR APPROVED EQUAL. REFER TO ARCHITECTURAL DRAWINGS FOR COLOR AND MOUNTING HEIGHTS

- COVER PLATES: HIGH ABUSE NYLON PER ARCHITECT. WHERE MORE THAN ONE SWITCH OCCURS AT THE SAME LOCATION, THEY SHALL BE GANGED UNDER ONE COVERPLATE, INSTALLED IN BOXES IN UNIFORM POSITION, SET TO OPEN AND CLOSE CIRCUITS BY MOVING IN THE SAME DIRECTION THROUGHOUT JOB. PROVIDE CIRCUIT NUMBER LABEL ON ALL DEVICE PLATES.
- ALL ELECTRICAL BOXES ON OPPOSITE SIDES OF CORRIDOR WALL AND FIREWALLS MUST BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES. REFER TO ARCHITECTURAL DRAWINGS FOR RECEPTACLE AND DATA J-BOX MOUNTING HEIGHTS.
- COORDINATE NEMA RECEPTACLE TYPES FOR ALL COPIERS WITH COPIER MANUFACTURER(S) PRIOR TO INSTALLATION. CONTRACTOR SHALL REPORT ANY CIRCUIT DISCREPANCY TO THE ENGINEER FOR REVIEW.
- REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION ON ALL FLOOR DEVICES. LOCATIONS SHALL BE IN ACCORDANCE WITH ALL UNDERWRITER LABORATORIES AND LOCAL AUTHORITY REQUIREMENTS. IN NO CASE SHALL U.L. LISTED FIRE RATED POKE-THRU DEVICES BE INSTALLED LESS THAN 24" ON CENTER AND/OR MORE THAN ONE (1) PENETRATION PER 65 SQUARE FEET OF FLOOR AREA OF BEAM SPACE. THE CONTRACTOR SHALL CALL TO THE ATTENTION OF, AND REQUEST DIRECTION FROM THE ARCHITECT AND THE ENGINEER IN ANY CASE IN WHICH THE INSTALLATION MAY VARY FROM THESE REQUIREMENTS PRIOR TO ROUGH-IN.
- THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE FURNITURE MANUFACTURER THE INSTALLATION OF ALL ELECTRICAL DEVICES MOUNTED IN DEMOUNTABLE PARTITIONS. REFER TO ARCHITECT FOR LOCATION OF ALL DEMOUNTABLE PARTITIONS. THE LICENSED ELECTRICIAN SHALL MAKE THE FINAL CONNECTION BETWEEN CIRCUIT AND PLUG-IN FURNITURE SYSTEM.

### SECTION 26 28 16 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PROVIDE ALL SAFETY DISCONNECT SWITCHES INDICATED ON THE DRAWINGS AND AT ALL MECHANICAL EQUIPMENT. PROVIDE HEAVY DUTY TYPE SAFETY SWITCHES SIMILAR TO GE TYPE TH. ALL SWITCHES SHALL BE FUSIBLE, EXCEPT THOSE INDIVIDUALLY ENCLOSED SAFETY SWITCHES INDICATED AS NON-FUSIBLE. PROVIDE NEMA 1 ENCLOSURE FOR NORMAL INDOOR INSTALLATIONS AND NEMA 3R ENCLOSURE FOR INSTALLATIONS OUTDOORS AND IN WET AREAS. COMPLY WITH CODE REQUIREMENTS FOR OTHER ENVIRONMENTS. PROVIDE EXTERNALLY OPERATED HANDLES WITH PROVISIONS FOR PADLOCKING IN THE OFF OR ON POSITION. SWITCH RATINGS SHALL BE SIZED LARGE ENOUGH FOR THE APPLIED LOAD. SWITCHES SERVING MOTORS SHALL BE HORSEPOWER RATED FOR THE INSTALLED MOTOR. VOLTAGE RATINGS SHALL BE SUFFICIENT FOR THE INSTALLED CIRCUIT VOLTAGE. TOGETHER WITH THE SPECIFIED FUSES (IF SWITCH IS FUSIBLE) THE SWITCH SHALL SAFELY AND WITHOUT FAILURE WITHSTAND SHORT CIRCUITS ON A SYSTEM CAPABLE OF DELIVERING UP TO 200,000 AMPS RMS SYMMETRICAL AT THE APPLIED VOLTAGE. INSTALL SWITCHES SECURELY TO WALLS. WHERE WALL IS NOT AVAILABLE, PROVIDE UNISTRUT SUPPORT STRUCTURE. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D,

### 26 36 00 TRANSFER SWITCHES

QUALITY ASSURANCE QUALITY STANDARDS: NEMA ICS 1, NFPA 110, AND UL 1008.

