SECTION 337173

ELECTRICAL UTILITY SERVICES

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***NOTE TO SPECIFIER***

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Electrical service entrance.
			2. Transformer and pad.
			3. Service entrance equipment.
			4. Service entrance section.
		2. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
		3. Related Sections:
			1. Section 250504 - Building Automation System (BAS) General.
			2. Section 251104 - Metering Devices.
			3. Section 259004 - Sequence of Operation
			4. Section 260500 - Common Work Results for Electrical: Grounding.
			5. Section 260533 - Raceway and Boxes for Electrical Systems.
			6. Section 260800 - Commissioning of Electrical Systems.
			7. Section 312000 - Earth Moving.
			8. Section 312300 - Excavation and Fill: Earthwork trenching, backfilling, and compacting.
	2. REFERENCES
		1. National Electrical Contractors Association (NECA):
			1. NECA - Standard of Installation.
		2. National Electrical Manufacturer's Association (NEMA):
			1. Std Pub No. AB 1: Molded-Case Circuit Breakers.
			2. Std Pub No. PB-2: Dead-Front Distribution Switchboards.
			3. Std Pub No. SG 3: Low-Voltage Power Circuit Breakers.
			4. Std Pub No. SG 5: Power Switchgear Assemblies.
		3. Underwriter’s Laboratories
			1. UL 50: Electrical Cabinets and Boxes.
			2. UL 489: Molded-Case Circuit Breakers and Circuit-Breakers Enclosures.
			3. UL 854: Service-Entrance Cables.
			4. UL 869: Electrical Service Equipment.
		4. IEEE
			1. Std 241; pertaining to service entrances.
		5. National Fire Protection Association (NFPA):
			1. NFPA 70 - National Electric Code.
	3. SYSTEM DESCRIPTION
		1. System Characteristics: 480Y/277 volts, three phase, four wire, 60 hertz.
		2. Provide service entrance equipment and accessories which are UL listed and labeled and marked “SUITABLE FOR USE AS SERVICE EQUIPMENT”.
	4. SUBMITTALS
		1. Section 013300 - Submittal Procedures: Procedures for submittals.
			1. Product Data: Service entrance section electrical characteristics including voltage, frame size and trip ratings, fault current withstand ratings, and time-current curves of equipment and components.
			2. Shop Drawings:
				1. Utility company drawings, details, and data for service to Project.
				2. Service entrance section front and side views of enclosures with overall dimensions indicated; conduit entrance locations and requirements; nameplate legends; size and number of bus bars per phase, neutral, and ground.
				3. Instrumentation and metering equipment.
			3. Assurance/Control Submittals:
				1. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
				2. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
				3. Manufacturer's Instructions: Service entrance section application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
		2. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
			1. Maintenance Data: Service entrance section spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.
	5. QUALITY ASSURANCE
		1. Qualifications:
			1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
			2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience approved by Utility company for installation of electrical utility service.
		2. Regulatory Requirements:
			1. Conform to requirements of NFPA 70.
			2. Products: Listed and classified by Underwriters Laboratories Incorporated as suitable for the purpose specified and indicated.
		3. Pre-Installation Meetings:
			1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
			2. Require attendance of parties directly affecting Work of this Section.
			3. Review conditions of operations, procedures and coordination with related Work.
			4. Agenda:
				1. Tour, inspect, and discuss conditions of Project Site and location of utility service point.
				2. Review electrical service entrance design and requirements.
				3. Review required submittals, both completed and yet to be completed.
				4. Review Utility company drawings, details, and data.
				5. Review and finalize construction schedule related to electrical service and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
				6. Review required inspections, testing, certifying, and material usage accounting procedures.
				7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
				8. Review safety precautions relating to electrical service installation operations.
	6. PROJECT OR SITE CONDITIONS
		1. Existing Utilities: Contact local utility companies and make arrangements to obtain utility company location and marking service prior to start of Work.
			1. Locate existing underground utilities in areas of Work using “Ground Penetrating Radar (GPR)” detection. If utilities are to remain in place, provide means of support and protection during trenching and excavation operations.
				1. Pothole and locate existing underground utilities at locations to assure that no conflict with Work of this Contract will occur and required clearance is available to prevent damage to existing utilities.
				2. Perform potholing minimum 10 days before start of excavation or underground work.
			2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility company and Contracting Officer immediately for directions.
			3. Coordinate with Contracting Officer and utility companies to keep existing utility services and facilities in operation.
			4. Repair damaged utilities to satisfaction of utility company, at no additional cost to U.S. Postal Service.
			5. Do not interrupt existing utilities serving facilities occupied and used by U.S. Postal Service or others, during occupied hours, except when permitted in writing by Contracting Officer and then only after acceptable temporary utility services have been provided and approved by Contracting Officer.
	7. DELIVERY, STORAGE, AND HANDLING
		1. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
		2. Service Entrance Section:
