GENERAL ELECTRICAL NOTES (CONTINUATION):

I. CENTRAL PROCESSING UNIT MODULE: THE CENTRAL PROCESSING UNIT (CPU) MODULE SHALL COMMUNICATE WITH, MONITOR AND CONTROL ALL OTHER MODULES IN THE PANEL.

J. INITIATING ZONE MODULE
1. THE INITIATING ZONE MODULE SHALL PROVIDE EIGHT FULLY SUPERVISED STYLE B (CLASS B) INITIATING DEVICE CIRCUITS (IDC).

K. NOTIFICATION CIRCUIT MODULE
1. THE NOTIFICATION CIRCUIT MODULE SHALL PROVIDE FOUR FULLY SUPERVISED STYLE Z (CLASS A) NOTIFICATION CIRCUITS.

L. CONTROL RELAY MODULE
1. THE CONTROL RELAY MODULE SHALL PROVIDE FOUR FORM-C AUXILIARY RELAY CIRCUITS RATED AT 5 AMPERES, 28 VDC.

M. UNIVERSAL DIGITAL ALARM COMMUNICATOR TRANSMITTER (UDACT). THE UDACT IS AN INTERFACE FOR COMMUNICATING DIGITAL INFORMATION BETWEEN A FIRE ALARM CONTROL PANEL AND A UL LISTED CENTRAL STATION.
1. THE UDACT SHALL BE COMPACT IN SIZE, MOUNTING IN A STANDARD MODULE POSITION OF THE FIRE ALARM CONTROL CABINET. OPTIONALLY THE UDACT SHALL HAVE THE ABILITY FOR REMOTE MOUNTING, UP TO 6,000 FEET FROM THE FIRE ALARM CONTROL PANEL. THE WIRE CONNECTIONS BETWEEN THE UDACT AND THE CONTROL PANEL SHALL BE SUPERVISED WITH ONE PAIR FOR POWER AND ONE PAIR FOR MULTIPLEXED COMMUNICATION OF OVERALL SYSTEM STATUS. SYSTEMS THAT UTILIZE RELAY CONTACT CLOSURES AREN'T ACCEPTABLE.
2. THE UDACT SHALL INCLUDE CONNECTIONS FOR DUAL TELEPHONE LINES (WITH VOLTAGE DETECT), PER UL/NFPA/FCC REQUIREMENTS. IT SHALL INCLUDE THE ABILITY FOR SPLIT REPORTING OF PANEL EVENTS UP TO THREE DIFFERENT TELEPHONE NUMBERS.

N. ENCLOSURES: THE CONTROL PANEL SHALL BE HOUSED IN A UL LISTED CABINET SUITABLE FOR SURFACE MOUNTING. CABINET AND FRONT SHALL BE CORROSION PROTECTED, GIVEN A RUST-RESISTANT PRIME COAT AND MANUFACTURER'S STANDARD FINISH. AN OPTIONAL SEMI-FLUSH TRIM RING SHALL BE AVAILABLE FOR FINISHED INSTALLATIONS.

O. POWER SUPPLY:
1. THE MAIN POWER SUPPLY FOR THE FIRE ALARM CONTROL PANEL SHALL PROVIDE ALL CONTROL PANEL AND PERIPHERAL DEVICE POWER NEEDS AS WELL AS 2.0 AMPERES OF 24 VDC POWER FOR NOTIFICATION DEVICES.

P. FIELD CHARGING POWER SUPPLY: THE FCPS IS A DEVICE DESIGNED FOR USE AS EITHER A REMOTE 24 VOLT POWER SUPPLY OR USED TO POWER NOTIFICATION APPLIANCES.
1. THE FCPS SHALL PROVIDE UP TO 6.0 AMPS (4.0 AMPS CONTINUOUS) OF REGULATED 24 VOLT POWER. IT SHALL INCLUDE AN INTEGRAL CHARGER DESIGNED TO CHARGE 7.0 AMP HOUR BATTERIES AND TO SUPPORT 60 HOUR STANDBY.

