

1. GENERAL CONDITIONS:

1.1 SCOPE OF WORK

- 1.1.1 THE SCOPE OF WORK FOR THIS PROJECT IS DEFINED BY THIS SPECIFICATION AND THE DRAWING SET ATTACHED TO THE PROJECT BID DOCUMENTS. SCOPE, TERMS AND BID FORM. SECTION 2 OF THIS DOCUMENT DESCRIBES EQUIPMENT REQUIREMENTS AND SECTION 3 DESCRIBES INSTALLATION EXECUTION REQUIREMENTS. EQUIPMENT DRAWINGS AND INSTALLATION GUIDES FOR EQUIPMENT PROVIDED BY NEXAMP ARE ATTACHED TO THE BID FORM.
- 1.1.2 THIS PROJECT COVERS THE INSTALLATION OF A PHOTOVOLTAIC (PV) SYSTEM AND/OR BATTERY ENERGY STORAGE SYSTEM.
- 1.1.3 THIS PV SYSTEM SHALL BE INTERACTIVE WITH THE ELECTRICAL DISTRIBUTION SYSTEM OF THE LOCAL UTILITY SERVICE PROVIDER.
- 1.1.4 PERMISSION TO OPERATE THE SYSTEM IS NOT GRANTED UNTIL THE SYSTEM HAS BEEN INSPECTED AND APPROVED BY NEXAMP, THE APPROPRIATE ELECTRICAL INSPECTOR, AND LOCAL UTILITY SERVICE PROVIDER PERSONNEL.
- 1.1.5 THE INSTALLATION CONSISTS OF A SOLAR ARRAY, INVERTER(S), METERING EQUIPMENT AND ASSOCIATED EQUIPMENT REQUIRED TO INTERCONNECT THE SYSTEM TO THE LOCAL UTILITY.
- 1.1.6 PLANNING AND INSTALLATION PRACTICES SHALL COMPLY WITH THE INTERNATIONAL BUILDING CODE, NATIONAL ELECTRICAL CODE, ALL APPLICABLE LOCAL CODES AND LOCAL UTILITY REQUIREMENTS, AND INSTRUCTIONS PROVIDED IN EQUIPMENT INSTALLATION DOCUMENTATION.
- 1.1.7 ALL ELECTRICAL WORK IS TO BE COMPLETED BY A QUALIFIED, LICENSED ELECTRICIAN AND APPRENTICES WORKING UNDER THE DIRECT SUPERVISION OF THE LICENSED ELECTRICIAN.
- 1.1.8 INSTALLATION SHALL BE COMPLETED IN A NEAT AND WORKMANLIKE MANNER.

1.2 QUALITY ASSURANCE

- 1.2.1 REFERENCE STANDARDS: ELECTRICAL MATERIAL AND EQUIPMENT SHALL CONFORM IN ALL RESPECTS TO THE LATEST APPROVED STANDARDS OF THE FOLLOWING, WHERE THE STANDARDS ARE APPLICABLE:
1. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA).
 2. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
 3. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE).
 4. INSULATED CABLE ENGINEERS ASSOCIATION (ICEA).
 5. NATIONAL ELECTRICAL CODE (NEC).
 6. NATIONAL ELECTRICAL SAFETY CODE (NESC).
 7. ASTM A 48, GRAY IRON CASTINGS.
 8. ANSI A14.3, SAFETY REQUIREMENTS FOR FIXED LADDERS.
 9. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