- PRODUCTS
  - PERFORMANCE REQUIREMENTS: INDICATED CURRENT RATINGS: FOR CONTINUOUS LOADING AND TOTAL SYSTEM TRANSFER. FAULT CURRENT CLOSING AND SHORT-CIRCUIT RATINGS: COORDINATED WITH OVERCURRENT
  - PROTECTIVE DEVICE(S). a. SHORT-TIME WITHSTAND CAPABILITY FOR THREE CYCLES.
  - TRANSFER SWITCH AND SPD RATING: SERVICE RATED.
  - GROUND-FAULT PROTECTION: NORMAL BUS. NEUTRAL SWITCHING FOR FOUR-POLE SWITCHES: NEUTRAL POLE SWITCHED SIMULTANEOUSLY WITH PHASE POLES.
  - NEUTRAL TERMINAL: SOLID. FULLY RATED.
- REMOTE PROGRAMMING FOR DEVICES. GENERAL-PURPOSE TYPE 1 FOR INDOORS AND TYPE 3R FOR EXTERIOR ENCLOSURES.
- CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES:
  - SWITCH CHARACTERISTICS: CONTINUOUS-DUTY REPETITIVE TRANSFER OF FULL-RATED CURRENT BETWEEN ACTIVE POWER SOURCES. DOUBLE THROW; MECHANICALLY HELD IN BOTH DIRECTIONS. MATERIAL: HARD-DRAWN COPPER OR ALUMINUM, 98 PERCENT CONDUCTIVITY. LUGS: COMPRESSION TYPE.
  - GROUND BAR.
  - AUTOMATIC SWITCHING ARRANGEMENT: DELAYED TRANSITION. NONAUTOMATIC SWITCHING ARRANGEMENT: UNDER-LOAD MANUAL ELECTRIC SWITCH OPERATION. DIGITAL COMMUNICATION INTERFACE.
- AUTOMATIC TRANSFER-SWITCH CONTROLLER.
- LARGE-MOTOR-LOAD POWER TRANSFER: IN-PHASE MONITOR. C. TRANSFER SWITCH ACCESSORIES:
  - REMOTE ANNUNCIATOR SYSTEM TO ANNUNCIATE THE FOLLOWING CONDITIONS:
  - SOURCES AVAILABLE. SWITCH POSITION.
  - TEST MODE. FAILURE OF COMMUNICATION LINK.
  - REMOTE ANNUNCIATOR AND CONTROL SYSTEM TO ANNUNCIATE THE FOLLOWING CONDITIONS: SOURCES AVAILABLE.
  - SWITCH POSITION. TEST MODE.
  - FAILURE OF DIGITAL COMMUNICATION LINK.
- KEY-SWITCH OR USER-CODE ACCESS TO CONTROL FUNCTIONS OF PANEL. SOURCE QUALITY CONTROL: FACTORY TEST AND INSPECT COMPONENTS, ASSEMBLED SWITCHES, AND D ASSOCIATED EQUIPMENT.

#### **26 41 13 LIGHTNING PROTECTION FOR STRUCTURES** QUALITY ASSURANCE

INSTALLER: UL-LISTED INSTALLER, CATEGORY OWAY OR LPI MASTER INSTALLER. PERFORMANCE REQUIREMENTS LIGHTNING PROTECTION STANDARD: NFPA 780 FOR CLASS II BUILDINGS. COMPONENTS: UL 96. COMPONENTS ROOF-MOUNTING AIR TERMINALS: COPPER. GROUND RODS: SOLID COPPER. MAIN CONDUCTORS: CLASS I. INSTALLATION CONDUCTORS TO BE CONCEALED: Α. SYSTEM CONDUCTORS. DOWN CONDUCTORS. INTERIOR CONDUCTORS

CONDUCTORS WITHIN NORMAL VIEW OF EXTERIOR LOCATIONS AT GRADE. GROUND LOOP.

GROUND RING.

LIGHTNING PROTECTION COMPONENTS BONDED WITH INTERMEDIATE-LEVEL INTERCONNECTION LOOP CONDUCTORS AT 60-FOOT INTERVALS. FIELD QUALITY CONTROL

A. INSPECTION: UL MASTER LABEL CERTIFICATE.

### SECTION 26 51 00 - LIGHTING

PROVIDE QUANTITY OF FIXTURES AS INDICATED ON DRAWINGS. REFER TO LIGHT FIXTURE FOR SPECIFICATIONS REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHTS, LENGTHS, AND EXACT LOCATIONS. ALL LIGHTING FIXTURES WHICH ARE SUPPORTED BY THE CEILING GRID SHALL BE SECURED TO THE GRID AS REQUIRED BY THE LOCAL CODE AUTHORITIES.

LINEAR LIGHTING FIXTURES SHALL BE SERIES INDICATED IN THE LIGHTING FIXTURE SCHEDULE WITH EXACT LENGTHS PER ARCHITECTURAL DRAWINGS. REFER TO THE ARCHITECT AND MILLWORK CONTRACTOR FOR EXACT LENGTH AND MOUNTING DETAILS. PROVIDE BONDING JUMPERS BETWEEN ADJACENT UNDER COUNTER LIGHTING FIXTURE CASINGS.

#### SECTION 27 5 00 – COMMUNICATION SYSTEMS

PROVIDE A J-BOX WITH PLASTER RING FOR DEVICE SUPPORT, AND 1" SPARE CONDUIT ROUTED TO THE ACCESSIBLE CEILING AT EACH POSITION INDICATED TO HAVE A DATA AND/OR TELEPHONE OUTLET, CARD READER, MAGNETIC LOCK, DOOR RELEASE, AUDIO/VISUAL DEVICE BOX, OR TV CABLE JUNCTION BOX. SYMBOLS AND DEVICES NOT SPECIFICALLY NOTED REPRESENT ARCHITECTURAL, A/V, OR SECURITY DEVICE COMPONENTS. REFER TO THE RESPECTIVE DRAWINGS FOR LOCATIONS, ADDITIONAL INFORMATION AND SPECIFICATIONS.