Q. SPECIFIC SYSTEM OPERATIONS
1. WALK TEST OPERATION
   a. WALK TEST MODE SHALL TEST INITIATING DEVICE CIRCUITS AND NOTIFICATION DEVICE CIRCUITS FROM THE FIELD WITHOUT RETURNING TO THE PANEL TO RESET THE SYSTEM.
   b. UPON ACTIVATION OF AN INITIATING DEVICE ALL OUTPUTS NORMALLY ACTIVATED BY THE TESTED ZONE SHALL ACTIVATE FOR APPROXIMATELY FOUR SECONDS. ONLY CIRCUITS THAT WERE SELECTED FOR THE WALK TEST SHALL PARTICIPATE IN THE TEST.
   c. INCLUDING A TROUBLE INTO THE INITIATING CIRCUIT SHALL ACTIVATE THE CONTROLLED OUTPUTS AND REMAIN ACTIVATED UNTIL THE TROUBLE IS CLEARED.
2. ALARM VERIFICATION OPERATION: WHEN AN ALARM CONDITION IS DETECTED ON AN INITIATING DEVICE CIRCUIT WHICH HAS BEEN PROGRAMMED FOR ALARM VERIFICATION, THE SYSTEM WILL AUTOMATICALLY ENTER THE ALARM VERIFICATION MODE. IF THE ALARM CONDITION IS NOT REMOVED AFTER A PRESENT TIME PERIOD OF 13 SECONDS, THEN THE SYSTEM WILL AUTOMATICALLY ENTER THE ALARM MODE.
3. WATERFLOW OPERATION: ALL INITIATING DEVICE CIRCUITS SHALL BE PROGRAMMABLE TO PROVIDE WATERFLOW DETECTION. IF AN ALARM OCCURS ON A WATERFLOW ZONE, ALL NOTIFICATION APPLIANCE CIRCUITS WHICH ARE "MAPPED" TO THAT ZONE WILL NOT BE AFFECTED BY THE SILENCE SWITCH.
4. SUPERVISORY OPERATION: AN ALARM ON A SUPERVISORY CIRCUIT SHALL ACTIVATE ALL PROGRAMMED (MAPPED) OUTPUTS, ACTIVATE A COMMON SUPERVISORY LED, AND ACTIVATE THE ZONE WHICH IS IN ALARM.
5. SIGNAL SILENCE OPERATION: ALL NOTIFICATION APPLIANCE CIRCUITS OF THE SYSTEM SHALL BE CAPABLE OR BEING PROGRAMMED TO DEACTIVATE WITH DEPRESSION OF THE SIGNAL SILENCE SWITCH.

R. BATTERIES
1. BATTERY SHALL HAVE SUFFICIENT CAPACITY TO POWER THE FIRE ALARM SYSTEM FOR NOT LESS THAN 24 HOURS PLUS 5 MINUTES OF ALARM UPON A NORMAL AC POWER FAILURE.

S. SYSTEM COMPONENTS
1. PROGRAMMABLE ELECTRONIC SOUNDERS:
   a. ELECTRONIC SOUNDERS SHALL OPERATE ON 24 VDC NOMINAL.
   b. ELECTRONIC SOUNDERS SHALL BE FIELD PROGRAMMABLE WITHOUT THE USE OF SPECIAL TOOLS, TO PROVIDE SLOW WHOOP, CONTINUOUS, OR INTERRUPTED TONES WITH AN OUTPUT SOUND LEVEL OF AT LEAST 90 DBA MEASURED AT 10 FEET FROM THE DEVICE.
2. STROBE LIGHTS SHALL MEET THE REQUIREMENTS OF THE ADA, UL STANDARD 1971.
3. MANUAL FIRE ALARM STATIONS
   a. MANUAL FIRE ALARM STATIONS SHALL BE NON-CODE, NON-BREAKGLASS TYPE, EQUIPPED WITH KEY LOCK SO THAT THEY MAY BE TESTED WITHOUT OPERATING THE HANDLE.
4. CONVENTIONAL PHOTOELECTRIC AREA SMOKE DETECTORS
5. PHOTOELECTRIC SMOKE DETECTORS SHALL BE A 24 VDC, TWO-WIRE, CEILING MOUNTED, LIGHT SCATTERING TYPE USING AN LED LIGHT SOURCE.
6. EACH DETECTOR SHALL CONTAIN A REMOTE LED OUTPUT AND A BUILT-IN TEST SWITCH.
7. DETECTOR SHALL BE PROVIDED ON A TWIST-LOCK BASE.
8. DUCT SMOKE DETECTORS: DUCT SMOKE DETECTORS SHALL BE A 24 VDC TYPE WITH VISUAL ALARM AND POWER INDICATORS, AND A RESET SWITCH. EACH DETECTOR SHALL BE INSTALLED IN THE SUPPLY/RETURN AIR DUCT (S), WITH PROPERLY SIZED AIR SAMPLING TUBES.
9. AUTOMATIC CONVENTIONAL HEAT DETECTORS
   a. AUTOMATIC HEAT DETECTORS SHALL HAVE A COMBINATION RATE OF RISE AND FIXED TEMPERATURE RATED AT 135° F FOR AREAS WHERE AMBIENT TEMPERATURES DO NOT EXCEED 100° F AND 200° F FOR AREAS WHERE THE TEMPERATURE DOES NOT EXCEED 150° F.