1.3 SHOP DRAWINGS

- 1.3.1 CONTRACTOR SHALL SUBMIT DETAILS OF SYSTEMS AND EQUIPMENT TO NEXAMP FOR REVIEW WITHIN FIVE DAYS AFTER AWARD OF CONTRACT. CONTRACTOR SHALL SUBMIT CONSOLIDATED ELECTRONIC COPIES CONTAINING ONE COPY EACH OF MANUFACTURER DATA SHEETS AND SHOP DRAWINGS. MANUFACTURER CUT SHEETS WITH MULTIPLE CHOICES SHALL BE CLEARLY FLAGGED TO INDICATE THE CATALOG NUMBERS FOR ITEMS SUBMITTED. IF CUT SHEETS ARE PROVIDED WITHOUT INDICATING ARROWS THEY WILL BE RETURNED WITHOUT A REVIEW. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL ALL EQUIPMENT AND MATERIAL AS IT IS LISTED IN THE MANUFACTURER'S CUT SHEETS. ALL NEXAMP (OR THIRD PARTY) REVIEW COMMENTS SHALL REQUIRE A RESPONSE BACK FROM THE SUBCONTRACTOR BEFORE A SUBMITTAL IS CONSIDERED APPROVED.
- 1.3.2 SHOP DRAWINGS SHALL INCLUDE, BUT NOT LIMITED TO:
1. UNISTRUT
 2. FASTENERS/HARDWARE
 3. GROUNDING LUGS
 4. CABLE SUPPORTS, ZIP TIES, and CLIPS
 5. DUCT SEAL (SUITABLE FOR EXTERIOR USE)
 6. DISCONNECT SWITCHES
 7. FUSES
 8. CONDUITS AND RACEWAYS
 9. CONDUIT BUSHINGS/LOCKNUTS
 10. CONDUIT FITTINGS (COUPLINGS, CONNECTORS, CLIPS, ETC.)
 11. CONDUIT EXPANSION FITTINGS
 12. CONDUIT SUPPORTS
 13. WIRE AND CABLE
 14. HANDHOLES/MANHOLES
 15. ENCLOSURES (PULLBOXES, JUNCTION BOXES, ETC.)
 16. WIREWAYS
 17. ADHESIVES
 18. WATERPROOF CONDUIT SEALS
 19. POLYWATER FST-250 FOAM SEALANT
 20. POLYWATER INSTAGROUT
 21. POTENTIAL TRANSFORMERS/CURRENT TRANSFORMERS
 22. CT CABINETS
 23. UNDERGROUND WARNING TAPE MAGNETIC TYPE
 24. FIREPROOFING
 25. MEDIUM VOLTAGE EQUIPMENT
 26. PV MODULE WIRING CONNECTORS
 27. SURGE ARRESTERS
 28. MARKEL PAINT MARKER COLOR RED
 29. BRADY WM-A-Z CABLE AND WIRE MARKERS OR APPROVED EQUAL
 30. ANY ADDITIONAL COMPONENTS CALLED OUT ON THE DRAWINGS WHICH MAY NOT BE COVERED ABOVE.

2. PRODUCTS:

2.1 GENERAL

- 2.1.1 PROVIDE MATERIALS AND EQUIPMENT NECESSARY TO MAKE INSTALLATION COMPLETE IN EVERY DETAIL UNDER THIS CONTRACT WHETHER OR NOT SPECIFICALLY SHOWN ON CONSTRUCTION DRAWINGS OR SPECIFIED HEREIN. MATERIALS AND EQUIPMENT SHALL BE NEW.
- 2.1.2 ALL ELECTRICAL COMPONENTS AND MATERIALS USED IN THIS SYSTEM SHALL BE NEW AND UL LISTED FOR ITS PURPOSE.
- 2.1.3 ALL DC EQUIPMENT AND COMPONENTS ASSOCIATED WITH MODULES AND INVERTERS SHALL BE UL LISTED FOR EITHER 600 VOLTS DC, 1000 VOLTS DC, OR 1500 VOLTS DC MINIMUM, AS REQUIRED BY SYSTEM VOLTAGE.
- 2.1.4 INTENT OF SPECIFICATIONS IS THAT ONE MANUFACTURER, NOT COMBINATION, IS SELECTED FOR PARTICULAR CLASSIFICATION OF MATERIAL. FOR EXAMPLE, WIRE OF ONE MANUFACTURER, WIRE LUGS OF ONE MANUFACTURER, ETC. NEXAMP MAY GIVE SPECIFIC EXEMPTION FROM THIS REQUIREMENT.

