THIS EDGE INTENTIONALLY LEFT BLANK FOR BINDING - PAPER SIZE 34" X 22" - THIS EDGE INTENTIONALLY LEFT BLANK FOR BINDING - PAPER SIZE 34" X 22" - THIS EDGE INTENTIONALLY LEFT BLANK FOR BINDING

3.15 SPECIAL REQUIREMENTS

3.15.1 PROVIDE INSERTS, HANGERS, ANCHORS AND STEEL SUPPORTS REQUIRED FOR INSTALLATION OF ELECTRICAL EQUIPMENT.

3.15.2 ALL EQUIPMENT INSTALLED SHALL BE INSPECTED, TIGHTENED, AND TORQUED TO MANUFACTURER SPECIFICATIONS.

3.15.3 PROVIDE MISCELLANEOUS HARDWARE AND SUPPORT ACCESSORIES, INCLUDING SUPPORT RODS, NUTS, BOLTS, SCREWS, AND OTHER SUCH ITEMS, WITH GALVANIZED OR CADMIUM PLATED FINISH INDOORS. OUTDOOR LOCATIONS SHALL BE STAINLESS STEEL ONLY.

3.15.4 ALL EQUIPMENT INCLUDING INVERTERS, COMBINER BOXES, SWITCHBOARDS, PANELBOARDS, AND TRANSFORMERS SHALL BE CLEANED AND VACUUMED AFTER INSTALLATION. EQUIPMENT WITH DAMAGE TO PAINTED COATINGS SHALL BE REPORTED AND REPAIRED TO THE SATISFACTION OF NEXAMP.

3.15.5 PROVIDE TYPED DIRECTORIES IN PANELBOARDS BASED ON CIRCUIT DESIGNATIONS SHOWN ON CONTRACT DRAWINGS AND ON OWNER APPROVED ROOM NAMES AND NUMBERS WHERE APPROPRIATE.

3.16 SURGE ARRESTERS

3.16.1 SURGE ARRESTERS TO BE INSTALLED WHERE INDICATED ON CONSTRUCTION DRAWINGS AND PER MANUFACTURER REQUIREMENTS.

3.17 LABELING

3.17.1 REQUIRED EQUIPMENT NAMEPLATES AND LABELING SHALL BE ATTACHED WITH OUTDOOR RATED ADHESIVE, AS INDICATED ON CONSTRUCTION DRAWINGS.

3.17.2 CABLES AND WIRING SHALL BE LABELED TO INDICATE CIRCUIT DESIGNATION (AND POLARITY WHERE APPLICABLE) AT ALL TERMINATION POINTS OR AS INDICATED ON CONSTRUCTION DRAWINGS.

3.17.3 LABEL CONDUCTORS PASSING THROUGH ENCLOSURES, PULL BOXES, WIREWAYS, AND TERMINATIONS AT COMBINER BOXES.

3.17.4 COORDINATE LABELING OF FUSES AND CENTRAL INVERRTER DC DISCONNECTS TO CORRESPONDING COMBINER BOX AS INDICATED ON DRAWINGS.

3.18 UTILITY METERING

3.18.1 METERING SHALL BE COORDINATED AND INSTALLED PER LOCAL UTILITY CONSTRUCTION SPECIFICATIONS AND PROCEDURES. METERING TELEMETRY REQUIREMENTS OF THE LOCAL UTILITY SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

3.19 DATA ACQUISITION SYSTEM

3.19.1 THE DATA ACQUISITION SYSTEM TO BE INSTALLED AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.2 CONDUIT ENTRANCES IN DAS ENCLOSURES SHALL BE FROM EITHER SIDE OR BOTTOM. NO TOP CONDUIT ENTRANCES ARE ALLOWED.

3.19.3 AUXILIARY POWER CIRCUIT TO THE DATA ACQUISITION SYSTEM SHALL BE INSTALLED AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.4 DIRECT INVERTER MONITORING COMMUNICATION CABLE TO BE INSTALLED FROM THE POINT OF TERMINATION IN THE PV INVERTER TO POINT OF TERMINATION IN THE DATA ACQUISITION SYSTEM AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.5 RS-485 TWISTED PAIR CABLES TO BE TERMINATED WITH FERRULE CRIMP CONNECTORS. CAT5/CAT6 CABLES TO BE TERMINATED WITH RJ45 CONNECTOR AND SHALL BE CRIMPED ON THE CONDUCTOR JACKET, NOT THE CONDUCTORS THEMSELVES.