T. INSTALLATION
1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE NEC, NFPA 72, LOCAL AND STATE CODES AS SHOWN ON THE DRAWINGS, AND AS RECOMMENDED BY THE MAJOR EQUIPMENT MANUFACTURER.
2. ALL CONDUIT, JUNCTION BOXES, CONDUIT SUPPORTS AND HANGERS SHALL BE CONCEALED IN FINISHED AREAS AND MAY BE EXPOSED IN UNFINISHED AREAS.
3. JUNCTION BOXES SHALL BE THE COLOR RED.
4. ALL FIRE DETECTION AND ALARM SYSTEM DEVICES, CONTROL PANELS AND REMOTE ANNUNCIATORS SHALL BE FLUSH MOUNTED WHEN LOCATED IN FINISHED AREAS AND MAY BE SURFACE MOUNTED WHEN LOCATED IN UNFINISHED AREAS.

U. TEST
1. PROVIDE THE SERVICE OF A COMPETENT, FACTORY-TRAINED ENGINEER OR TECHNICIAN AUTHORIZED BY THE MANUFACTURER OF THE FIRE ALARM EQUIPMENT TO TECHNICALLY SUPERVISE AND PARTICIPATE DURING ALL OF THE ADJUSTMENTS AND TESTS FOR THE SYSTEM.
2. BEFORE ENERGIZING THE CABLES AND WIRES, CHECK FOR CORRECT CONNECTIONS AND TEST FOR SHORT CIRCUITS, GROUND FAULTS, CONTINUITY AND INSULATION.
3. CLOSE EACH SPRINKLER SYSTEM CONTROL VALVE AND VERIFY PROPER SUPERVISORY ALARM AT THE FACP.
4. VERIFY ACTIVATION OF ALL FLOW SWITCHES.
5. OPEN INITIATING DEVICE CIRCUITS AND VERIFY THAT THE TROUBLE SIGNAL ACTUATES.
6. OPEN AND SHORT NOTIFICATION APPLIANCE CIRCUITS AND VERIFY THAT THE TROUBLE SIGNAL ACTUATES.
7. GROUND DEVICE CIRCUITS AND VERIFY RESPONSE OF TROUBLE SIGNALS.
8. CHECK PROPER OPERATION OF ALL ALARM NOTIFICATION DEVICES.
9. CHECK INSTALLATION, SUPERVISION AND OPERATION OF SMOKE DETECTORS.
10. VERIFY THAT EACH INITIATING DEVICE ALARM SIGNAL IS PROPERLY RECEIVED AND PROCESSED BY THE FIRE ALARM CONTROL PANEL (WALK TEST).
11. CONDUCT TESTS TO VERIFY TROUBLE INDICATIONS FOR COMMON MODE FAILURES, SUCH AS ALTERING CURRENT POWER FAILURE.