			1. Deliver individually wrapped for protections and mounted on shipping skids.
			2. Store in clean, dry space. Maintain factory wrapping or provide additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
			3. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to distribution panel internal components, enclosure, and finish.
2. PRODUCTS
	1. service entrance equipment and accessories
		1. Provide service entrance equipment and accessories (of types, sizes, ratings and electrical characteristics indicated) which comply with manufacturer’s standard materials, design and construction in accordance with published product information and as required for complete installation; and as herein specified.
	2. MANUFACTURERS
		1. Approved by Utility company for use on electrical service entrance Work; included on Utility company list of approved Products.
		2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Not Permitted.
	3. ELECTRICAL SERVICE
		1. Products conforming to Utility company requirements as indicated on Utility company prepared Drawings, Details, and Data.
	4. TRANSFORMER AND PAD
		1. Transformer: Furnished and installed by Utility company; type and rating as indicated on Drawings.
		2. Transformer Pad: [Precast] [Poured-in-place] reinforced concrete pad [by Contractor] [by Utility company] of size, type, and configuration as required by Utility company.
	5. SERVICE ENTRANCE EQUIPMENT
		1. Meter Cabinet and Base: Cabinet and base of size, type, and configuration furnished and installed as required by Utility company.
		2. Utility Meters: Furnished and installed by Utility company.
	6. SERVICE ENTRANCE SECTION
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. ABB/G.E. Industrial Solutions (ABB/GEIS), Mebane, NC (800) 431-7867.
			2. Eaton Corporation; Cutler-Hammer Products, Pittsburgh, PA (800) 525-2000.
			3. Siemens Energy & Automation, Inc., Alpharetta, GA (800) 964-4114.
			4. Square D Company, Palatine, IL (800) 392-8781.
		2. Description: NEMA PB 2 and UL 869 with electrical ratings and configurations as indicated and specified.
		3. Section Devices: [Panel mounted] [Draw-out type].
		4. Bus Material: Copper (tin plated).
		5. Bus Connections: Bolted, accessible from front for maintenance.
		6. Fully insulate load side bus bars.
		7. Ground Bus: Extend width of switchboard.
		8. Line and Load Terminations: Accessible from front only of distribution panel, suitable for conductor materials and sizes indicated.
		9. Pull Section: Size as indicated on Drawings. Arrange as indicated on Drawings.
		10. Enclosure: NEMA 1.
			1. Align sections at front and rear.
			2. Distribution Panel Height: As indicated on Drawings, lifting members and pull boxes.
			3. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.
	7. overcurrent protective devices
		1. Provide overcurrent protection devices as indicated on the drawings and specified within related electrical specifications.
	8. Advanced METERING EQUIPMENT (electric UTILITY MAINS)
		1. The meter device shall be UL listed. All meters shall have the following ratings, features and functions.
			1. Designed for multifunction electrical measurements on 3 phase power systems. The Meter shall support 3-Element Wye, 2.5 Element Wye, 2 Element Delta, 4 wire Delta systems.
			2. Provide surge withstand ratings confirming to to ANSI C62.41 (6KV)
			3. Be user programmable for voltage range to any PT ratio.
			4. Accept a direct voltage input range of up to 576 Volts Line to Neutral, and a range of up to 721 Volts Line to Line.
			5. Accept a current input of up to 11 amps continuous. Startup current for a 5 Amp input shall be no greater than .005 Amps.
			6. Have the following additional ratings and features:
				1. Fault Current Withstand shall be 100 Amps for 10 seconds, 300 Amps for 3 seconds, and 500 Amps for 1 second.
				2. Meter shall be programmable for current to any CT ratio.
				3. All inputs and outputs shall be galvanically isolated to 2500 Volts AC.
			7. Accept current inputs of class 10: (0 to 11A), 5 Amp Nominal and class 2 (0 to 2A), 1A Nominal Secondary.
			8. Provide an accuracy of +/- 0.5% or better for volts and amps, and 0.5% for power and energy functions and meet or exceed the accuracy requirements of ANSI C12.20 (Class 0.5%).
			9. Provide true RMS measurements of voltage, phase to neutral and phase to phase; current, per phase and neutral.
			10. Provide sampling at 400+ samples per cycle on all channels measured readings simultaneously.
			11. The meter shall utilize 24 bit Analog to Digital conversion.
			12. Provide at a minimum Voltage and current per phase, kW, kVAR, PF, kVA, Frequency, kWh, %THD (% of total Harmonic Distortion).
			13. Shall be a traceable revenue meter, which shall contain a utility grade test pulse allowing power providers to verify and confirm that the meter is performing to its rated accuracy.
			14. The meter shall include 1 independent communications port on the back, with advanced features. The port shall provide Ethernet communication speaking Modbus MS/TCP, Modbus/IP, or BACnet MS/TCP protocols.
			15. Provide user configured fixed window or sliding window demand. This shall allow the user to set up the particular utility demand profile.
				1. Readings for kW, kVAR, kVA and PF shall be calculated using utility demand features.
				2. All other parameters shall offer max and min capability over the user selectable averaging period.
				3. Voltage shall provide an instantaneous max and min reading displaying the highest surge and lowest sag seen by the meter.
			16. Capable of operating on a power supply of 90 to 265 Volts AC and 100 to 370 Volts DC. Universal Power AC/DC Supply shall be available. An option shall also be available to operate on a power supply from 18-60 VDC.
			17. Meter shall provide update rate of 100msec for Watts, Var and VA. All other parameters shall be 1 second.