#### SECTION 28 46 21 – FIRE ALARM

FIRE ALARM SYSTEM: SIEMENS, NOTIFIER, SIMPLEX OR APPROVED EQUAL

MANUAL PULL STATIONS: FABRICATED OF METAL OR PLASTIC, AND FINISHED IN RED WITH MOLDED, RAISED-LETTER OPERATING INSTRUCTIONS OF A CONTRASTING COLOR. DOUBLE -ACTION MECHANISM, REQUIRING TWO ACTIONS, SUCH AS A PUSH AND A PULL, TO INITIATE AN ALARM. SMOKE DETECTORS: PHOTOELECTRIC TYPE WITH LED OR INFRARED LIGHT SOURCE WITH MATCHING SILICON-

CELL RECEIVER. SENSITIVITY CAN BE ADJUSTED IN PLACE AFTER INSTALL. INTEGRAL THERMAL DETECTOR. DUCT SMOKE DETECTORS SHALL BE PHOTOELECTRIC TYPE NOTIFICATION APPLIANCES: WHITE WITH RED LETTERS.

COMBINATION DEVICES: FACTORY- INTEGRATED AUDIBLE AND VISIBLE DEVICES IN A SINGLE ASSEMBLY HORNS: ELECTRIC-VIBRATING TYPE, 24VDC; WITH PROVISION FOR HOUSING THE OPERATING MECHANISM BEHIND A GRILLE. HORNS PRODUCE A SOUND-PRESSURE LEVEL OF 90DB, MEASURED 3 FFFT FROM HORN

- VISIBLE ALARM DEVICES: SYNCHRONIZED XENON STROBE LIGHTS LISTED UNDER UL 1971 WITH CLEAR LENS. MOUNT LENS ON ALUMINUM FACEPLATE WITH WORD FIRE ENGRAVED ON LENS. RATED LIGHT OUTPUT 15/30/75/110 CANDELA AS REQUIRED FOR INSTALLED LOCATION. FIRE ALARM CONTROL PANEL:
- CABINET: FLUSH MOUNTED, LOCKABLE STEEL ENCLOSURE. ARRANGE INTERIOR COMPONENTS SO OPERATIONS REQUIRED FOR TESTING OR FOR NORMAL MAINTENANCE OF THE SYSTEM ARE PERFORMED FROM THE FRONT OF THE ENCLOSURE.
- EACH ENCLOSURE WITH AN ENGRAVED, RED, LAMINATED, PHENOLIC-RESIN NAMEPLATE WITH LETTERING NOT LESS THAN 1-INCH HIGH. IDENTIFY INDIVIDUAL COMPONENTS AND MODULES WITHIN CABINETS WITH PERMANENT LABELS.
- ALARM AND SUPERVISORY SYSTEMS: SEPARATE AND INDEPENDENT IN THE FACP. ALARM-INITIATING C. ZONE BOARDS CONSIST OF PLUG-IN CARDS.
- CONTROL MODULES: INCLUDE TYPES AND CAPACITIES REQUIRED TO PERFORM THE FUNCTIONS OF FIRE ALARM SYSTEMS. INDICATIONS: LOCAL, VISIBLE AND AUDIBLE SIGNALS ANNOUNCE ALARM, SUPERVISORY AND TROUBLE
- CONDITIONS. EACH TYPE OF AUDIBLE ALARM SHALL HAVE A DIFFERENT SOUND. RESETTING CONTROLS: PREVENT THE RESETTING OF ALARM, SUPERVISORY, OR TROUBLE SIGNALS
- WHILE THE ALARM OR TROUBLE CONDITION STILL EXISTS. ALPHANUMERIC DISPLAY AND SYSTEM CONTROLS: ARRANGED FOR INTERFACE BETWEEN HUMAN OPERATOR AT THE FACP AND ADDRESSABLE SYSTEM COMPONENTS, INCLUDING ANNUNCIATION AND SUPERVISION. DISPLAY ALARM, SUPERVISORY, AND COMPONENT STATUS MESSAGES AND THE PROGRAMMING AND CONTROL MENU. LIQUID-CRYSTAL TYPE, 40 CHARACTERS, MINIMUM DISPLAY. KEYPAD ARRANGED TO PERMIT ENTRY AND EXECUTION OF PROGRAMMING, DISPLAY AND CONTROL
- COMMANDS EMERGENCY POWER SUPPLY: COMPONENTS INCLUDE VALVE-REGULATED, RECOMBINANT LEAD ACID BATTERY; CHARGER: AND AN AUTOMATIC TRANSFER SWITCH. BATTERY NOMINAL LIFE EXPECTANCY: 10 YEARS. MINIMUM. BATTERY CAPACITY: COMPLY WITH NFPA 72.
- BATTERY CHARGER: SOLID-STATE, FULLY AUTOMATIC, VARIABLE-CHARGING-RATE TYPE. PROVIDE CAPACITY FOR 150 PERCENT OF THE CONNECTED SYSTEM LOAD WHILE MAINTAINING BATTERIES AT
- FULL CHARGE INTEGRAL AUTOMATIC TRANSFER SWITCH: TRANSFERS THE LOAD TO THE BATTERY WITHOUT LOSS OF SIGNALS OR STATUS INDICATIONS WHEN NORMAL POWER FAILS.
- ADDRESSABLE INTERFACE DEVICE: DESCRIPTION: MICROELECTRONIC MONITOR MODULE LISTED FOR USE IN PROVIDING A MULTIPLEX Α SYSTEM ADDRESS FOR LISTED FIRE AND SPRINKLER ALARM-INITIATING DEVICES WITH NORMALLY OPEN
- CONTACTS INTEGRAL RELAY: CAPABLE OF PROVIDING A DIRECT SIGNAL TO THE ELEVATOR CONTROLLER TO INITIATE ELEVATOR RECALL OR TO A CIRCUIT-BREAKER SHUNT TRIP FOR POWER SHUTDOWN. WIRE: NON-POWER-LIMITED CIRCUITS: SOLID-COPPER CONDUCTORS WITH 600-V RATED, 75 DEGREES C. COLOR-CODED INSULATION. LOW-VOLTAGE CIRCUITS: NO. 16 AWG, MINIMUM. LINE-VOLTAGE CIRCUITS: NO. 12 AWG,