2.2 LOW VOLTAGE WIRE AND CABLE

- 2.2.1 PROVIDE WIRE AND CABLES AND ASSOCIATED CONNECTORS, SPLICES, AND TERMINATIONS FOR RATED VOLTAGES AS INDICATED ON CONSTRUCTION DRAWINGS. WIRE AND CABLE SHALL BE AS MANUFACTURED BY AMERICAN INSULATED WIRE CORPORATION, GENERAL CABLE CORPORATION, SOUTH WIRE COMPANY, SENATOR WIRE AND CABLE COMPANY, OKONITE, PIRELLI, ALCAN, OR APPROVED EQUAL.
- 2.2.2 PROVIDE CONDUCTORS AND SPLICES OF SIZE, AMPACITY RATING, MATERIAL, TYPE, AND CLASS FOR APPLICATION AND SERVICE INDICATED.
- 2.2.3 CONDUCTOR MATERIAL SHALL BE SOFT DRAWN COPPER, UNLESS OTHERWISE NOTED ON CONSTRUCTION DRAWINGS. WIRE SIZE #12 AWG AND LARGER SHALL BE CLASS B STRANDED, AND CLASS C STRANDED FOR TRACKER SYSTEMS WHERE REQUIRED BY NATIONAL ELECTRICAL CODE.
- 2.2.4 SINGLE CONDUCTOR INSULATION SHALL BE TYPE THHN/THWN-2, XHHW-2, OR PV RATED WIRE.
- 2.2.5 EXPOSED CONDUCTORS FOR MODULE WIRING SHALL BE PV RATED WIRE.
- 2.2.6 CONDUCTORS INSTALLED IN CONDUIT EXPOSED TO SUNLIGHT ON ROOFTOP INSTALLATIONS SHALL BE XHHW-2 OR PV WIRE.
- 2.2.7 SERVICE ENTRANCE CONDUCTORS IN CONDUIT SHALL BE THHN/THWN-2 OR XHHW-2.
- 2.2.8 DIRECT BURIED CABLE SHALL HAVE JACKET RATED FOR DIRECT BURIAL.
- 2.2.9 METAL CLAD CABLE FOR DIRECT BURIAL SHALL BE ALCAN STABILLOY TYPE MC CABLE WITH PVC JACKET, XHHW-2 OR RHW-2, RATED FOR DIRECT BURIAL.
- 2.2.10 INSTRUMENT WIRE FOR DAS COMMUNICATIONS: RS-485 CABLE SHALL BE BELDEN 3106A OR EQUIVALENT. CAT5 CABLE SHALL BE 7919A OR EQUIVALENT. CAT6 CABLE SHALL BE SHIELDED (BELDEN 7953A OR EQUIVALENT). FIBER OPTIC CABLE SHALL BE USED FOR EXCESSIVELY LONG RUNS, WHEN INDICATED ON CONSTRUCTION DRAWINGS.
- 2.2.11 CONNECTORS SHALL BE OF THE LOCKING TYPE, APPROVED FOR USE WITH SPECIFIED MODULE.
- 2.2.12 ALUMINUM CABLE SHALL BE COMPACT AA 8000 CONDUCTORS.
- 2.2.13 #2 AWG IS THE MINIMUM WIRE SIZE TO BE USED FOR ALUMINUM PHASE CONDUCTORS, #4 AWG IS THE MINIMUM SIZE FOR ALUMINUM GROUND WIRES

2.3 MEDIUM VOLTAGE CABLE

- 2.3.1 CABLE SHALL BE SUITABLE FOR ENVIRONMENT AND VOLTAGE INSULATION LEVEL, AS INDICATED ON CONSTRUCTION DRAWINGS.
- 2.3.2 MEDIUM VOLTAGE CABLE TO BE MV 105 °C, JCN, (AT LEAST 1/3 NEUTRAL),133%, OR AS SPECIFIED IN THE CONTRACT DRAWINGS.