V. FINAL INSPECTION
1. AT THE FINAL INSPECTION A FACTORY TRAINED REPRESENTATIVE OF THE MANUFACTURER OF THE MAJOR EQUIPMENT SHALL DEMONSTRATE THAT THE SYSTEMS FUNCTION PROPERLY IN EVERY RESPECT.

W. INSTRUCTION
1. PROVIDE INSTRUCTION AS REQUIRED TO THE BUILDING PERSONNEL AND FILE AND SAFETY PERSONNEL. 'HANDS-ON' DEMONSTRATIONS OF THE OPERATION OF THE SYSTEM SHALL BE PROVIDED.

PART 4 – EXECUTION

4.1 INSTALLATION

A. ELECTRICAL INSTALLATIONS SHALL CONFORM TO REQUIREMENTS OF NFPA 70 AND TO REQUIREMENTS SPECIFIED HEREIN.
1. UNDERGROUND SERVICE: UNDERGROUND SERVICE CONDUCTORS AND ASSOCIATED CONDUIT SHALL BE CONTINUOUS FROM SERVICE ENTRANCE EQUIPMENT TO POWER SYSTEM CONNECTION.
2. SERVICE ENTRANCE IDENTIFICATION: SERVICE ENTRANCE DISCONNECT DEVICES, SWITCHES OR ENCLOSURES SHALL BE LABELED OR IDENTIFIED AS SUCH:
   a. LABELS: WHENEVER WORK RESULTS IN SERVICE ENTRANCE DISCONNECT DEVICES IN MORE THAN ONE ENCLOSURE, AS PERMITTED BY NFPA 70, EACH ENCLOSURE, SHALL BE LABELED AS ONE OF SEVERAL ENCLOSURES CONTAINING SERVICE ENTRANCE DISCONNECT DEVICES. LABEL, AT MINIMUM, SHALL INDICATE TOTAL NUMBER OF ENCLOSURES THAT CONTAIN SERVICE DISCONNECT DEVICES. PROVIDE LAMINATED PLASTIC LABEL CONFORMING TO PARAGRAPH ENTITLED 'NAMPLATES'. USE LETTERING AT LEAST 0.25 INCH IN HEIGHT AND ENGRAVE ON BLACK-ON-WHITE MATTE FINISH.
   b. WIRING METHODS: PROVIDE INSULATED CONDUCTORS INSTALLED IN RIGID STEEL CONDUIT, IMC, RIGID NONMETALLIC CONDUIT OR EMT, EXCEPT WHERE SPECIFICALLY INDICATED OR SPECIFIED OTHERWISE REQUIRED BY NFPA 70 TO BE INSTALLED OTHERWISE. PROVIDE INSULATED, GREEN EQUIPMENT GROUNDING CONDUCTOR IN FEEDER AND BRANCH CIRCUITS, INCLUDING LIGHTING CIRCUITS. GROUNDING CONDUCTOR SHALL BE SEPARATE FROM ELECTRICAL SYSTEM NEUTRAL CONDUCTOR. PROVIDE INSULATED, GREEN EQUIPMENT GROUNDING CONDUCTOR FOR CIRCUIT INSTALLED IN CONDUIT OR RACEWAYS. MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH DIAMETER FOR LOW VOLTAGE LIGHTING AND POWER CIRCUITS.
   c. RESTRICTIONS APPLICABLE TO EMT:
      1) DO NOT INSTALL UNDERGROUND.
      2) DO NOT ENCASE CONCRETE, MORTAR, GROUT OR OTHER CEMENTIOUS MATERIALS.
      3) DO NOT USE IN AREAS SUBJECT TO SEVERE PHYSICAL DAMAGE INCLUDING BUT NOT LIMITED TO EQUIPMENT ROOMS WHERE MOVING OR REPLACING EQUIPMENT COULD PHYSICALLY DAMAGE THE EMT.
      4) DO NOT USE OUTDOORS.
      5) DO NOT USE IN CLASS 1, GROUP P LOCATIONS.
         a) RESTRICTIONS APPLICABLE TO PVC SCHEDULE 40 AND PVC SCHEDULE 80: DO NOT INSTALL ABOVE GRADE OR WITHIN BUILDING INTERIOR UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