#### MINIMUM. POWER-LIMITED CIRCUITS: NFPA 70, TYPES FPL, FPLR, OR FPLP, AS RECOMMENDED BY MANUFACTURER.

- INSTALLATION: CONNECT THE FACP WITH A DEDICATED CIRCUIT BREAKER, WITH LOCKABLE TABS AND RED IDENTIFICATION LABEL READING "FIRE ALARM".
- MANUAL PULL STATIONS: MOUNT SEMIFLUSH IN RECESSED BACK BOXES.
- WATER-FLOW DETECTORS AND VALVE SUPERVISORY SWITCHES: PROVIDED BY DIVISION 23. CONNECTION FOR EACH SPRINKLER VALVE STATION AND WATERFLOW REQUIRED TO BE SUPERVISED. REFER TO PLUMBING/FIRE PROTECTION DRAWINGS FOR QUANTITY AND LOCATION.
- CEILING-MOUNTED SMOKE DETECTORS: NOT LESS THAN 4-INCHES (100 MM) FROM A SIDE WALL TO THE D. NEAR EDGE. FOR EXPOSED SOLID-JOIST CONSTRUCTION, MOUNT DETECTORS ON THE BOTTOM OF JOISTS. ON SMOOTH CEILINGS, INSTALL NOT MORE THAN 30 FEET (9 M) APART IN ANY DIRECTION. COMPLY WITH NFPA 72.
- WALL-MOUNTED SMOKE DETECTORS: AT LEAST 4-INCHES (100 MM), BUT NOT MORE THAN 12-INCHES BELOW THE CEILING. COMPLY WITH NFPA 72. SMOKE DETECTORS NEAR AIR REGISTERS: INSTALL NO CLOSER THAN 60-INCHES (1520 MM). COMPLY
- WITH NFPA 72. DUCT SMOKE DETECTORS: COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND NFPA 72. PROVIDE IN QUANTITY AND LOCATION AS REFERRED BY THE PROVIDED EQUIPMENT. VERIFY THAT EACH UNIT IS LISTED FOR THE COMPLETE RANGE OF AIR VELOCITY, TEMPERATURE, AND HUMIDITY POSSIBLE WHEN AIR-HANDLING SYSTEM IS OPERATING. INSTALL SAMPLING TUBES SO THEY EXTEND THE FULL WIDTH OF THE DUCT.
- FIRE/SMOKE DAMPERS: PROVIDED BY DIVISION 23. CONNECT TO EACH AS REQUIRED BY THE н SEQUENCE OF OPERATION AND THE REQUIREMENTS OF DIVISION 23 CONTROL SYSTEMS. PROVIDE SMOKE DETECTORS IN QUANTITY AND LOCATION AS REQUIRED TO COMPLY WITH IBC 716.3.2.1, IBC 716.3.3.3, AND NFPA 72. REFERENCE MECHANICAL (HVAC) SYSTEMS' DRAWINGS AND SPECIFICATION FOR THE QUANTITY AND LOCATION OF DAMPER DEVICES.
- AUDIBLE ALARM-INDICATING DEVICES: INSTALL NOT LESS THAN 6-INCHES (150 MM) BELOW THE CEILING INSTALL BELLS AND HORNS ON FLUSH-MOUNTED BACK BOXES WITH THE DEVICE-OPERATING MECHANISM CONCEALED BEHIND A GRILLE. COMBINE AUDIBLE AND VISIBLE ALARMS AT THE SAME LOCATION INTO A SINGLE UNIT. VISIBLE ALARM-INDICATING DEVICES: INSTALL IN ACCORDANCE WITH NFPA 72 AND MISSOURI
- ACCESSIBILITY STANDARDS. DEMONSTRATION: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL ON PROCEDURES AND SCHEDULES FOR STARTING AND STOPPING,

TROUBLESHOOTING, SERVICING, ADJUSTING, AND MAINTAINING EQUIPMENT AND SCHEDULES.