2.4 RACEWAYS

- 2.4.1 RIGID STEEL CONDUIT SHALL BE HOT-DIPPED GALVANIZED STEEL CONFIRMING TO ANSI C80.1 AND UL 6. CONDUIT SHALL BE AS MANUFACTURED BY ALLIED TUBE AND CONDUIT CO., WHEATLAND TUBE CO., LTV STEEL TUBULAR CO., OR APPROVED EQUAL.
- 2.4.2 INTERMEDIATE METAL CONDUIT SHALL BE HOT-DIPPED GALVANIZED STEEL CONFORMING TO ANSI C80.6 AND UL 1242. CONDUIT SHALL BE AS MANUFACTURED BY ALLIED TUBE AND CONDUIT CORP., WHEATLAND TUBE CO., LTV STEEL TUBULAR PRODUCTS CO. OR APPROVED EQUAL.
- 2.4.3 ELECTRIC METALLIC TUBING SHALL BE GALVANIZED STEEL CONFORMING TO ANSI C80.3 AND UL 797. TUBING SHALL BE AS MANUFACTURED BY PYLE NATIONAL, ALLIED TUBE AND CONDUIT CORP., WHEATLAND TUBE COMPANY, OR APPROVED EQUAL.
- 2.4.4 PLASTIC CONDUIT SHALL BE EITHER SCHEDULE 40 OR SCHEDULE 80 PVC 90°C AS INDICATED ON CONSTRUCTION DRAWINGS. UV RATED, PLASTIC CONDUIT SHALL BE AS MANUFACTURED BY CARLON ELECTRICAL PRODUCTS CO., ALLIED TUBE AND CONDUIT COMPANY, TRIANGLE COMPANY OR APPROVED EQUAL.
- 2.4.5 FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED STEEL, LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE SIMILAR, BUT WITH EXTRUDED MOISTURE AND OIL-PROOF OUTER JACKET OF POLYVINYL CHLORIDE PLASTIC.
- 2.4.6 RIGID AND INTERMEDIATE CONDUIT FITTINGS, COUPLINGS, AND CONNECTORS SHALL BE THREADED AND GALVANIZED. COMPRESSION TYPE FITTINGS, COUPLINGS, AND CONNECTORS SHALL NOT BE PERMITTED.
- 2.4.7 INDOOR COUPLINGS AND CONNECTORS FOR ELECTRIC METALLIC TUBING SHALL BE STEEL SET-SCREW. OUTDOOR COUPLINGS AND CONNECTORS FOR ELECTRIC METALLIC TUBING SHALL BE COMPRESSION TIGHT FITTINGS - RAIN TIGHT.
- 2.4.8 STEEL SUPPORT RODS OR SUPPORT BOLTS FOR CONDUITS SHALL BE 1/8 INCH DIAMETER FOR EACH INCH OR FRACTION THEREOF OF DIAMETER OF CONDUIT SIZE, BUT NO ROD OR BOLT SHALL BE LESS THAN 1/4 INCH IN DIAMETER. SUPPORT RODS FOR STEEL CHANNEL SHALL NOT BE LESS THAN 5/ 8 INCH IN DIAMETER.
- 2.4.9 ROOF EQUIPMENT SUPPORTS SHALL BE DURABLOCK DB10/DB20, OR APPROVED EQUAL.
- 2.4.10 EXPANSION FITTINGS FOR UP TO 2 INCH MOVEMENT IN EITHER DIRECTION, SHALL BE OZ GEDNEY TYPE 'TX' FOR EMT AND TYPE 'AX' FOR IMC/RMC, OR BY APPLETON, CROUSE-HINDS OR APPROVED EQUAL.
- 2.4.11 WATERPROOF CONDUIT SEALS FOR RMC/IMC ENTRY SHALL BE COMPRISED OF MALLEABLE IRON SEAL WITH GLAND ASSEMBLY AND ADJUSTABLE PRESSURE RINGS AND NEOPRENE SEALING GROMMETS, OZ GEDNEY OR APPROVED EQUAL, TYPE WSK FOR POURED CONCRETE WALLS AND TYPE FSK FOR FLOORS. FOR CORED WALLS AND FLOORS, PROVIDE PVC COATED STEEL DISCS, NEOPRENE SEALING RING AND STAINLESS STEEL SCREWS AND WASHERS, OZ GEDNEY TYPE CSML OR APPROVED EQUAL.
- 2.4.12 MYERS HUBS SHALL BE BY ARLINGTON INDUSTRIES OR APPROVED EQUAL.
- 2.4.13 CONDUIT SUPPORTS SHALL BE GALVANIZED MINERALLAC TYPE, GALVANIZED STEEL OR APPROVED PVC FOR USE ON PVC CONDUIT.
- 2.4.14 WIRE TERMINATIONS FOR ARRAY DC WIRING SHALL BE COMPATIBLE WITH THE MANUFACTURER SPECIFIED CONNECTORS ON THE PV MODULES. TERMINATIONS SHALL REQUIRE A SPECIAL TOOL TO OPEN IN ORDER TO PREVENT OPENING THE CONNECTION ACCIDENTALLY WHILE UNDER LOAD.