         b) RESTRICTIONS APPLICABLE TO FLEXIBLE CONDUIT: USE ONLY AS SPECIFIED IN PARAGRAPH ENTITLED 'FLEXIBLE CONNECTIONS'.
   d. SERVICE ENTRANCE CONDUIT, UNDERGROUND: PVC, TYPE-EPC 40. CONVERT NONMETALLIC CONDUIT OTHER THAN PVC SCHEDULE 80 TO RIGID STEEL CONDUIT OR STEEL IMC BEFORE RISING THROUGH FLOOR SLAB. UNDERGROUND PORTION SHALL BE ENCASED IN A MINIMUM OF 3 INCHES OF CONCRETE AND SHALL BE INSTALLED MINIMUM OF 18 INCHES BELOW SLAB OR GRADE.
   e. UNDERGROUND CONDUIT OTHER THAN SERVICE ENTRANCE: PVC, TYPE EPC-40. CONVERT NONMETALLIC CONDUIT OTHER THAN PVC SCHEDULE 80 TO RIGID STEEL CONDUIT OR STEEL IMC BEFORE RISING THROUGH FLOOR SLAB.
   f. CONDUIT IN FLOOR SLABS: RIGID STEEL; STEEL IMC OR PVC, TYPE EPC-40.
   g. METAL CLAD CABLE: INSTALL IN ACCORDANCE WITH NFPA 70, TYPE MC CABLE.
3. CONDUIT INSTALLATION: ALL CONDUIT SHALL BE INSTALLED CONCEALED IN NEW AND EXISTING CONSTRUCTION. WHERE CONDUIT CANNOT BE INSTALLED CONCEALED BEHIND OR WITHIN EXISTING WALLS, CEILINGS OR FLOORS, SURFACE RUN CONDUIT SHALL BE PERMITTED WITH THE WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER ON A CASE BY CASE BASIS. SURFACE CONDUIT INSTALLED WITHOUT WRITTEN PERMISSION SHALL BE REMOVED AND INSTALLED CONCEALED AT THE CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE ARCHITECT/ENGINEER. SURFACE CONDUIT INCLUDING JUNCTION BOXES AND FITTINGS SHALL BE FIELD PAINTED BY THE CONTRACTOR. CONCEAL CONDUIT UNDER FLOOR SLABS AND WITHIN FINISHED WALLS, CEILINGS AND FLOORS. KEEP CONDUIT A MINIMUM OF 6 INCHES AWAY FROM PARALLEL RUNS OF FLUES AND STEAM OR HOT WATER PIPES. INSTALL CONDUIT PARALLEL WITH OR AT RIGHT ANGLES TO CEILINGS, WALLS AND STRUCTURAL MEMBERS WHERE LOCATED ABOVE ACCESSIBLE CEILINGS AND WHERE CONDUIT WILL BE VISIBLE AFTER COMPLETION OF THE PROJECT. RUN CONDUITS IN UNDER FLOOR SLAB AS IF EXPOSED.
   a. CONDUIT INSTALLED UNDER FLOOR SLABS: CONDUIT RUN UNDER FLOOR SLAB SHALL BE LOCATED A MINIMUM OF 12 INCHES BELOW VAPOR BARRIER. SEAL AROUND CONDUITS AT PENETRATIONS THROUGH VAPOR BARRIER.
   b. CONDUIT THROUGH FLOOR SLABS: WHERE CONDUITS RISE THROUGH FLOOR SLABS, CURVED PORTION OF BENDS SHALL NOT BE VISIBLE ABOVE FINISH SLAB.