ENERGY & INDUSTRIA Date Issued: 02/23/24 Issue for Constructio 10260 Westheimer Road., Suite 400 Houston, Tx 77042 713-429-4949 www.InfinityMEP.com Ž D m C Ω Ш S Š õ Ζ S Ζ O Δ M ш Δ ΙO DEREK CHARI GASKAMP NUMBER PE-2019032920

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Sheet Content:

### ELECTRICAL SPECIFICATIONS

SCALE:

1/8" = 1'-0"

Drawn By: Checked By: Plot Date: 01/29/2024 Project Number: H23233 Sheet:





(1) (J L2-5,7



## KEYNOTES

 EYNOTE
 DESCRIPTION

 1
 PROVIDE J-BOX FOR MOTORIZED GATE. COORDINATE EXACT REQUIREMENTS AND LOCATION WITH VENDOR.

 2
 PROVIDE 120V POWER FOR SEPTIC SYSTEM.



Date Issued: 02/23/24 06/26/24

Issue for Construction IFC Set Addendum 02



	FIRE ALARM NOTES
А	FIRE ALARM SYSTEM DESIGN (DEVICES AND LAYOUT) ARE UNDER SEPARATE PERMIT BY THE FIRE ALARM CONTRACTOR.
В	FIRE ALARM SYSTEM CONSTRUCTION DOCUMENTS FOR THE SCOPE OF WORK INDICATED IN THIS PROJECT SHALL BE SUBMITTED TO THE LOCAL AUTHORITY HAVING JURISDICTION FOR APPROVAL PRIOR TO COMMENCING FIRE ALARM WORK AND THE INSTALLATION MUST BE APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION AFTER COMPLETION.
D	THE FIRE ALARM SYSTEM MODIFICATIONS FOR THIS PROJECT SHALL BE DESIGNED BY A LICENSED FIRE ALARM CONTRACTOR AND BE IN ACCORDANCE WITH NFPA 72 & 101 AND THE LOCAL AUTHORITY HAVING JURISDICTION BUILDING CODE. CONTRACTOF IS RESPONSIBLE FOR SUBMISSION OF PL
E	ALL 120V CIRCUITS REQUIRED FOR THE OPERATION OF THE FIRE ALARM SYSTEM SHALL BE INCLUDED. LOCATIONS OF ALL PANELS AND BOOSTERS SHALL BE COORDINATED WITH ARCHITECT. CONTRACTOR SHALL TEST THE SYSTEM IN THE PRESENCE OF LOCAL AUTHORITIES AND MAKE ALL REQUIRED MODIFICATIONS AND ADDITIONS TO THE DESIGN AT NO ADDITIONAL COST.
F	FIRE ALARM NOTIFIER SHALL REPORT TO LOCAL FIRE DEPARTMENT AND TO THE AMEREN CORPORATE MONITORING SYSTEM.



HE FIRE ALARM CONTRACTOR.
IN THIS PROJECT SHALL BE OMMENCING FIRE ALARM WORK AND AFTER COMPLETION.
ICENSED FIRE ALARM CONTRACTOR ICTION BUILDING CODE. CONTRACTOR
E INCLUDED. LOCATIONS OF ALL TEST THE SYSTEM IN THE PRESENCE E DESIGN AT NO ADDITIONAL COST.

В	REFER TO ARCHITECTUR, REPRESENTATIVE FOR EX CABLE FOR AV DEVICES.
С	PROVIDE RECESSED CLO

## **GENERAL NOTES**

HITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL DEVICES. REFER TO IT TIVE FOR EXACT LOCATION OF IT DEVICES. REFER TO AV DRAWINGS FOR A DETAILED LAYOUT OF CONDUIT AND

SSED CLOCK TYPE BOX FOR ALL WALL MOUNTED TV POWER AND A/V DEVICES. ALL 125-VOLT THROUGH 250-VOLT RECEPTACLES SUPPLIED BY SINGLE-PHASE BRANCH CIRCUITS RATED 150 VOLTS OR LESS TO GROUND, 50 AMPERES OR LESS, INSTALLED IN THE LOCATIONS SPECIFIED IN 210.8(B) (1) THROUGH (B) (12) SHALL HAVE GROUND FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL. 210.8(B)(2) KITCHENS OR AREAS WITH A SINK AND PROVISIONS FOR EITHER FOOD PREPARATION OR COOKING.

KEYNOTE	
1	COORDINATE
2	120V POWER I CONTACTORS
3	CONTRACTOR MOTION DETE PROVIDE J-BC
4	COORDINATE
5	PROVIDE NEW
7	DISCONNECT
8	DISCONNECT
9	DISCONNECT
11	PROVIDE J-BC
12	PROVIDE COP 'L1' GROUND E
13	PROVIDE NFP.
14	3/4" X 10'-0" CO
15	PROVIDE REC COVER PLATE WALL AND STU LOCATION WIT
16	PROVIDE 120





## **KEYNOTES**

DESCRIPTION EXACT APPLIANCE REQUIREMENTS WITH VENDOR.

FOR HOOD CONTROLS. COORDINATE EXACT LOCATION WITH EQUIPMENT INSTALLER. PROVIDE CONTROL S AND TOGGLE SWITCH AS REQUIRED FOR HOOD CONTROL OF EXHAUST AND SUPPLY FANS.

R TO PROVIDE ELECTRICITY FOR CARD READER WITH MAG LOCK. MAG LOCK TO BE TIED TO FIRE ALARM. PROVIDE ECTOR, PUSH RELEASE BUTTON, KEYPAD, ETC AS REQUIRED, COORDINATE WITH BUILDING SECURITY EQUIPMENT. DX AND 3/4"C W/ PULLSTRING STUBBED TO ACCESSIBLE CEILING FOR CARD READER AND PUSH RELEASE BUTTON. ALL REQUIREMENTS IN THIS ROOM WITH TENANT'S IT REPRESENTATIVE.