			18. The meter shall be provided with I/O expandability through option card slots.
		2. Meter Software features
			1. Meter shall provide internally calculated values based in voltage and current inputs. The following parameters shall be provided for each measured phase and total of all 3 phases: volts, amps, kW, kVAR, PF, kVA, frequency., kWh, %THD. predicted kW based on selected demand period.
			2. All meter setup parameters shall be adjustable though a software configuration tools, though the front panel keypad or though a web based browser. All meter configurations shall be password protected from alteration.
			3. All meter parameters shall be accessible through the Modbus MS/TCP, Modbus/IP, or BACnet MS/TCP protocols.
		3. Acceptable Manufactures Models
			1. Schneider Electric/Square D – PM750
			2. Electro Industries - Shark S100
			3. Siemens – PAC3200
			4. General Electric – EPM 6000
			5. E-Mon/D-Mon – Class 3000.
		4. Accessories:
			1. Current transformers: All CT’s should conform to the ANSI standard accuracy class for metering service of 0.3 or better and shall be provided with certificates of test stipulating the ratio and phase angle corrections at 10% and 100% of rating with the standard ANSI burden nearest to the actual "in-service" burden Whenever practical, the CT’s should be designed to withstand continuous operation and maintain class 0.3 or better metering accuracy at twice or more of rated current (ex. Transformer thermal rating factor greater than or equal to 2)
			2. Voltage Transformers: All VTs should conform to the ANSI standard accuracy class for metering service of 0.3 or better and be provided with certificates of test stipulating the ratio and phase angle corrections at 100% rating with zero burden and with the rated maximum standard burden.
			3. Test Block/Switches: These test blocks should be designed to provide a means to measure the input quantities from the current and/or voltage transformers and to allow the application of test quantities
3. EXECUTION
	1. EXAMINATION
		1. As specified in Section 260500 – Common Work Results for Electrical.
		2. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
			1. Verify that field measurements are as indicated on Utility Company Drawings.
		3. Existing Utilities, Conduits and Piping:
			1. Locate the routings of the existing underground utilities, conduits and piping in the areas of the Work prior to the installation of the proposed conduit. Trace the locations of existing underground utilities, conduits, and piping using “Ground Penetrating Radar (GPR)” detection.
				1. The routings of these existing underground utilities, conduits and piping shall be identified and marked to avoid any trenching conflicts. These routings shall be recorded on the As‑Built drawings prepared by the Contractor for future reference.
			2. Existing utilities, conduits and piping that are to remain shall be supported and protected during the trenching process.
			3. Refer to requirements specified in section 312000, paragraph 1.6.A.3.
		4. Report in writing to USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
		5. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.
	2. PREPARATION
		1. Arrange with Utility Company to obtain permanent electric service to Project.
		2. Coordinate with USPS Project Manager and Utility Company service contact person for execution of required Utility Company documents.
	3. INSTALLATION
		1. Install service entrance equipment as indicated, in accordance with equipment manufacturer’s written instructions, and with recognized industry practices, to ensure that service entrance equipment fulfills requirements. Comply with applicable installation requirements of NEC and NEMA Standards.
		2. Electrical Service Conduit:
			1. Furnished and installed by Contractor in conformance with Utility Company requirements in locations indicated on Drawings.
			2. Trenching, backfilling, and compacting for utilities specified in Section 312300.
			3. Install service in accordance with manufacturer's published instructions, Utility Company requirements, and as indicated on Drawings.
		3. Electrical Service Wiring:
			1. Primary: Furnished and installed by [Utility Company] [Contractor].
			2. Secondary: Furnished and installed by Contractor.
		4. Transformer and Pad:
			1. Transformer: Furnished and installed by [Utility Company] [Contractor].
			2. Transformer Pad: Furnished and installed by [Utility Company] [Contractor] at location indicated on Drawings in conformance with Utility Company requirements.
		5. Service Entrance Section:
			1. Install switchboard in locations indicated on Drawings, in accordance with NEMA PB 2.1.
			2. Tighten accessible bus connections and mechanical fasteners after placing distribution panel.
			3. Ground as specified in Section 260500 and as indicated on Drawings.
		6. Confined space markings: Work within electrical manholes and underground vaults must comply with “confined space” OSHA requirements. Manhole covers and the entrance to underground vaults shall be stamped or marked as “CONFINED SPACE – PERMIT REQUIRED”.
	4. FIELD QUALITY CONTROL
		1. Section 014000 - Quality Requirements: Field testing and inspection.
		2. Obtain service entrance quality control inspection and approval of installation by Utility Company.
		3. Test service entrance equipment and electrical circuitry upon completion of installation work and after energizing circuitry and demonstrate its capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise remove and replace with new units and retest. Engineer’s or Owner’s presence at test is required.
		4. Inspect and test switchboard in accordance with NETA ATS, except Section 4.
		5. Perform switchboard inspections and tests listed in NETA ATS, Section 7.1.

END OF SECTION

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