   c. CONDUIT SUPPORT: SUPPORT CONDUIT BY PIPE STRAPS, WALL BRACKETS, HANGERS OR CEILING TRAPEZE. FASTEN BY WOOD SCREWS TO WOOD, BY TOGGLE BOLTS ON HOLLOW MASONRY UNITS; BY CONCRETE INSERTS OF EXPANSION BOLTS ON CONCRETE AND BRICK AND BY MACHINE SCREWS, WELDED THREADED STUBS OR SPRING TENSION CLAMPS ON STEEL WORK. THREADED C-CLAMPS MAY BE USED ON RIGID STEEL ONLY. DO NOT WELD CONDUITS OR PIPE STRAPS TO STEEL STRUCTURES. LOAD APPLIED TO FASTENERS SHALL NOT EXCEED ¼ PROOF TEST LOAD. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS. IN SUSPENDED CEILING CONSTRUCTION, RUN CONDUIT ABOVE CEILING. DO NOT SUPPORT CONDUIT BY CEILING SUPPORT SYSTEM. CONDUIT AND BOX SYSTEMS SHALL BE SUPPORTED INDEPENDENTLY OF BOTH TIE WIRES SUPPORTING CEILING GRID SYSTEM AND CEILING GRID SYSTEMS INTO WHICH CEILING PANELS ARE PLACED. SUPPORTING MEANS SHALL NOT BE SHARED BETWEEN ELECTRICAL RACEWAYS AND MECHANICAL PIPING OR DUCTS. INSTALLATION SHALL BE COORDINATED WITH ABOVE CEILING MECHANICAL SYSTEMS TO ASSURE MAXIMUM ACCESSIBILITY TO SYSTEMS. SPRING-STEEL FASTENERS MAY BE USED FOR LIGHTING BRANCH CIRCUIT CONDUIT SUPPORTS IN SUSPENDED CEILINGS IN DRY LOCATIONS. SUPPORT EXPOSED RISERS IN WIRE SHAFTS OF MULTI-STORY BUILDINGS BY U-CLAMP HANGERS AT EACH FLOOR LEVEL AND AT 10 FOOT MAXIMUM INTERVALS.
   d. DIRECTIONAL CHANGES IN CONDUIT RUNS: MAKE CHANGES IN DIRECTION OF RUNS WITH SYMMETRICAL BENDS OR CAST-METAL FITTINGS. MAKE FIELD-MADE BENDS AND OFFSETS WITH HICKEY OR CONDUIT-BENDING MACHINE. DO NOT INSTALL CRUSHED OR DEFORMED CONDUITS. AVOID TRAPPED CONDUITS. PREVENT PLASTER, DIRT OR TRASH FROM LODGING IN CONDUITS, BOXES FITTINGS AND EQUIPMENT DURING CONSTRUCTION. FREE CLOGGED CONDUITS OF OBSTRUCTIONS.
   e. PULL WIRE: INSTALL PULL WIRE IN EMPTY CONDUITS. PULL WIRE SHALL BE PLASTIC HAVING A MINIMUM 200-POUND TENSILE STRENGTH, LEAVE MINIMUM OF 36" OF STACK AT EACH END OF PULL WIRE.
   f. DATA SYSTEM CONDUITS: INSTALL IN ACCORDANCE WITH SPECIFIED REQUIREMENTS FOR CONDUIT AND WITH ADDITIONAL REQUIREMENT THAT NO LENGTH OF RUN SHALL EXCEED 150 FEET FOR TRADE SIZES 2" AND SMALLER AND SHALL NOT CONTAIN MORE THAN (2) 90 DEGREE BENDS OR EQUIVALENT. PROVIDE PULL OR JUNCTION BOXES WHERE NECESSARY TO COMPLY WITH THE REQUIREMENTS. INSIDE RADII OF BENDS IN CONDUITS 1" TRADE SIZE AND LARGER SHALL BE MINIMUM 5 TIMES NOMINAL DIAMETER. TERMINATE CONDUIT AT BOTTOM EDGE OF CABLE TRAYS AND BACKBOARDS WITH PLASTIC BUSHINGS.