- V TIME SWITCH 'T1' INTERMATIC #ET2815C. COORDINATE EXACT LOCATION WITH BUILDING ENGINEER.
- SHALL BE 60A/240V/2P/N3R/NF. SHALL BE 30A/240V/2P/N3R/NF.
- SHALL BE 30A/240V/2P/N1/NF.
- OX FOR EV CHARGER. PPER TELECOMMUNICATIONS GROUNDING BUSBAR. PROVIDE #6 GREEN INSULATED WIRE FROM BUSBAR TO PANEL BAR. COORDINATE ALL REQUIREMENTS AND LOCATION WITH TENANT IT REP.
- PA 780 COMPLIANT LIGHTNING PROTECTION SYSTEM FOR STRUCTURE. OPPERCLAD GROUND ROD WITH #4/0 COPPER GROUNDING ELECTRODE CONDUCTOR.
- CESSED FLOOR BOX FOR CONFERENCE ROOM. FLOOR BOX SHALL BE HUBBELL #CFB6G30CR OR EQUIVALENT AND E TO MATCH FLOOR TYPE. PROVIDE 1-1/2"C W/PULLSTRING FOR DATA AND 3/4"C FOR POWER IN SLAB TO NEAREST UB TO ACCESSIBLE CEILING. COORDINATE FLOOR BOX ACCESSORIES WITH AV REP. COORDINATE FINISH AND TH ARCHITECT.
- V POWER FOR LOUVER MOTORIZED DAMPER. INTERLOCK DAMPER WITH ASSOCIATED MECHANICAL EQUIPMENT.



Date Issued: 02/23/24 06/26/24

Issue for Construction IFC Set Addendum 02





# 2 ELARGED IT ROOM 1/4" = 1'-0"

				• <b>b</b> ••
DESIGNATION	FIXTURE DESCRIPTION	MOUNTING	MANUFACTURER	MODI
A	2X4 RECESSED ARCHITECTURAL LAY-IN	RECESSED	NATIONAL LED	FTR3-24-UNVL-3
AE	2X4 RECESSED ARCHITECTURAL LAY-IN WITH 90 MIN. EMERGENCY BACKUP BATTERY	RECESSED	NATIONAL LED	FTR3-24-UNVL-3
В	RECESSED DOWNLIGHT	RECESSED	NATIONAL LED	LTR4-6R-UNV-1-
BE	RECESSED DOWNLIGHT WITH 90 MIN. EMERGENCY BACKUP BATTERY	RECESSED	NATIONAL LED	LTR4-6R-UNV-1-
EM	EXTERIOR EMERGENCY ONLY WALL PACK	SURFACE/WALL	CHLORIDE	PLEMBZ
Н	HIGH BAY	RECESSED	NATIONAL LED	EBXLE1-1-UNVL-
HE	HIGH BAY WITH 90 MIN. EMERGENCY BACKUP BATTERY	RECESSED	NATIONAL LED	EBXLE1-1-UNVL-
W	WALL PACK	SURFACE/WALL	NATIONAL LED	DS-402U-3-UNVL
Х	EXIT SIGN	SURFACE/WALL	CHLORIDE	CLXNRW
	·			

GEN	ERAL	NO	<b>FE</b>

LAMP TYPE	DIMMING TYPE	VOLTAGE
50W LED	0-10V	UNV
50W LED	0-10V	UNV
13W LED	0-10V	UNV
13W LED	0-10V	UNV
5W LED		UNV
101W LED	0-10V	UNV
101W LED	0-10V	UNV
39.9W LED		UNV
5W LED		UNV
	LAMP TYPE 50W LED 50W LED 13W LED 13W LED 5W LED 101W LED 39.9W LED 5W LED 5W LED	DIMMING TYPE           50W LED         0-10V           50W LED         0-10V           50W LED         0-10V           13W LED         0-10V           13W LED         0-10V           5W LED         0-10V           101W LED         0-10V           101W LED         0-10V           39.9W LED         0-10V           5W LED         5W LED

	KEYNOTES
KEYNOTE	DESCRIPTION
1	HOMERUN EXTERIOR LIGHTS VIA PHOTOCELL. COORDINATE EXACT LOCATIC PHOTOCELL SHALL BE INTERMATIC #EK4236S OR EQUIVALENT.





## S

 A
 REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF FIXTURES.

 B
 FIXTURES WITH BATTERY PACK SHALL HAVE NORMAL BALLAST CONNECTED TO LIGHT SWITCH, AND BATTERY BALLAST CONNECTED TO UN-SWITCHED POWER. BATTERY BALLAST IS SWITCHED AT PANEL ONLY. REFER TO MANUFACTURER WIRING DIAGRAM FOR INSTALLATION WITH FIXTURE NORMAL BALLAST.

C EXIT SIGNS SHALL BE CONNECTED TO UN-SWITCHED POWER. EMERGENCY LIGHTS SHALL BE SWITCHED AT PANEL ONLY.

G CONTROL SYSTEMS IN SCOPE IN ACCORDANCE ERVICES OF A REGISTERED DESIGN PROFESSIONAL TION HAVE BEEN PERFORMED IN ACCORDANCE WITH BE GIVEN TO THE OWNER OR OWNER'S AUTHORIZED MADE AVAILABLE TO CODE OFFICIAL UPON REQUEST ENERGY & INDUSTRIAL

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ION AND SCHEDULES WITH OWNER/ARCHITECT.



