### GENERAL ELECTRICAL REQUIREMENTS

- TERM "PROVIDE" IS DEFINED AS MEANING "FURNISH AND INSTALL". TERM "CONSTRUCTION DOCUMENTS" INCLUDES PROJECT SPECIFICATIONS AND ACCOMPANYING DRAWINGS. "AHJ" IS AUTHORITY HAVING JURISDICTION.
- 2. DIVISION 26 WORK PERFORMED UNDER THESE SPECIFICATIONS SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING CODES AND STANDARDS: ANSI, ASTM, NFPA (INCLUDING NFPA 101 AND NFPA 70 - NEC). EQUIPMENT AND INSTALLATION SHALL CONFORM TO: NEMA AND UL. ADDITIONALLY, ALL WORK SHALL COMPLY WITH APPLICABLE GSA CODES AND STANDARDS.
- SUBMIT SHOP DRAWINGS AND PRODUCT DATA INFORMATION FOR RACEWAY, BOXES, BREAKERS, EQUIPMENT ENCLOSURES, CONDUCTORS, AND SPLICING MATERIALS. CONTRACTOR SHALL ALSO INCLUDE APPROVED HEAT TRACING COMPONENTS AND THERMOSTATS, TO CONFIRM COORDINATION BETWEEN DISCIPLINES.
- ENGINEER'S SHOP DRAWING AND PRODUCT REVIEW SHALL BE ONLY FOR CONFORMANCE WITH DESIGN CONCEPT OF PROJECT AND COMPLIANCE WITH CONSTRUCTION DOCUMENTS.
- 5. REFER TO FIRE PROTECTION, FIRE ALARM, AND MECHANICAL DRAWINGS FOR FLOOR PLANS.
- CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR LOCATING AND CONFIRMING SUFFICIENT POWER SOURCES.
- INFORMATION SHOWN ON CONSTRUCTION DOCUMENTS IS AN ACCURATE DEPICTION OF DESIGN INTENT, BUT IS NOT GUARANTEED. DO NOT SCALE THE DRAWINGS FOR EXACT DIMENSION; REFER TO DIMENSIONED DETAILS. WHERE STRUCTURAL OR ARCHITECTURAL FEATURES GOVERN LOCATION OF WORK, REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS.
- 8. CONTRACTOR SHALL COORDINATE WORK OF VARIOUS TRADES SO THAT INTERFERENCE BETWEEN TRADES BETWEEN CONDUITS, CABLE TRAY, PIPING, DUCTWORK, EQUIPMENT, ARCHITECTURAL AND STRUCTURAL WORK, ETC., WILL BE AVOIDED. PROVIDE ALL NECESSARY MODIFICATIONS, OFFSETS IN RACEWAYS, FITTINGS, ETC., REQUIRED FOR A PROPER INSTALLATION, SO AS TO TAKE UP A
- ELECTRICAL CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, MATERIALS, AND WORKMANSHIP
  PROVIDED UNDER THIS DIVISION TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE YEAR FROM
  DATE OF FINAL ACCEPTANCE (DATE OF CERTIFICATE OF SUBSTANTIAL COMPLETION), UNLESS A
  LANCEP UNIFATION IS CONTRACTABLY PEQUIPMEN. LONGER DURATION IS CONTRACTUALLY REQUIRED.
- 10. PROVIDE TEMPORARY SERVICES AS REQUIRED, INCLUDING TEMPORARY POWER FOR LIGHTING AND CONSTRUCTION.
- 11. PATCH NEW AND EXISTING CONSTRUCTION AT ALL OPENINGS CUT (OR DAMAGED) FOR INSTALLATION OF NEW ELECTRICAL WORK, ADDITIONALLY, PATCH NEW AND EXISTING CONSTRUCTION (TO MATCH ORIGINAL CONTITIONS) AT ALL REMAINING OPENINGS CAUSED BY THE REMOVAL OR RELOCATION OF EXISTING WORK. PATCH WORK SHALL USE HIGH QUALITY MATERIALS.
- 12. REGARDLESS OF THE DIAGRAMMATIC LOCATION SHOWN ON THE DRAWINGS, INSTALL ALL EQUIPMENT, RACEWAY, JUNCTION BOXES, ETC., TO ALLOW ACCESS AND AMPLE SPACE FOR MAINTENANCE, REMOVAL, OR CHANGES. THIS ACCESSIBILITY REQUIREMENT APPLIES AFTER WORK BY ALL TRADES IS INSTALLED AND COMPLETE. IF THE GOVERNMENT OR ENGINEER DETERMINES AN ITEM IS NOT SUFFICIENTLY ACCESSIBLE, CONTRACTOR SHALL REMEDY AT NOT ADDITIONAL
- 13. SEAL ALL PENETRATIONS THOUGH FIRE—RATED ASSEMBLIES WITH FIRESTOPPING MATERIAL AS MANUFACTURED BY 3M, DOW CORNING, CHASE TECHNOLOGY, TREMOO, THOMAS AND BETTS, OR O.Z. GEDNEY, FIRE STOPPING METHOO SHALL BE U. APPROVED FOR THE INTENDED ASSEMBLY, AND ACCEPTABLE TO THE LOCAL AUTHORITY HAVING JURISDICTION. ALL MATERIALS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