3.19.6 THE PV PRODUCTION METER, ASSOCIATED CURRENT TRANSFORMERS AND ENCLOSURE SHALL BE INSTALLED AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.7 THE WEATHER STATION SHALL BE INSTALLED AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.8 AUXILIARY POWER CIRCUIT TO THE WEATHER STATION SHALL BE INSTALLED AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.9 COMMUNICATION CABLE TO BE INSTALLED FROM THE POINT OF TERMINATION IN WEATHER STATION TO THE POINT OF TERMINATION IN THE DATA ACQUISITION SYSTEM AS INDICATED ON CONSTRUCTION DRAWINGS.

3.19.10 FOR SYSTEMS USING HARDWIRED WEATHER SENSORS AS INDICATED ON CONSTRUCTION DRAWINGS, THE PYRANOMETER SHALL BE INSTALLED AS SHOWN ON CONSTRUCTION DRAWINGS. BACK OF CELL MODULE TEMPERATURE SENSOR TO BE INSTALLED WITH DIRECT THERMAL CONTACT TO THE BACK OF PV MODULE AS INSTRUCTED BY NEXAMP, AND SECURED WITH A THERMAL CONDUCTIVE ADHESIVE. FOR DENO WIRELESS WEATHER STATIONS, INSTALL PER MANUFACTURERS INSTRUCTIONS.

3.20 CONCRETE WORK

3.20.1 CONCRETE HOUSEKEEPING PADS SHALL BE FURNISHED FOR SWITCHGEAR, INVERTERS, TRANSFORMERS, AND OTHER ELECTRICAL EQUIPMENT AS SHOWN ON CONSTRUCTION DRAWINGS.

3.20.2 CONCRETE WORK SHALL BE EXECUTED AS INDICATED ON CONSTRUCTION DRAWINGS AND PER CIVIL SPECIFICATIONS.

3.20.3 CONCRETE EQUIPMENT PADS AND OPENINGS SHALL BE COORDINATED WITH THE CONSTRUCTION MANAGER, EQUIPMENT APPROVAL DRAWINGS, AND UTILITY CONTRACTORS. CONCRETE EQUIPMENT PAD DRAWINGS INDICATING PAD CUTOUTS SHALL BE SUBMITTED FOR APPROVAL.

3.20.4 ATTENTION TO SEALING EQUIPMENT OPENINGS SHALL BE ADHERED TO AS INDICATED IN NEXAMP SPECIFICATIONS, CONSTRUCTION DRAWINGS, AND MANUFACTURERS' INSTALLATION MANUALS TO MAINTAIN WARRANTIES. THE USE OF MANUFACTURERS' GLAND PLATES SHALL BE USED WHEN INDICATED IN MANUFACTURER'S INSTALLATION MANUALS TO MAINTAIN WARRANTIES.

3.20.5 EQUIPMENT CABINETS WITH AIR GAPS BETWEEN CABINETS AND PADS GREATER THAN 1/4" SHALL REQUIRE INSTALLATION OF ANGLE GALVANIZED STEEL ANGLE IRONS SHALL BE USED FOR PAINTED STEEL EQUIPMENT CABINETS. STAINLESS STEEL ANGLE IRONS SHALL BE USED FOR ALL OTHER CABINET MATERIAL TYPES. WIDTH OF ANGLE IRON SHALL BE A MIN. OF 2". THICKNESS OF ANGLE IRON SHALL BE 1/8" MIN. HEIGHT OF ANGLE IRONS SIZED AS REQUIRED TO SEAL OPENING BETWEEN PAD AND BOTTOM OF CABINET AND TO ENSURE IT DOES NOT IMPEDE OPENING OF CABINET DOORS OR ACCESS PANELS. ANGLE IRON BOLTS SHALL BE 1/4" X 3" LG. POWER WEDGE BOLTS AND ALL ASSOCIATED HARDWARE SHALL BE STAINLESS STEEL. BOLTS SHALL BE SPACED A MAX. OF 24" O.C. SPACING BETWEEN EDGE OF CONCRETE AND ANGLE IRON BOLT SHALL BE A MIN. OF 1-1/2".