2.5 ENCLOSURES, PULL BOXES, WIREWAYS AND CHANNELS

- 2.5.1 ENCLOSURES, PULL BOXES, CONDUIT BODIES, AND WIREWAYS SHALL BE CODE GAUGE GALVANIZED STEEL WITH SCREW COVERS TO MATCH. NEMA 3R FOR OUTDOOR USE ON VERTICAL SURFACES, NEMA 4 FOR OUTDOOR USE ON HORIZONTAL SURFACES, AND NEMA 1, PAINTED STEEL FOR INDOOR USE.
- 2.5.2 ALUMINUM, PLATED GALVANIZED STEEL, AND HOT DIPPED GALVANIZED STEEL CHANNEL SUPPORTS SHALL BE MINIMUM 1-5/8 INCH MILD STRIP STEEL WITH MINIMUM 12 GAUGE WALL THICKNESS, UNISTRUT, B-LINE, OR APPROVED EQUAL. LOADINGS SHALL BE PER MANUFACTURER RECOMMENDATIONS.

2.6 DISCONNECTS

- 2.6.1 PROVIDE DISCONNECT SWITCHES FUSED OR UNFUSED AS SHOWN ON CONSTRUCTION DRAWINGS. SWITCHES SHALL BE TYPE HD SAFETY SWITCHES, RATED FOR MAXIMUM SYSTEM VOLTAGE, FOR HEAVY DUTY WITH INTERLOCKING COVER, SIDE OPERATED WITH LOCKABLE HANDLE. SWITCH ENCLOSURE SHALL BE NEMA LISTED FOR LOCATION AND ATMOSPHERE IN WHICH THEY ARE MOUNTED. SWITCHES SHALL BE LISTED FOR AC OR DC USE, AS APPLICABLE TO THE SYSTEM IN WHICH THEY ARE INSTALLED.
- 2.6.2 DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY ONE OF FOLLOWING: GENERAL ELECTRIC, EATON (CUTLER-HAMMER), SQUARE D CO., SIEMENS OR APPROVED EQUAL.

2.7 FUSES

- 2.7.1 FUSES ARE TO BE LISTED FOR THEIR USE.
- 2.7.2 FUSES SHALL BE FURNISHED WITH ALL FUSED DISCONNECTS.
- 2.7.3 PROVIDE UL FUSE REDUCERS WHERE APPLICABLE OR AS INDICATED ON CONSTRUCTION DRAWINGS.
- 2.7.4 PROVIDE CURRENT LIMITING, NON-RENEWABLE FUSES, BUSSMANN, FERRAZ-SHAMWUT OR APPROVED EQUAL, UL CLASS R UP TO 600 AMP, AND CLASS L OVER 600 AMP.
- 2.7.5 LOW VOLTAGE AC FUSES SHALL BE RATED 600V OR LESS AC, UL LISTED, AND HAVE MINIMUM INTERRUPTING RATINGS OF 200,000 RMS AMPERES WITH PEAK LET-THROUGH CURRENT AND MAXIMUM CLEARING VALUES WITHIN PRESCRIBED UL LIMITS UNLESS OTHERWISE APPROVED BY NEXAMP ENGINEERING.