   g. CONDUIT INSTALLED IN CONCRETE FLOOR SLABS: LOCATE SO AS NOT TO ADVERSELY AFFECT STRUCTURAL STRENGTH OF SLABS. INSTALL CONDUIT WITHIN MIDDLE ONE-THIRD OF CONCRETE SLAB. DO NOT STACK CONDUITS. SPACE CONDUITS HORIZONTALLY NOT CLOSER THAN THREE DIAMETERS EXCEPT AT CABINET LOCATIONS. CURVED PORTIONS OF BENDS SHALL NOT BE VISIBLE ABOVE FINISHED SLAB. INCREASE SLAB THICKNESS AS NECESSARY TO PROVIDE MINIMUM ONE-INCH COVER OVER CONDUIT. WHERE EMBEDDED CONDUITS CROSS BUILDING AND/OR EXPANSION JOINTS, PROVIDE SUITABLE WATER TIGHT EXPANSION/DEFLECTION FITTINGS AND BONDING JUMPERS. EXPANSION/DEFLECTION FITTINGS SHALL ALLOW HORIZONTAL AND VERTICAL MOVEMENT OF RACEWAY. CONDUIT LARGER THAN ONE-INCH TRADE SIZE SHALL BE PARALLEL WITH OR AT RIGHT ANGLES TO MAIN REINFORCEMENT. WHERE NONMETALLIC CONDUIT IS USED RACEWAY MUST BE CONVERTED TO RIGID STEEL OR STEEL IMC BEFORE RISING ABOVE FLOOR, UNLESS SPECIFICALLY INDICATED.
   h. LOCKNUTS AND BUSHINGS: FASTEN CONDUITS TO SHEET METAL BOXES AND CABINETS WITH TWO LOCKNUTS WHERE REQUIRED BY NFPA 70, WHERE INSULATED BUSHINGS ARE USED AND WHERE BUSHINGS CANNOT BE BROUGHT INTO FIRM CONTACT WITH THE BOX; OTHERWISE, USE AT LEAST MINIMUM SINGLE LOCKNUT AND BUSHING. LOCKNUTS SHALL HAVE SHARP EDGES FOR DIGGING INTO WALL OF METAL ENCLOSURES. INSTALL BUSHINGS ON ENDS OF CONDUITS AND PROVIDE INSULATING TYPE WHERE REQUIRED BY NFPA 70.
   i. STUB-UPS: PROVIDE CONDUITS STUBBED UP THROUGH CONCRETE FLOOR FOR CONNECTION TO FREE-STANDING EQUIPMENT WITH ADJUSTABLE TOP OR COUPLING THREADED INSIDE FOR PLUGS. SET FLUSH WITH FINISHED FLOOR. EXTENDED CONDUCTORS TO EQUIPMENT IN RIGID STEEL CONDUIT, EXCEPT THAT FLEXIBLE METAL CONDUIT MAY BE USED 6 INCHES ABOVE FLOOR. WHERE NO EQUIPMENT CONNECTIONS ARE MADE, INSTALL SCREWDRIVER OPERATED THREADED FLUSH PLUGS IN CONDUIT END.
   j. FLEXIBLE CONNECTIONS: PROVIDE FLEXIBLE STEEL CONDUIT BETWEEN 3 AND 6 FEET IN LENGTH FOR RECESSED AND SEMI-RECESSED LIGHTING FIXTURES; FOR EQUIPMENT SUBJECT TO VIBRATION, NOISE TRANSMISSION, OR MOVEMENT AND FOR MOTORS. INSTALL FLEXIBLE CONDUIT TO ALLOW 20 % SLACK. MINIMUM FLEXIBLE STEEL CONDUIT SIZE SHALL BE 3/4 " IN DIAMETER. PROVIDE LIQUID TIGHT FLEXIBLE CONDUIT IN WET LOCATIONS AND IN FIRE PUMP ROOMS. PROVIDE SEPARATE GROUND CONDUCTOR ACROSS FLEXIBLE CONNECTIONS.
   k. FIRESTOPPING: CONDUITS PASSING THROUGH SMOKE AND FIRE PARTITIONS SHALL BE RIGID STEEL THREADED TYPE WITH GROUNDING BUSHINGS. E.M.T. AND PVC SHALL TRANSITION TO RIGID STEEL THREADED CONDUIT A MINIMUM OF 12 INCHES BEYOND EACH SIDE OF FIRE PARTITIONS: PENETRATIONS SHALL BE FIRE STOPPED IN ACCORDANCE WITH SECTION 07920 "FIRESTOP SYSTEM". CONDUCTORS RUN THROUGH SMOKE AND FIRE PARTITIONS SHALL BE INSTALLED IN 4-INCH RIGID STEEL CONDUITS WITH GROUNDING BUSHINGS, EXTENDING 12" BEYOND EACH SIDE OF PARTITIONS. SEAL CONDUIT ON BOTH ENDS TO MAINTAIN SMOKE AND FIRE RATINGS OF PARTITIONS. PENETRATIONS SHALL BE FIRESTOPPED IN ACCORDANCE WITH SECTION 07920 "FIRESTOP SYSTEMS".