3.20.6 CONDUIT ENTERING THROUGH PAD CUTOUT OPENING SHALL EXTEND INTO EQUIPMENT. CABINET OPENINGS TO BE COORDINATED WITH GLAND PLATES.

3.20.7 STONE DUST OR GRAVEL SHALL BE PROVIDED TO FILL ¾ OF PAD CUTOUT OPENING CAVITY.

3.20.8 GALVANIZED STEEL MESH SHALL BE INSTALLED BETWEEN TWO LAYERS OF FOAM SEALANT TO PREVENT INFILTRATION OF VERMIN INTO EQUIPMENT CABINET. WIRE MESH SHALL BE MCNICHOL'S QUALITY WIRE MESH AND INDUSTRIAL WOVEN CONSTRUCTION 4 MESH 0.025" WIRE 0.225".

3.20.9 POLYWATER INSTAGROUT OR APPROVED EQUIVALENT SHALL BE INSTALLED BETWEEN WIRE MESH AND THE TOP OF CONCRETE PAD, OR THE BASE OF THE EQUIPMENT CABINET. WHEN IT IS NOT POSSIBLE TO USE THE MANUFACTURERS' GLAND PLATES AND WITH THE APPROVAL OF NEXAMP, IT SHALL BE PERMISSIBLE TO EXTEND THE POLYWATER INSTAGROUT INSTALLATION INTO THE EQUIPMENT CABINET OPENING.

3.21 UNDERGROUND CONDUITS, MANHOLES, & HANDHOLES

3.21.1 CONTRACTOR SHALL PROVIDE AND COORDINATE ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS AS SHOWN, SPECIFIED AND REQUIRED TO FURNISH AND INSTALL UNDERGROUND DUCT BANKS, MANHOLES AND HANDHOLES.

3.21.2 PROVIDE A PULLBOX, HANDHOLE, VAULT, OR CONDUIT DRAINAGE SECTION BELOW OR ADJACENT TO THE ENTRY POINT INTO AN ELECTRICAL EQUIPMENT PAD, COMBINER BOX, STRING INVERTER, OR OTHER ELECTRICAL EQUIPMENT WHERE CONDUITS ARE >200' IN LENGTH, ARE NEGATIVELY SLOPED TOWARD EQUIPMENT, AND SOIL DRAINAGE IS POOR.

3.21.3 DO NOT BACKFILL WITH MATERIAL CONTAINING LARGE ROCK, PAVING MATERIALS, CINDERS, LARGE OR SHARPLY ANGULAR SUBSTANCES, CORROSIVE MATERIAL OR OTHER MATERIALS WHICH CAN DAMAGE OR CONTRIBUTE TO CORROSION OF DUCTS OR CABLES OR PREVENT ADEQUATE COMPACTION OF FILL.

3.21.4 TRENCHES SHALL BE BACKFILLED IN 12" LIFTS. COMPACTION SHALL BE 95% UNDER ROADWAYS AND 90% UNDER VEGETATIVE SURFACES.

3.21.5 PROVIDE UNDERGROUND CONDUIT DUCT BANKS WITH MANHOLES AND PULLBOXES AS NEEDED OR AS INDICATED ON THE DRAWINGS.

3.21.6 COORDINATION: DUCT BANK ROUTING SHOWN ON THE DRAWINGS IS DIAGRAMMATIC. COORDINATE INSTALLATION WITH PIPING AND OTHER UNDERGROUND SYSTEMS AND STRUCTURES AND LOCATE CLEAR OF INTERFERENCES. COORDINATE MANHOLE AND HANDHOLE INSTALLATION WITH PIPING, SHEET PILING AND OTHER UNDERGROUND SYSTEMS AND STRUCTURES AND LOCATE CLEAR OF INTERFERENCES.