2.8 GROUNDING

- 2.8.1 ALL GROUNDING LUGS SHALL BE UL LISTED AND APPROVED FOR USE AS SPECIFIED BY MODULE AND MOUNTING MANUFACTURERS.
- 2.8.2 PROVIDE GROUNDING COMPONENTS THAT PREVENT THE CONTACTING OF DISSIMILAR METALS AND ARE SUITABLE FOR THE ENVIRONMENT.
- 2.8.3 PROVIDE COPPER GROUND RODS AND APPROVED UL LISTED CONNECTIONS. UNDERGROUND CONNECTIONS SHALL BE COMPRESSION FITTINGS LISTED FOR UNDERGROUND USAGE OR EXOTHERMIC WELD TYPE.
- 2.8.4 PROVIDE UL LISTED IRREVERSIBLE PRESSURE CONNECTIONS, BURNDY, ILSCO, T&B, OR APPROVED EQUAL.
- 2.8.5 PROVIDE GROUNDING CONDUCTORS AS INDICATED ON CONSTRUCTION DRAWINGS.

2.9 UTILITY METER SOCKET

- 2.9.1 PROVIDE UL LISTED METERING EQUIPMENT AS REQUIRED BY UTILITY.

2.10 ELECTRICAL MANHOLES

- 2.10.1 MANHOLES SHALL CONFORM TO THE REQUIREMENTS LISTED BELOW AND/OR DETAILED ON THE CONSTRUCTION DRAWINGS.
- 2.10.2 MATERIAL AND CONSTRUCTION:
1. PRE-CAST REINFORCED CONCRETE
 2. MINIMUM INTERIOR DIMENSIONS AS INDICATED ON THE DRAWINGS OR REQUIRED BY THE UTILITY COMPANY.
 3. DUCT ENTRANCES SIZED AND LOCATED TO SUIT DUCT BANKS. DUCT-BANK PENETRATION SHALL BE WATERTIGHT.
 4. MODULAR SECTIONS WITH TONGUE-AND-GROOVE JOINTS. JOINTS SHALL BE GASKETED AND WATER TIGHT.
 5. NOMINAL INSIDE DIMENSIONS AS SHOWN.
 6. BASE SECTION: SHALL INCLUDE SUMP AND GRATE AND GROUND ROD OPENINGS
 7. SUMP COVERS; ASTM A48; CLASS 30B GALVANIZED.
- 2.10.3 FRAMES AND COVERS:
1. MATERIAL SHALL BE CAST IRON CONFORMING TO ASTM A 48, CLASS 30A.
 2. COVERS SHALL BE 42" MINIMUM DIAMETER, WATERTIGHT, SEALED TYPE MARKED "ELECTRICAL" IN RAISED TWO INCH LETTERS.
 3. FRAME SHALL BE GROUTED ON THE MANHOLE.
 4. PROVIDE FRAMES AND COVERS OF ONE OF THE FOLLOWING:
 - a. NEENAH FOUNDRY COMPANY.
 - b. FLOCKHART FOUNDRY COMPANY.
 - c. CAMPBELL FOUNDRY COMPANY.
 - d. APPROVED EQUAL.