## 14 PENETRATIONS

- 14.1. IN CONCRETE BLOCK WALLS, CORE DRILL HOLES AND PROVIDE GALVANIZED STEEL SLEEVES.14.2. IN NON-RATED PENETRATIONS, SEAL ANNULAR SPACES WITH URETHANE CAULK.
- 14.3. IN FIRE RATED PENETRATIONS, SEAL ALL ANNULAR SPACES WITH A FIRE STOPPING MATERIAL TO ACCOMPLISH AN HOURLY FIRE RATING EQUAL TO OR HIGHER THAN FIRE RATING OF THE WALL OR FLOOR ASSEMBLY.
- PENETRATIONS THROUGH VAPOR OR TEMPERATURE BARRIERS SHALL BE SEALED TO PREVENT CONDENSATION.
- USING A BLACK PERMANENT MARKER, NEATLY LABEL ALL JUNCTION BOXES AND PULLBOXES ON THEIR COVER PLATES, FOR IDENTIFICATION PURPOSES.
- 16. OBTAIN PERMITS AND REQUEST INSPECTIONS FROM ALL AUTHORITIES HAVING JURISDICTION, AND INCLUDE ALL ASSOCIATED COSTS OR FEES. INCLUDE ALL COSTS ASSOCIATED WITH PROVIDING UTILITY SERVICE AND TEMPORARY SERVICES TO THE PROJECT.
- 17. ALL MATERIALS PROVIDED SHALL BE NEW AND UNUSED, LISTED UNDER A UL CATEGORY, AND SHALL BE THE PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN PRODUCING SUCH EQUIPMENT AND MATERIALS FOR AT LEAST FIVE YEARS.
- 18. ALL NEW ITEMS PROVIDED SHALL BE 'BUY AMERICAN ACT' COMPLIANT.
- THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY

### GROUNDING AND BONDING

- 1. EQUIPMENT GROUNDING CONDUCTOR SHALL BE COPPER WITH GREEN INSULATION.
  2. GROUNDING SYSTEM IN ACCORDANCE WITH NEC-ZSO AND ANY APPLICABLE STATE OR LOCAL CODES. ALL GROUNDING EQUIPMENT SHALL BE UL LISTED.
  3. PROVIDE EQUIPMENT GROUND CONDUCTORS IN ALL FEEDER AND BRANCH CIRCUIT CONDUITS, AND TERMINATE ON AN UNINSULATED GROUND BUS WITHIN THE APPROPRIATE PANELBOARD OR EQUIPMENT ENCLOSURE. NEUTRAL BUS OF DISTRIBUTION EQUIPMENT SHALL NOT BE USED FOR EQUIPMENT GROUNDS.
  4. ALL METALLIC EQUIPMENT ENCLOSURES, RACEWAY SYSTEMS, ETC., SHALL BE GROUNDED.
  5. PROVIDE BONDING BUSHINGS ON CONDUITS USED SOLELY FOR THE PROTECTION OF GROUNDING CONDUITIONS.