3.21.7 COORDINATE CONDUIT ROUTING, DUCT BANK AND MANHOLES WITH OTHER NEW AND EXISTING UNDERGROUND UTILITIES. REVISE LOCATIONS AND ELEVATIONS AS REQUIRED TO SUIT FIELD CONDITIONS AND ENSURE THAT CONDUITS, DUCT RUNS, MANHOLES AND HANDHOLES DO NOT INTERFERE WITH EXISTING AND NEW UNDERGROUND UTILITIES AND PIPING.

3.21.8 WHERE UNDERGROUND CONDUIT ENTERS BUILDING AND CONTINUES INSIDE TO PULL BOX, CABINET SWITCHBOARDS OR OTHER ELECTRICAL APPARATUSES, PORTION THROUGH WALL OR FLOOR SHALL BE STEEL. PROVIDE ADAPTER BELOW FLOOR OR OUTSIDE WALL TO CONNECT PLASTIC AND STEEL CONDUIT.

3.21.9 RACEWAYS FOR UNDERGROUND SYSTEMS SHALL BE TYPE PVC SCHEDULE 40 OR SCHEDULE 80 CONDUIT, AS INDICATED ON CONSTRUCTION DRAWINGS.

3.21.10 JOINTS IN CONDUITS AND FITTINGS SHALL BE WATERTIGHT PRIMED AND GLUED AND SHALL MEET REQUIREMENTS OF MANUFACTURER INSTALLATION RECOMMENDATIONS. CONNECTIONS BETWEEN CONDUITS OF DIFFERENT TYPES SHALL BE MADE USING ADAPTERS AND OTHER MATERIALS AND METHODS RECOMMENDED BY CONDUIT MANUFACTURERS.

3.21.11 WHERE UNDERGROUND CONDUIT ENTERS BUILDING THROUGH MEMBRANE-WATERPROOFED WALL OR FLOOR, PROVIDE WEATHERPROOF CONDUIT SEALS. SECURE TO MASONRY OR CONCRETE CONSTRUCTION WITH ONE OR MORE INTEGRAL FLANGES. MEMBRANE WATERPROOFING SHALL BE SECURED TO DEVICE IN WATERTIGHT MANNER.

3.21.12 COMPLETELY SEAL ACTIVE AND SPARE CABLES IN CONDUIT AT BUILDING ENTRANCE OR AT FIRST TERMINATION WITH CONDUIT SEALING BUSHINGS. CAP SPARE CONDUITS ENTERING BUILDING.

3.21.13 EXCAVATION, SHORING, BRACING, BACKFILLING AND GRADING SAHILL BE PROVIDED BY OTHERS. COORDINATE TRENCHES TO BE EVENLY GRADED SO THAT CONDUITS SLOPE UNIFORMLY AT LEAST 3 INCHES PER 100 FEET, TOWARD MANHOLES/HANDHOLES AND AWAY FROM BUILDINGS OR EQUIPMENT ENCLOSURES, WITHOUT HORIZONTAL OR VERTICAL WAVES. UNLESS SPECIFIED OTHERWISE, CONDUIT SHALL SLOPE UNIFORMLY FROM ONE MANHOLE/HANDHOLE TO NEXT OR FROM HIGH POINT BETWEEN MANHOLES/HANDHOLES. AVOID LOW POINTS BETWEEN MANHOLES/HANDHOLES, OR UP-TURNED ELBOWS. WHERE IT IS IMPOSSIBLE TO AVOID TRAP OR LOW POINT IN CONDUIT WITHOUT CONCRETE ENVELOPE, DRILL 1/2 INCH HOLE IN BOTTOM OF CONDUIT AT LOW POINT AND PROVIDE CRUSHED STONE SUMP BELOW CONDUIT. SUMP TO BE SIZED BASED ON LENGTH AND DIAMETER OF CONDUIT RUN.

3.21.14 RUN CONDUITS STRAIGHT BETWEEN MANHOLES/HANDHOLES/EQUIPMENT AND UPTURNED ELBOWS. UNAVOIDABLE BENDS IN NONMETALLIC CONDUITS SHALL BE MADE WITH ASSEMBLING COUPLINGS AND FITTINGS AT SLIGHT ANGLES IF RESULTING RADIUS IS AT LEAST 100 FEET. FOR RADII LESS THAN 100 FEET, ALL CONDUIT SWEEPS SHALL BE RIGID STEEL. ELBOWS FOR 4 INCH CONDUITS SHALL HAVE MINIMUM 36 INCH STEEL RADIUS. CONDUITS SHALL TERMINATE IN END BELLS WHERE LINES ENTER MANHOLES/HANDHOLES.