- 2.10.4 PULLING IRONS:
1. MATERIAL SHALL BE GALVANIZED STEEL.
 2. CAST IN THE WALL OPPOSITE TO THE CENTERLINE OF EACH INCOMING DUCT BANK AND 12 INCHES BELOW CENTERLINE OF BOTTOM LINE OF DUCTS.
 3. PRODUCT AND MANUFACTURER SHALL BE ONE OF THE FOLLOWING:
 - a. CAT. NO. DU273 BY MCGRAW EDISON COMPANY.
 - b. CAT. NO. 8119 BY A.B. CHANCE COMPANY.
 - c. APPROVED EQUAL.
- 2.10.5 CABLE RACKS:
1. CABLE RACKS SHALL ADEQUATELY SUPPORT CABLES WITH SPACE ALLOWED FOR FUTURE CABLES. PROVIDE AS INDICATED TO SUPPORT MOUNTING CHANNELS AND RACKS. CAST-IN PLACE ANCHORS WITH MINIMUM RATED PULLOUT WORKING CAPACITY OF 2000 POUNDS. PENNSYLVANIA INSERT CORP. 5/8-11-INSERT, WITH 5/8-11 HEX HEAD CAP SCREW MADE FROM 316 STAINLESS STEEL.
 2. EACH RACK SHALL BE A VERTICAL ASSEMBLY OF 24 INCH CABLE RACKS EXTENDING FROM WITHIN 6 INCHES OF THE MANHOLE ROOF SLAB TO WITHIN 6 INCHES OF THE MANHOLE FLOOR.
 3. CABLE RACK MOUNTING CHANNEL: HEAVY DUTY NON-METALLIC STANCHIONS. UNDERGROUND DEVICES, INC. MODEL C36 OR APPROVED.
 4. CABLE RACKS: HEAVY DUTY NON-METALLIC RACKS. 8, 14, 20 INCHES AS INDICATED.
 5. PRODUCT AND MANUFACTURER SHALL BE ONE OF THE FOLLOWING:
 - a. UNDERGROUND DEVICES, INC. MODEL RA 08, RA14, AND RA20.
 - b. APPROVED EQUAL.
- 2.10.6 INSULATORS:
1. MATERIAL SHALL BE PORCELAIN.
 2. PRODUCT AND MANUFACTURER SHALL BE ONE OF THE FOLLOWING:
 - a. CAT. NO. J_5122 BY JOSLYN MANUFACTURING AND SUPPLY COMPANY.
 - b. CAT. NO. 2120 BY HUBBARD AND COMPANY.
 - c. APPROVED EQUAL.
- 2.10.7 MANHOLE STEPS:
1. MATERIAL SHALL BE EXTRUDED ALUMINUM.
 2. STEPS SPACED EVENLY AT APPROXIMATELY TWELVE TO SIXTEEN INCH CENTERS AND SHALL PROJECT EVENLY FROM MANHOLE WALLS.
 3. MANUFACTURER SHALL BE ONE OF THE FOLLOWING:
 - a. FLOCKHART FOUNDRY COMPANY
 - b. NEENAH FOUNDRY COMPANY
 - c. APPROVED EQUAL.