-BUILDING STEEL













N	EW									L1			
FULL S	SIZE NEL	JTRAL, W NEMA FEED T MOUN	V/ COPPE ENCLOSU THRU LUC TING	IR GROU JRE GS	IND BUS						400 240 120 1 3	AMP MCB VOLT P-P VOLT P-N PHASE WIRE	400
										_	22000	AIC SYMMETRICAL	
C PH	B PH	A PH	LOAD	TYPE	DESCRIPTION	CKT BKR	NO		NO	CKT BKR		DESCRIPTION	TYP
(AMP)	(AMP)	(AMP)	(VA)			AMP /P				AMP /P			
		6.0	720	RP	4 DUPLEX	20 /1	1	Α	2	30 /2	SPD		
8.3			2000	RP	IT L6-20R	20 /2	3	С	4				
		8.3		RP			5	А	6	20 /2	IT L6-20	R	RP
8.3			1000	RP	IT QUAD	20 /1	7	С	8				RP
		8.3	1000	RP	IT DUPLEX	20 /1	9	Α	10	20 /1	DISHWA	ASHER	RF
4.5			540	RP	3 DUPLEX	20 /1	11	С	12	20 /1	MICROV	VAVE	RF
		15.0	1800	RP	5 QUAD	20 /1	13	Α	14	50 /2	OVEN		MN
4.5			540	RP	WAREHOUSE DUPLEX	20 /1	15	С	16				MN
		4.2	500_	MN	FACP	20 /1	_17	A	18	20 /1	REFRIG	ERATOR	RF
2.9			696	$\Gamma_{c}$	FCU-3	15 /2	19	С	20	20 /1	HOOD V	/ENT	RF
		2.9		С			21	A	22	20 /1	LIGHTIN	IG	LT
29.1			6984	С	HP-2	35 /2	23	С	24		SPACE		
		29.1		с			25	A	26	20 /1	WAREH	OUSE LIGHTING	
1	~~~~			<u> </u>	ASBACEM M M M M M		2	C	28	20 /1	OUTDO	OR LIGHTING	01
<u> </u>				1	SPACE		29	A	30	20 /2	IT L6-20	B	RF
29.1			6984	С	HP-1	35 /2	31	C	32				RF
		29.1		C C			33	A	34		SPACE		
29		2011	696	C C	FCU-1	15 /2	35	C	36	20 /1	FF-2.3		MN
		2.9		C			37	A	38	20 /1	FIRE/SN		MN
13.4	-	2.0	3216	C C	FCU-2/CU-1	20 /2	39	C	40	20 /2	IT   6-20	R	RF
		13.4	02.0	C C		20 /2	41	A	42	20 /2			RF
			CON	NECTER		1		1	1				
					. 20, 20								20,000
СРН	B PH	A PH	LOAD	TYPE	DESCRIPTION	1				DEMAND	TYPE	DESCRIPTION	LOA
	(AMP)	(AMP)	(VA)	· · · E		-				FACTOR	···· <u>-</u>		(VA
	- ( )	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(***)	н	FLECTRIC HEAT	-				0.00	Н	ELECTRIC HEAT	
77 4	-	77.4	18576	0		-				1 00	C		185
	+		10070		MISC MOTORS	-				1.00		MISC MOTORS	
27	+		320			-				1.00			111
2.1		16.6	1000			-				1.20			- 412
07.0		10.0	1990			-				1.25			248
07.3	1	85.3	18320	KP	RECEPTAGLES	1				INEC 220.44		RECEPTACLES	1416

(AMP)	(AMP)	(AMP)	(VA)		
				н	ELECTRIC HEAT
77.4		77.4	18576	С	A/C REFRIGERATION
				MM	MISC. MOTORS
2.7			329	OL	OUTDOOR LIGHTING
		16.6	1990	LT	INDOOR LIGHTING
67.3		85.3	18320	RP	RECEPTACLES
				EX	EXISTING DEMAND
				MC	MISC. CONTINUOUS
129.9		129.9	31180	MN	MISC. NON-CONTINUOUS
				кт	KITCHEN EQUIPMENT
277.4		309.2	70395		*** TOTAL ***
29.1		29.1	6984		LARGEST MOTOR

9.9	31180	MN	MISC. NON-CONTINUOUS
		KT	KITCHEN EQUIPMENT
9.2	70395		*** TOTAL ***
9.1	6984		LARGEST MOTOR

	NEC 220.44	RP	RECEPTACLES
	1.25	EX	EXISTING DEMAND
	1.25	MC	MISC. CONTINUOUS
	1.00	MN	MISC. NON-CONTINUOUS
	0.65	KT	KITCHEN EQUIPMENT
	L2		FEED-THRU
	0.25		LARGEST MOTOR
			*** TOTAL ***