3.21.15 SUPPORT MULTIPLE CONDUIT RUNS IN DUCT BANKS ON PREFORMED NON-METALLIC SPACERS ON 5 FOOT CENTERS. SEPARATORS CONTAINING METAL SHALL HAVE METAL NON-CONTINUOUS AND SHALL NOT FORM MAGNETIC LOOP. SPACING BETWEEN EXTERIOR SURFACES OF CONDUITS SHALL BE AT LEAST: 3 INCHES BETWEEN TELEPHONE/DATA CONDUITS, 3 INCHES BETWEEN CONDUITS CONTAINING CABLES OPERATING AT 600 V OR LESS, 6 INCHES BETWEEN TELEPHONE/DATA CONDUIT AND POWER CONDUIT IN SAME ENVELOPE, AND 3 INCHES BETWEEN CONDUITS THAT CONTAIN CABLES OPERATING AT MORE THAN 600 V. SPACE SEPARATORS TO PREVENT SAGGING OF CONDUITS AND BREAKING OF COUPLINGS AND WATERTIGHT SEALS. MAINTAIN DEFORMATION OF CONDUIT AT SEPARATORS TO 0.10 INCH OR LESS. SECURE WITH CORDS WHERE NECESSARY. DO NOT USE TIE WIRES, REINFORCING RODS, OR METALLIC MATERIALS. DIRECT BURIED CONDUCTORS SHALL COMPLY WITH DETAIL SHOWN IN DRAWINGS.

3.21.16 STAGGER CONDUIT COUPLINGS SO THAT COUPLINGS ON ADJACENT CONDUITS DO NOT LIE IN SAME TRANSVERSE PLANE. SPACE END BELLS 9 INCHES CENTER TO CENTER AT MANHOLE WALL FACE FOR 4-INCH CONDUITS; SPACE PROPORTIONATELY FOR OTHER SIZES. TRANSITION TO END BELL SPACING SHALL START 10 FEET FROM FACE OF MANHOLE WALL. CONDUIT SLOPE SHALL EQUAL THAT OF MAIN MAKE NEW CONDUIT ENTRANCES INTO EXISTING MANHOLES AND BUILDING WALLS CONSISTENT WITH GRADING REQUIREMENTS AND EXISTING ENTRANCES; WATERPROOF AS REQUIRED BY NEXAMP.

3.21.17 CONCRETE SHALL HAVE AT LEAST THREE INCHES OF COVER AROUND EXTERIOR SURFACE OF EACH CONDUIT IN BANK.

3.21.18 ENVELOPES MAY BE POURED DIRECTLY AGAINST SIDES OF TRENCHES IF TRENCH WALL IS CLEAN, EVEN AND FREE OF LOOSE MATERIAL.REMOVE LOOSE DIRT AND EXTRANEOUS MATERIAL. CONCRETE SHALL BE VIBRATED DURING POURING TO ELIMINATE VOIDS UNDER AND BETWEEN CONDUITS AND HONEYCOMBING OF EXTERIOR SURFACES. SECURE BOLTS SUFFICIENTLY TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT.

3.21.19 ENVELOPE BETWEEN MANHOLES SHALL BE POURED IN SINGLE OPERATION. WHERE MORE THAN ONE POUR IS NECESSARY, PROVIDE 3/4-INCH REINFORCING ROD DOWELS EXTENDING 18 INCHES INTO CONCRETE ON EACH SIDE OF JOINT.

3.21.20 ENVELOPE FOR CONDUITS SHALL BE REINFORCED, WHERE INDICATED ON CONSTRUCTION DRAWINGS. PROVIDE REINFORCEMENT WHERE ENVELOPES CONNECT TO MANHOLES, BUILDING WALLS AND/OR EXISTING ENVELOPES. ENVELOPES THAT TERMINATE FOR FUTURE EXTENSION SHALL HAVE DOWELS AS SPECIFIED FOR JOINTS BETWEEN POURS. REINFORCEMENT SHALL BE 3/4-INCH RODS, POSITIONED AT FOUR CORNERS OF ENVELOPE, 1-1/2 INCHES FROM OUTSIDE EDGES OF ENVELOPE.