- 1. ALL CONDUCTORS PROVIDED IN THESE CONTRACT DOCUMENTS SHALL HAVE 600V RATED, THWN
- PROVIDE STRANDED COPPER CONDUCTORS, MINIMUM #12 AWG, UNLESS NOTED OTHERWISE. ALUMINUM CONDUCTORS ARE NOT PERMITTED.
- PROVIDE SOLID COLOR INSULATION FOR ALL CONDUCTORS, REGARDLESS OF SIZE. UNL SPECIFIED OTHERWISE BY AHJ, POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:
- FOR 208Y/120V, 3-PHASE, 4-WIRE SYSTEMS
- PHASE A = BLACK
- PHASE B = RED 3.1.3. PHASE C = BLUE
- 3.1.5. GROUND = GREEN
- FOR 240/120V, 1-PHASE, 3-WIRE SYSTEMS
- 3.1.1. PHASE A = BLACK312 PHASE B = RED
- NEUTRAL = WHITE
- 3.1.4. GROUND = GRFFN FOR 480Y/277V, 3-PHASE, 4-WIRE SYSTEMS
- 3.1.1. PHASE A = BROWN
- 3.1.3. PHASE C = YELLOW
- NEUTRAL = GRAY GROUND = GREEN
- 4. DO NOT INSTALL MORE THAN THREE BRANCH CIRCUITS PER CONDUIT
- FOR BRANCH CIRCUITS OVER 100 FEET IN LENGTH, INCREASE THE CONDUCTORS BY ONE SIZE, AND INCREASE THE CONDUIT AS REQUIRED.
- PROVIDE #12 AWG CONDUCTORS FOR BRANCH CIRCUIT NOT OTHERWISE SHOWN OR SCHEDULED ON THE DRAWINGS. PROVIDE CONDUCTOR QUANTITIES AS REQUIRED FOR PROPER OPERATION OF DEVICES OR EQUIPMENT SERVED.
- SPLICES SHALL BE LIMITED. IF A SPLICE IS DEEMED UNNECESSARY BY THE GOVERNMENT OR ENGINEER, CONTRACTOR SHALL DISPOSE OF THE SPLICED CONDUCTORS AND RE—PULL NEW CONTINUOUS CONDUCTORS AT NO ADDITIONAL COST.

# PANELBOARDS AND BREAKERS:

-(3) 8, #10G IN 3/4" EMT

INTENT IS TO ROUTE NEW POWER RACEWAY ADJACENT TO SPRINKLER RISER
OF BASEMENT TO ATTIC. BASEMENT AND ATTIC EXPOSED ROUTING TO BE FIELD

FOR NEW BREAKER(S) IN EXISTING PANEL(S): NEW BREAKER(S) SHALL BE 100% COMPATIBLE WITH EXISTING PANEL. NEW BREAKER(S) SHALL ALSO MATCH AIC RATING, BRAND, AND MOUNTING TYPE OF OTHER EXISTING BREAKERS. EXISTING PANEL SCHEDULE SHALL BE EDITED TO INDICATE NEW LOAD.

FINAL CONNECTION TO ELECTRIC UNIT HEATER SHALL BE VIA FMC. LENGTH OF FMC SHALL BE LIMITED TO 6' MAXIMUM.

ACCESSIBLE FROM EUH LOCATION (AND NO FARTHER THAN 50' AWAY FROM LOAD).

IN LIEU OF DISCONNECT SWITCHES, CONTRACTOR MAY PROVIDE LOCKABLE MANUAL STARTERS.

5. DISCONNECTING MEANS FOR EACH EUH SHALL BE VISIBLE AND READILY

- NEW BREAKERS BEING PROVIDED IN EXISTING PANELBOARDS SHALL MATCH BRAND AND INTERRUPTING CURRENT RATING OF PANEL. MOUNTING PROVISIONS NECESSARY FOR INSTALLATION IN THE EXISTING PANEL SHALL BE COORDINATED BY THE CONTRACTOR.
- 2. BREAKERS SHALL BE UL LISTED, WITH TRIP VALUE AND POLES AS NOTED ON THE DRAWINGS.