2.11 HANDHOLES

- 2.11.1 THE PULL/SPLICE BOX UNDERGROUND ENCLOSURES SHALL BE CONSTRUCTED OF POLYMER CONCRETE CONSISTING OF SAND AND AGGREGATE BOUND TOGETHER WITH A POLYMER RESIN. INTERNAL REINFORCEMENT MAY BE PROVIDED BY MEANS OF STEEL, FIBERGLASS, OR A COMBINATION OF THE TWO. HANDHOLES FOR INSTALLATION IN ROADWAYS SHALL BE CONCRETE REINFORCED H20 TRAFFIC RATED.
- 2.11.2 ENCLOSURE:
1. THE ENCLOSURE MUST BE MANUFACTURED WITH AN OPEN BOTTOM AND A REMOVABLE GASKETED COVER. THE ENCLOSURES SHALL BE GREEN OR CONCRETE GRAY IN COLOR.
 2. THE ENCLOSURES SHALL BE DESIGNED TO BE INSTALLED FLUSH TO GRADE WITH THE COVER FITTING FLUSH TO THE BOX.
 3. THE ENCLOSURES SHALL BE SUITABLE FOR INSTALLATION IN EITHER DIRECT OR BURIED NATIVE SOIL, EMBEDDED IN CONCRETE, OR EMBEDDED IN ASPHALT SURFACING (A CONCRETE COLLAR IS REQUIRED FOR INSTALLATION IN ASPHALT).
 4. THE ENCLOSURES SHALL BE OF A STACKABLE DESIGN FOR GREATER INSTALLATION FLEXIBILITY.
 5. ALL COVERS ARE TO BE EQUIPPED WITH A MINIMUM OF TWO STAINLESS STEEL LOCKDOWN MECHANISMS. ALL COVERS SHALL HAVE A LOGO RECESSED INTO THE COVER AND IT SHALL READ ELECTRIC.
 6. ALL ENCLOSURE COVERS SHALL HAVE SOME TYPE OF RECESSED ACCESS POINT TO ALLOW REMOVAL OF THE COVER WITH A HOOK. THE ACCESS POINTS SHALL BE PLACED IN SUCH A LOCATION TO ALLOW FOR THE GREATEST AMOUNT OF LEVERAGE AND SAFETY POSSIBLE.
 7. ENCLOSURES SHALL BE DESIGNED AND SUITABLE FOR INSTALLATION AND USE THROUGH A TEMPERATURE RANGE OF -40°C (-40°F) TO 60°C (140°F).
 8. A CERTIFIED COPY OF ALL TEST REPORTS MUST BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE CONSTRUCTION IS TO BE PERFORMED AND SUBMITTED PRIOR TO SHIPMENT OF PRODUCTS.
- 2.11.3 MATERIAL REQUIREMENTS:
1. PERMANENT DEFLECTION OF ANY SURFACE SHALL NOT EXCEED 10 PERCENT OF THE MAXIMUM ALLOWABLE STATIC DESIGN LOAD DEFLECTION.
 2. THE COVERS SHALL BE SKID RESISTANT AND HAVE A MAXIMUM COEFFICIENT OF FRICTION OF 0.50 ON THE TOP SURFACE OF THE OVER. COATINGS WILL NOT BE ALLOWED.
 3. ANY POINT ON THE COVERS MUST BE ABLE TO WITHSTAND A 70 FOOT-POUND IMPACT ADMINISTERED WITH A 12 POUND WEIGHT HAVING A "C" TUP (ASTM D-2444) WITHOUT PUNCTURING OR SPLITTING. THE TEST SHALL BE PERFORMED WITH THE COVER RESTING ON A FLAT, RIGID SURFACE SUCH AS CONCRETE OR A 1" STEEL PLATE.
 4. COVERS SHALL HAVE MOLDED LETTERING, ELECTRIC OR COMM AS APPLICABLE.
 5. FASTENING DEVICES USED TO SECURE THE COVER TO THE BOX SHALL BE CAPABLE OF WITHSTANDING A MINIMUM TORQUE OF 15 FOOT-POUNDS AND A MINIMUM STRAIGHT PULLOUT STRENGTH OF 750 POUNDS.
 6. THE MATERIAL SHALL BE TESTED ACCORDING TO THE REQUIREMENTS OF ASTM D643, SECTION 7, PROCEDURE 1, FOR CHEMICAL RESISTANCE. THE MANUFACTURER IS RESPONSIBLE FOR PROOF OF COMPLIANCE WITH THE LATEST VERSION OF THE ASTM STANDARDS.
 7. OTHER REQUIRED ACCEPTANCE STANDARDS ARE:
 - a. ASTM D756, PROCEDURE E: ACCELERATED SERVICE EXPOSURE.
 - b. ASTM G53: RECOMMENDED PRACTICE FOR OPERATING LIGHT AND WATER EXPOSURE ON NONMETALLIC MATERIALS (WITH A U.V.A. 340 BULB).
 - c. ASTM D570, SECTION 5, 6.1, 6.5: WATER ABSORPTION.
 - d. ASTM D790: FLEXURAL PROPERTIES.
 - e. ATSM D635: FLAMMABILITY TEST.
- 2.11.4 MANUFACTURERS SHALL BE STRONGWELL QUAZITE OR APPROVED EQUAL.

VERSION 3.0

DESIGN COORDINATOR



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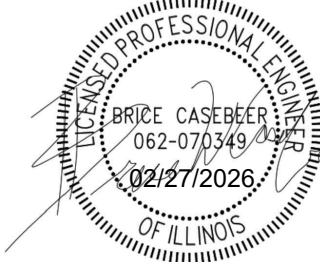
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SEAL



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REVISIONS

#	DESCRIPTION	DATE
0	IFC	02/06/2026
1	IFC R1	02/27/2026

ISSUED FOR CONSTRUCTION
FEBRUARY 27, 2026

138883 CEMETERY
SUN, LLC
FREDERICK, IL, 62639

SHEET TITLE

OWNER'S ELECTRICAL
SPECIFICATIONS

SHEET NO.

E-004