3.21.21 TRENCHES SHALL NOT BE BACKFILLED UNTIL INITIAL SET OF ENVELOPE.

3.21.22 AFTER CONCRETE ENVELOPES HAVE SET, NON-METALLIC CONDUITS SHALL BE CLEARED WITH MANDREL WITH OUTSIDE DIAMETER 3/8 INCHES LESS THAN INSIDE DIAMETER OF CONDUIT.

3.21.23 EXERCISE EXTREME CAUTION IN ROUTING CONDUITS TO AVOID NEW AND EXISTING UNDERGROUND UTILITIES, EXISTING TUNNELS AND OTHER OBSTRUCTIONS. CONTRACTOR SHALL COMMUNICATE WITH DIGSAFE TO LOCATE EXISTING UTILITIES. SLOPE CONDUITS UNIFORMLY TO AVOID THESE OBSTACLES AND COORDINATE LOCATIONS AND ROUTINGS WITH WORK OF OTHER TRADES.

3.21.24 WHERE CONDUITS CROSS UNDER EXISTING ROADWAYS, WALKS AND OTHER PAVED AREAS, STEEL OR WROUGHT IRON PIPES MAY BE DRIVEN INSTEAD OF CONDUITS IN TRENCHES. ISOLATED STEEL CONDUITS SHALL BE GROUNDED. AFTER INSTALLATION, PAVED, GRASS, AND OTHER AREAS DISTURBED SHALL BE RESTORED TO ORIGINAL CONDITION.

3.21.25 WHERE CONDUIT RUNS CANNOT BE INSTALLED AS SHOWN ON CONSTRUCTION DRAWINGS BECAUSE OF CONDITIONS NOT DISCOVERABLE PRIOR TO DIGGING OF TRENCHES, REQUEST NEXAMP INSTRUCTIONS BEFORE FURTHER WORK IS DONE.

3.21.26 HANDHOLES SHALL BE SET ATOP A MINIMUM OF 8 INCHES OF GRAVEL.

3.21.27 INSTALL A METALLIC TYPE WARNING RIBBON 12" ABOVE UNDERGROUND DUCT BANKS. THE IDENTIFYING RIBBON SHALL BE A METALLIC TAPE, 3 INCHES WIDE, YELLOW COLOR, PERMANENTLY IMPRINTED WITH "CAUTION BURIED ELECTRIC LINE BELOW" IN BLACK LETTERS.

3.21.28 PROVIDE SUMP OPENING IN MANHOLE FLOOR.

3.21.29 PROVIDE GRADING RINGS OR BRICK STACKS FOR MANHOLES WHEN REQUIRED TO ADJUST MANHOLE COVER TO PROPER GRADE. STACKS SHALL BE MINIMUM OF 12 INCHES IN HEIGHT, CONSTRUCTED ON THE ROOF SLAB OR CONE SECTION ON WHICH THE MANHOLE FRAME AND COVER SHALL BE PLACED. THE HEIGHT OF THE STACK SHALL BE SUCH AS IS NECESSARY TO BRING THE MANHOLE FRAME TO THE PROPER GRADE.

3.21.30 CABLE RACKS:

1. PROVIDE CABLE HOOKS TO SUPPORT EACH CABLE ON EACH RACK ALONG THE CABLE RUN WITHIN THE MANHOLES.
2. INDIVIDUALLY SUPPORT EACH CABLE AT EACH HOOK ON PORCELAIN INSULATORS.
3. IN THE MANHOLE SECURELY TIE EACH CABLE IN PLACE AT EACH INSULATOR BLOCK TO PREVENT EXCESSIVE MOVEMENT OF INSULATORS, CABLES, OR FIREPROOF TAPE. TIE CABLES WITH NON-METALLIC 3/4-INCH STRAPPING TAPE AS MANUFACTURED BY 3M OR TIE DOWN WITH NYLON STRAPS