PNL MEZZ 200A MLO QO LOAD CENT

EXIST. PNL LCL GE TYPE NAB 225A MLO 3PH 4W

EXISTING SERVICE ENTRANCE GA POWER MAX PAST WINTER DEMAND (OVER LAST 3 YEARS AS OF 1/2018)

NEW ELECTRIC UNIT HEATERS

=185KW (642A AT ASSUMED PF OF 0.8)

THEREFORE EXISTING SERVICE ENTRANCE CAN ACCOMMODATE NEW LOADS.

208Y/120V

- NEW 175A/3P

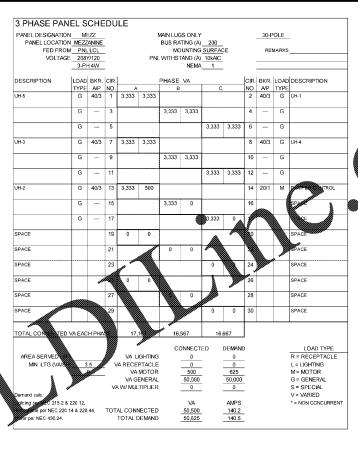
LOAD ESTIMATION

=148KW SUBTOTAL +25% SAFETY MARGIN

3. PROVIDE TYPEWRITTEN PANEL SCHEDULES IN EACH NEW PANELBOARD PROVIDED, AND IN EACH EXISTING PANLEBOARD WHOSE CIRCUITS HAVE BEEN MODIFIED AS PART OF WORK IN THIS PROJECT. SCHEDULES SHALL INDICATE CIRCUIT NUMBER, LOAD SERVED, AND CORRESPONDING

# RACEWAY AND BOXES

- 1. UNLESS OTHERWISE NOTED, MINIMUM CONDUIT SIZE SHALL BE 3/4" TRADE SIZE.
- 2. CONDUIT TYPES (CONDUIT TYPES SPECIFICALLY LISTED BELOW ARE THE ONLY PERMISSIBLE CONDUIT TYPES ON THIS PROJECT):
- RIGID METAL CONDUIT (RMC) MAY BE INSTALLED IN ANY LOCATION, EXCEPT IN A CORROSIVE ATMOSPHERE. RMC INSTALLED BELOW GRADE SHALL BE GIVEN AN EVEN AND COMPLETE COAT OF BITUMASTIC PAINT (PVC-COATED RIGID GALVANIZED STEEL (RGS) CONDUIT IS ALSO ACCEPTABLE).
- INTERMEDIATE METAL CONDUIT (IMC) MAY BE INSTALLED IN ANY LOCATION EXCEPT BELOW GRADE OR IN A CORROSIVE ATMOSPHERE.
- ELECTRICAL METALLIC TUBING (EMT) MAY BE INSTALLED IN INTERIOR LOCATIONS, EXCEPT HAZARDOUS LOCATIONS
- Flexible Metal Conduit (FMC) shall be used for final equipment connections. FMC shall be installed in lengths not to exceed 6 feet. FMC shall be galvanized steel and shall conform to ul 1. Aluminum FMC is not acceptable.
- 3.1. CONDUIT FITTINGS SHALL BE ZINC PLATED STEEL, AND CONFORM TO UL 514B. POT-METAL IS PROHIBITED.
- EMT FITTINGS SHALL BE CONCRETE TIGHT, AND RAINTIGHT. FITTINGS SHALL BE COMPRESSION TYPE. CONNECTORS SHALL HAVE INSULATED THROATS. 3.2.
- RMC AND IMC FITTINGS SHALL BE THREADED DOUBLE LOCKNUT TYPE WITH BUSHING. FMC FITTINGS SHALL BE CLAMP-TYPE WITH INSULATED THROAT.
- PROVIDE CONDUIT BUSHINGS AT TERMINATION POINT OF ALL CONDUIT WHICH DOES NOT
- TERMINATE INTO A BOX OR ENCLOSURE. 5. ALL CONDUITS SHALL BE INTERNALLY CLEANED AND DEBURRED PRIOR TO INSTALLATION OF PULLSTRINGS OR CONDUCTORS.
- BOXES SHALL BE GALVANIZED STEEL AND SIZED PER CODE TO ACCOMMODATE QUANTITY, SIZE, AND BENDING RADIUS OF ENCLOSED CONDUCTORS, AND THE INTENDED WIRING DEVICE OR SPLICE IF APPLICABLE
- ALL EXPOSED, SURFACE MTD. RACEWAY SHALL BE INDEPENDENTLY SUPPORTED BY CONDUIT STRAPS, CELING TRAPEZE WITH THREADED ROD SUPPORT, OR CLAMPS ATTACHED TO BUILDING STRUCTURAL COMPONENTS. CONDUIT OR BOXES SHALL NOT BE SUPPORTED BY WIRE OR STRINGERS. PARTS AND HARDWARE SHALL BE ZINC-COATED OR HAVE EQUIVALENT CORROSION
- 8. INSTALL RACEWAY AND BOXES SQUARE AND PARALLEL TO FINISHED WALL AND FLOOR PLANES.
- 9. BOXES SHALL BE SUPPORTED INDEPENDENT OF CONDUIT.