CHEN EQUIPMENT ED-THRU RGEST MOTOR TOTAL \*\*\*

KEYNOTE	
1	3/4" X 10'-0" C
	LOOP. PROV
2	PROVIDE PEI
	SHALL BE A 2
	RATING AT T



31180

 1746
 7.3
 7.3

 68561
 287
 301.3
 270.1

										L2						
															PANEL	BOAR
											400 AMP MCB	400	AMP BU	S RATIN	G	
FULL	SIZE NEU	TRAL, W	// COPPEI	R GROL	IND BUS						240 VOLT P-P					
	1	NEMA I	ENCLOSU	RE							120 VOLT P-N					
		FEED T	HRU LUG	S							1 PHASE					
SUF	FACE	MOUNT	ΓING								3 WIRE					
											22000 AIC SYMMETRICAL					
C PH	B PH	A PH	LOAD	TYPE	DESCRIPTION	CKT BKR	NO		NO	CKT BKR	DESCRIPTION	TYPE	LOAD	A PH	B PH	C PH
(AMP)	(AMP)	(AMP)	(VA)			AMP /P				AMP /P			(VA)	(AMP)	(AMP)	(AMP
		6.0	720	RP	OUTDOOR RECEPTACLES	20 /1	1	Α	2	20 /1	CP-1	MN	400	3.3		
8.3			1000	MN	OVERHEAD DOOR	20 /1	3	С	4	30 /2	EWH-1	MN	4500			18.8
$\sim$		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2000		MOTORIZED GATE		5	A	6			MN		18.8		
8.3				MN			7	ે	8	50 /2	WELDING RECEPTACLE	MN	7200			30.0
$\mathcal{A}$	p ~	<u></u>	500		SEPTHO SKOTEM		rs.	$\prec$	10			MN		30.0		
					SPACE		11	С	12	50 /2	EV CHARGER	MN	7680			32.0
					SPACE		13	А	14			MN		32.0		
					SPACE		15	С	16		SPACE					
					SPACE		17	А	18		SPACE					
					SPACE		19	С	20		SPACE					
					SPACE		21	Α	22		SPACE					
					SPACE		23	С	24		SPACE					
					SPACE		25	Α	26		SPACE					
					SPACE SPACE		25 27	A C	26 28		SPACE SPACE					
					SPACE SPACE SPACE		25 27 29	A C A	26 28 30		SPACE SPACE SPACE					
					SPACE SPACE SPACE SPACE		25 27 29 31	A C A C	26 28 30 32		SPACE SPACE SPACE SPACE					
					SPACE SPACE SPACE SPACE SPACE		25 27 29 31 33	A C A C A	26 28 30 32 34		SPACE SPACE SPACE SPACE SPACE					
					SPACE SPACE SPACE SPACE SPACE SPACE		25 27 29 31 33 35	A C A C A C	26 28 30 32 34 36		SPACE SPACE SPACE SPACE SPACE SPACE					
					SPACE SPACE SPACE SPACE SPACE SPACE SPACE		25 27 29 31 33 35 37	A C A C A C A	26 28 30 32 34 36 38		SPACE SPACE SPACE SPACE SPACE SPACE SPACE					
					SPACE SPACE SPACE SPACE SPACE SPACE SPACE SPACE		25 27 29 31 33 35 37 39	A C A C A C A C	26 28 30 32 34 36 38 40		SPACE SPACE SPACE SPACE SPACE SPACE SPACE SPACE					

C PH	B PH	A PH	LOAD	TYPE	DESCRIPTION
(AMP)	(AMP)	(AMP)	(VA)		
				Н	ELECTRIC HEAT
				С	A/C REFRIGERATION
				MM	MISC. MOTORS
				OL	OUTDOOR LIGHTING
				LT	INDOOR LIGHTING
		6.0	720	RP	RECEPTACLES
				EX	EXISTING DEMAND
				MC	MISC. CONTINUOUS
97.4		96.6	23280	MN	MISC. NON-CONTINUOUS
				КТ	KITCHEN EQUIPMENT
97.4		102.6	24000		*** TOTAL ***
					LARGEST MOTOR

		NEC DEMAND EC	AD3				
DEMAND	TYPE	DESCRIPTION	LOAD	N	A PH	B PH	C PH
FACTOR			(VA)	(AMP)	(AMP)	(AMP)	(AMP
0.00	н	ELECTRIC HEAT					
1.00	С	A/C REFRIGERATION					
1.00	MM	MISC. MOTORS					
1.25	OL	OUTDOOR LIGHTING					
1.25	LT	INDOOR LIGHTING					
NEC 220.44	RP	RECEPTACLES	720		6.0		
1.25	EX	EXISTING DEMAND					
1.25	MC	MISC. CONTINUOUS					
1.00	MN	MISC. NON-CONTINUOUS	23280		96.6		97.4
0.65	KT	KITCHEN EQUIPMENT					
		FEED-THRU		ING	CLUDED	IN TYPE	S
0.25		LARGEST MOTOR					
		*** TOTAL ***	24000	100	102.6		97.4



## **GENERAL NOTES**

## **KEYNOTES** DESCRIPTION

COPPERCLAD GROUND ROD WITH #1/0 COPPER GROUNDING ELECTRODE CONDUCTOR CONNECTED TO GROUND VIDE ADDITIONAL SUPPLEMENTAL GROUND ROD NO LESS THAN 6FT FROM FIRST GROUND ROD. PERMANENTLY AFFIXED FAULT CURRENT LABEL FOR ELECTRICAL EQUIPMENT AS REQUIRED BY NEC 110.24. LABEL A 2"X3" RECTANGLE WITH BLUE LETTERING ON A CONTRASTING BACKGROUND SHOWING THE DATE AND CURRENT THE TIME OF CALCULATION.



Date Issued: 02/23/24 06/26/24

Issue for Construction IFC Set Addendum 02