3.21.31 PRE-CAST MANHOLE INSTALLATION:

1. THE INSPECTION, HANDLING, STORAGE, TEMPERATURE CONDITIONING PRIOR TO INSTALLATION, BENDING AND TRAINING LIMITS, PULLING LIMITS, AND CALCULATION PARAMETERS FOR INSTALLATION OF ALL CABLES MUST COMPLY WITH THE MANUFACTURER'S RECOMMENDATIONS. FOR EASE OF INSTALLATION AND PREVENTION OF CABLE DAMAGE, THE CONTRACTOR SHALL UTILIZE QUADRANT BLOCKS LOCATED PROPERLY ALONG THE CABLE RUN. FAILURE TO COMPLY WITH ANY OF THE ABOVE SHALL MAKE THIS CONTRACTOR RESPONSIBLE FOR ANY CABLE FAILURES THAT OCCUR WITHIN THE MANUFACTURER'S WARRANTY PERIOD.
2. CABLE LUBRICANT SHALL BE SOAPSTONE, GRAPHITE OR TALC FOR RUBBER OR PLASTIC JACKETED CABLES.
3. LUBRICANTS FOR ASSISTING IN THE PULLING OR JACKETED CABLES SHALL BE THOSE SPECIFICALLY RECOMMENDED BY THE CABLE MANUFACTURER.
4. CABLE PULLING TENSIONS SHALL NOT EXCEED THE MAXIMUM PULLING TENSIONS RECOMMENDED BY THE CABLE MANUFACTURER.

3.21.32 GROUNDING:

1. MANHOLES SHALL BE GROUNDED WITH GROUND RODS. A BARE STRANDED COPPER GROUND WIRE FROM THE GROUND WIRE LOOP SHALL BE USED TO BOND TOGETHER AND GROUND THE MANHOLE COVER FRAME, LADDER SUPPORT BRACKET, CONCRETE INSERTS, CABLE RACKS, DUCT BANK GROUND CONDUCTORS, AND THE SHIELDS OF ANY MEDIUM VOLTAGE CABLES THAT ARE SPLICED IN THE MANHOLE.
2. GROUNDING: INSTALL A GROUND ROD FOR EACH MANHOLE. BOND ALL EXPOSED METAL MANHOLE ACCESSORIES AND THE CONCRETE REINFORCING RODS WITH BARE COPPER WIRE AND CONNECT TO THE GROUND ROD AND TO THE DUCTBANK GROUND CABLE.
3. PROVIDE FOAM SEALANT FOR ROD PENETRATION IN MANHOLE FLOOR FOR WATER TIGHT SEAL.

3.22 TESTING AND INSPECTION

3.22.1 TESTING OVERVIEW AND SCOPE

1. TEST AND INSPECT WORK AS REQUIRED BY CONTRACT DOCUMENTS, CODES, STANDARDS EQUIPMENT MANUFACTURER INSTRUCTIONS, AND AUTHORITIES HAVING JURISDICTION, TO SATISFACTION OF NEXAMP. TESTS SPECIFIED IN THIS SECTION SHALL BE CONSTRUED AS MINIMUM REQUIREMENTS.
2. REFERENCES
   - ANSI/NETA ATS, "STANDARDS FOR ACCEPTANCE TESTING SPECIFICATIONS"
   - NFPA 70, "NATIONAL ELECTRICAL CODE"
   - IEEE STANDARD 400, "IEEE GUIDE FOR FIELD TESTING AND EVALUATION OF THE INSULATION OF SHIELDED POWER CABLE RATED 5KV AND ABOVE"
3. NOTIFY NEXAMP AT LEAST FIVE WORKING DAYS PRIOR TO TESTING. TESTS SHALL BE WITNESSED BY NEXAMP UNLESS SUCH WITNESSING IS WAIVED IN WRITING.
4. FURNISH NEXAMP WITH WRITTEN REPORTS, SIGNED AND DATED FOR ALL TESTS, USING STANDARD FORMS PROVIDED BY NEXAMP WITHIN 48 HOURS OF TEST COMPLETION.
5. FURNISH ALL TESTING EQUIPMENT, MATERIAL, AND LABOR NECESSARY TO PERFORM TESTING.
6. CALIBRATED TEST EQUIPMENT SHALL BE USED. SUBMIT TEST EQUIPMENT CALIBRATION DOCUMENTS INDICATING CALIBRATION EXPIRATION DATE.
7. FAILURE OR DEFECTS IN WORKMANSHIP OR MATERIALS REVEALED BY TESTS SHALL BE REPLACED AND SUBSEQUENTLY RETESTED TO SATISFACTION OF NEXAMP.
8. NEXAMP OR OWNER WILL NOT BE RESPONSIBLE FOR MATERIAL AND EQUIPMENT PRIOR TO TESTING AND ACCEPTANCE.