4. MOUNTING HEIGHTS: MOUNT PANELBOARD AND CIRCUIT BREAKERS AND DISCONNECTING SWITCHES SO HEIGHT OF OPERATING HANDLE AT ITS HIGHEST POSITION IS A MAXIMUM OF 78" ABOVE FLOOR. MOUNT LIGHTING SWITCHES 48" ABOVE FINISHED FLOOR, RECEPTACLES 18 INCHES ABOVE FINISHED FLOOR AND OTHER DEVICES AS INDICATED. MEASURE MOUNTING HEIGHTS OF WIRING DEVICES AND OUTLETS TO CENTER OF DEVICE OR OUTLET.
5. CONDUCTOR IDENTIFICATION: PROVIDE CONDUCTOR IDENTIFICATION WITHIN EACH ENCLOSURE WHERE TAP, SPLICE, OR TERMINATION IS MADE. FOR CONDUCTORS NO. 6 AWG AND SMALLER DIAMETER, COLOR CODING SHALL BE FACTORY-APPLIED, COLOR IMPREGNATED INSULATION. FOR CONDUCTORS NO. 4 AWG AND LARGER DIAMETER, COLOR CODING SHALL BE BY PLASTIC-COATED, SELF-STICKING MARKERS; COLOR NYLON CABLE TIES AND PLATES; OR HEAT SHRINK-TYPE SLEEVES.
6. SPLICES: MAKE SPLICES IN ACCESSIBLE LOCATIONS. MAKE SPLICES IN CONDUCTORS NO. 10 AWG AND SMALLER DIAMETER WITH INSULATED, PRESSURE-TYPE CONNECTOR. MAKE SPLICES IN CONDUCTOR/S NO.8 AWG AND LARGER DIAMETER WITH SOLDLESS CONNECTOR AND COVER WITH INSULATION MATERIAL EQUIVALENT TO CONDUCTOR INSULATION.
7. COVERS AND DEVICE PLATES: INSTALL WITH EDGES IN CONTINUOUS CONTACT WITH FINISHED WALL SURFACES WITHOUT USE OF MATS OR SIMILAR DEVICES. PLASTER FILINGS ARE NOT PERMITTED. INSTALL PLATES WITH ALIGNMENT TOLERANCE OF 1/16 INCH. USE OF SECTIONAL TYPE DEVICE PLATES IS NOT PERMITTED. PROVIDE GASKET FOR PLATES INSTALLED IN WET LOCATIONS.
8. ELECTRICAL PENETRATIONS: SEAL OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE RESISTANCE-RATED WALLS, PARTITIONS, FLOOR AND CEILINGS UTILIZING PROPER FIRESTOPPING MATERIALS TO MAINTAIN FIRE RESISTIVE INTEGRITY.
9. EQUIPMENT CONNECTIONS: PROVIDE POWER WIRING FOR THE CONNECTION OF MOTORS AND CONTROL EQUIPMENT UNDER THIS SECTION OF THE SPECIFICATION. EXCEPT AS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, AUTOMATIC CONTROL WIRING, CONTROL DEVICES, AND PROTECTIVE DEVICES WITHIN THE CONTROL CIRCUITRY ARE NOT INCLUDED IN THIS SECTION OF THE SPECIFICATIONS BUT SHALL BE PROVIDED UNDER THE SECTION SPECIFYING THE ASSOCIATED EQUIPMENT.

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Revisions

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ELECTRICAL:
GENERAL ELECTRICAL NOTES (CONTINUATION)

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