# SPRINKLER GROUNDING NOTES: BOND INCOMING SPRINKLER PIPING TO THE EXISTING BUILDING GROUNDING ELECTRODE SYSTEM AT ONE OF TWO LOCATIONS: THE SERVICE ENTERACE NEUTRAL BUS AT THE LOCATION OF THE MAN BONDING JUMPER IN PANEL MD OR THE UNDERGROUND DOWESTIC

- WATER PIPE BUILDING ENTRANCE (BOTH ARE LOCATED IN THE BASEMENT BOILER ROOM). ELECTRICIAN SHALL PROVIDE TO ENGINEER PHOTO DOCUMENTATION OF THE NEW GROUNDING ELECTRODE CONNECTION TO EXISTING BUILDING GROUNDING ELECTRODE SYSTEM.
- THE EXISTING SERVICE ENTRANCE IS RATED AT 1000A AND IS COMPOSED OF THREE PARALLEL RUNS.
- 4. BOND METAILLIC RACEWAY TO GROUNDING ELECTRODE CONDUCTOR AT ALL REQUIRED LOCATIONS PER NEC.

# REFERENCE

NEC 250.50, 250.53, 250.66

SPRINKLER PIPE GROUNDING DETAIL

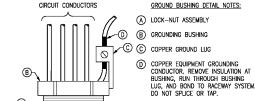
GREEN INSULATED 3/0 COPPER CONDUCTOR IN 3/4" EMT MIN.

- BOLTED CONNECTION

WITHIN 5' OF ENTRANCE

(TYP. OF 2)

-INTERIOR FACE OF EXTERIOR WALL

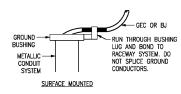


FOR FEEDER AND/OR BRANCH CIRCUITS

METAL UNDERGROUND -WATER PIPE IN DIRECT CONTACT WITH EARTH FOR

10' OR MORE (TYP. OF 2)

**GROUND BUSHING INSTALLATION DETAIL** 



- GEC, SBJ, ETC. RUN SEPARATELY SHALL BE PROTECTED BY A CONDUIT SYSTEM.
- 2 GROUNDING OR BONDING CONDUCTORS SHALL GENERALLY BE ENCLOSED BY METALIC CONDUIT. PROVIDE GROUND BUSHING ON EACH END AND BOND CONDUCTORS TO RACEWAY SYSTEM.
- GEC OR BONDING JUMPER IN CONDUIT

MARCH 9, 2018 100% DESIGN SUBMITTAL NOT APPROVED FOR CONSTRUCTION



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GSA

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COA: FL #26693 EXP 02/28/19 Project Number: 121-16

POWER RISER DIAGRAM