3.22.2 TORQUE VERIFICATION

1. MECHANICAL SYSTEM EQUIPMENT SHALL HAVE COMPONENTS TORQUED AND VERIFIED PER MANUFACTURER INSTALLATION MANUAL REQUIREMENTS.
2. ELECTRICAL SYSTEM EQUIPMENT SHALL HAVE COMPONENTS TORQUED AND VERIFIED PER MANUFACTURER INSTALLATION MANUAL REQUIREMENTS.

3.22.3 LOW VOLTAGE CABLE TESTS

1. MEGGER TESTS SHALL BE PERFORMED AT A DC VOLTAGE OF 2000 VOLTS FOR EQUIPMENT RATED 1500-2000 VOLTS.
2. MEGGER TESTS SHALL BE PERFORMED AT A DC VOLTAGE OF 1000 VOLTS FOR EQUIPMENT RATED 600-1000 VOLTS.
3. MEGGER TESTS SHALL BE PERFORMED AT A DC VOLTAGE OF 500 VOLTS FOR EQUIPMENT RATED 120-300 VOLTS.

3.22.4 MEDIUM VOLTAGE CABLE TESTS

1. VERY LOW FREQUENCY (VLF) - UNLESS OTHERWISE RECOMMENDED BY THE CABLE MANUFACTURER, THE VOLTAGES SHOWN IN THE TABLE BELOW SHALL BE USED FOR VLF ACCEPTANCE TESTING OF MEDIUM VOLTAGE CABLES AFTER INSTALLATION.

System Voltage (Phase to Phase)	Acceptance Test Voltage			
	Acceptance (Phase to Ground)		Maintenance (Phase to Ground)	
kV RMS	kV RMS	kV peak	kV RMS	kV peak
5	10	14	7	10
8	13	18	10	14
15	21	30	16	22
25	26	37	20	28
28	32	45	24	34
30	38	54	29	41
35	44	62	33	47
46	57	81	43	61
69	84	119	63	89

3.22.5 GROUNDING TESTS

1. PERFORM GROUND RESISTANCE TEST BY PASSING MINIMUM OF TEN AMPS DC BETWEEN GROUND REFERENCE SYSTEM AND GROUND POINT. CALCULATE RESISTANCE BY VOLTAGE DROP METHOD.
2. THE RESISTANCE TO GROUND OF EACH GROUND ROD IN A GROUND MAT/RING SHALL BE MEASURED BEFORE CONNECTION TO OTHER GROUND RODS. THE IMPEDANCE SHALL NOT EXCEED 5 OHMS PER IEEE REQUIREMENTS UNLESS APPROVED IN WRITING BY NEXAMP.
3. THE RESISTANCE TO GROUND OF THE TOTAL GROUND SYSTEM SHALL BE MEASURED WITH ALL CONNECTIONS COMPLETED.
4. VERIFY GROUND CONNECTIVITY BY GROUND CONTINUITY TEST BETWEEN MAIN GROUND SYSTEM AND EQUIPMENT GROUND BUS BARS AND GROUND LUGS.

3.22.6 PV ARRAY TESTING

1. VERIFY CORRECT POLARITY FOR EACH STRING AND FEEDER AND CORRECT ANY STRINGS MIS-WIRED.
2. MEASURE OPEN CIRCUIT VOLTAGE FOR EACH STRING. IF STRING VOLTAGE IS NOT WITHIN 3% OF OTHER STRINGS. IDENTIFY AND CORRECT FAULTY STRING WIRING AND/OR REPLACE BAD MODULES.

3.22.7 SEE ATTACHED APPENDIX A FOR COMMISSIONING PROCEDURES AND FORMS.

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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-006