



Electric Service Requirements

Transmission 69kV Service

Engineering Specification T010

January 2020

Powering forward.
Together.




 SMUD [®]	ENGINEERING SPECIFICATION	No. T010 Page 1 of 8	
		REV 1	DATE: 1/20
CATEGORY ELECTRIC SERVICE REQUIREMENT			
SUBJECT TRANSMISSION 69KV SERVICE			

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1. GENERAL REQUIREMENTS FOR SERVICE

- 1.1. The following is intended for use by customers of the Sacramento Municipal Utility District (SMUD) desiring service from the SMUD 69kV sub-transmission system. The requirements presented here are necessary if SMUD is to supply reliable, cost effective, and safe service. The customer and the customer's agents must carefully read and comply with all written material (this text, as well as all of the notes on the drawings).
- 1.2. It is important that satisfactory arrangements be made for the installation of electric service lines and the location and setting of meters. Contact SMUD's Customer Services Department, 6301 S Street, 1-888-742-7683, for new or additional service. This must be accomplished as soon as initial planning is considered. Delays in supplying this required information could cause an unnecessary inconvenience for the customer. Electric service will not be established until the "service entrance facilities" and interior wiring are satisfactorily completed by the customer.

NOTE: "Customer service entrance facilities" is the term used to designate all the electrical infrastructure and components required to be furnished and installed by the customer.

- 1.3. The basic steps for implementation of service at 69,000 volts are listed below:
- 1.3.1. Customer's requirements are presented to SMUD. Information should include initial loads, future load projections, needs for redundancy, etc.
- 1.3.2. Customer and SMUD agree on type of service and location. Service contract is prepared by SMUD and signed by the Customer. Customer pays 100% of SMUD equipment and installation costs. See section 1.8 below.
- 1.3.3. Customer grants SMUD a right-of-way on SMUD form for metering site and appurtenances.
- 1.3.4. Customer designs site and service to meet or exceed SMUD's design criteria as described in this document.
- 1.3.5. SMUD reviews and approves required documents as specified herein.

NOTE: SMUD approval is limited to design aspects that directly affect the reliability, protection and safe operation of SMUD furnished equipment and the safety of SMUD personnel in operating and maintaining such equipment. Approval by SMUD does not mean that SMUD concurs with all of the design and construction details shown on the drawings. SMUD assumes no responsibility for the correct application and safety aspects of owner-installed equipment and facilities.

- 1.3.6. Customer constructs required work per approved plans and specifications with SMUD inspection.
- 1.3.7. SMUD installs metering and other associated equipment.
- 1.3.8. SMUD performs installation tests, verification of customer protective equipment, function testing, and completes all approvals.
- 1.3.9. SMUD energizes station.
- 1.4. Where the operation of the customer's equipment will require unusually stable voltage regulation free from momentary outages and voltage transients or other stringent voltage control beyond that supplied by SMUD in the normal operation of its system, the customer, at his own expense, shall be responsible for installing, owning, operating, and maintaining any special or auxiliary equipment on the load side of the meter that will be required, as deemed necessary by the customer, for operation of the customer's equipment. SMUD may offer programs to advise and assist customers in obtaining the quality of power desired.
- 1.5. All materials used and all work performed on a customer's premises, with the exception of SMUD's metering facilities and service, must conform with local inspection authority requirements. No service can be connected unless passed by proper inspection authority. Only authorized SMUD employees are permitted to make connections between District wiring and customer wiring.
- 1.6. SMUD reserves the right to revise the commitment for service after twelve (12) months. A new SMUD commitment will normally be required after one year unless a customer has requested and received written approval for a longer period of time from SMUD. Revised commitments may include design changes and will reflect the changing costs of service.
- 1.7. The customer shall secure, at his own expense, all permits and licenses necessary to the prosecution of the service work. Right-of-way encroachment permits for line construction to the customer's property will be obtained by SMUD.
- 1.8. SMUD will furnish and install electric facilities which include: instrument transformers, revenue meter, primary conductors to the instrument transformers, secondary conductors for metering, and minor associated materials. The Customer shall pay 100% of SMUD's equipment and installation costs as determined by SMUD.
- 1.9. A SMUD Engineering Construction Inspector shall be assigned to the job. The customer shall notify the SMUD Engineering Construction Inspector Supervisor, 30 days prior to the construction to arrange for inspection. The installation of SMUD equipment shall not commence until a Final Inspection Report has been signed by the SMUD inspector.

**USE CAUTION WHEN
DIGGING TO AVOID
BURIED ELECTRICAL CABLES.
BEFORE DIGGING CALL
U.S.A. (Underground Service Alert)
800-227-2600 or 811**

2. REQUIREMENTS FOR SITE DESIGN

- 2.1. Service at 69,000 volts will require the construction and installation of a substation which typically will include the SMUD revenue metering and the customer's first transformation. The design of the substation shall conform to the requirements of this document (in addition to any local, state, or federal codes). Any conflicts between this document and other jurisdictional codes shall be brought to the attention of SMUD.
- 2.2. Site improvement plans shall be prepared by a Civil Engineer licensed by the State of California. The following criteria shall be used in the design of the substation:
 - 2.2.1. The site shall be well drained.
 - 2.2.2. Access to the site from public roads shall be via paved surface roads with no overhead obstructions. The road shall be a minimum of 20 feet wide and rated for H-20 full traffic loading. The access roads into substation shall be all weather access, consisting of a minimum of 6" AB base at 90% relative compaction, with 4" AC topping.
 - 2.2.3. The site shall have an aggregate base with a minimum of four inches of $\frac{3}{4}$ " washed crushed rock.
 - 2.2.4. SMUD's revenue metering equipment shall be included in the customer's secured area. As a minimum the fence or enclosure shall be in accordance with the NESC. Additionally, SMUD requires an access gate of at least 18' in width. The gate shall have a latch mechanism that accepts both the Customer's and SMUD's locks, allowing either to enter.
 - 2.2.5. The fence and grounding system shall be designed to meet or exceed the requirements of IEEE Standard 80.

3. Customer Scope of Work

- 3.1. The customer shall provide all land, civil facilities design, and construction for the substation. Civil facilities are all land, grading, drainage, slabs, foundations, structures, conduit, grounding, surfacing, and fencing necessary for the substation.

- 3.2. SMUD metering facility details may vary, based on the specific site configuration, design, and requirements. The customer is required to furnish the following for SMUD's metering installation, unless specifically waived or modified by SMUD:
- 3.2.1. Dead-end/support structure for 69 kV conductor to/from SMUD's revenue metering instrument transformers.
 - 3.2.2. Support pedestals for SMUD's revenue metering instrument transformers. Necessary design details from instrument transformer vendor will be provided by SMUD.
 - 3.2.3. Foundations for above structures.
 - 3.2.4. Concrete pad for installation and access to meter enclosure. Pad is typically located adjacent to metering support structures.
 - 3.2.5. Customer will submit to SMUD the drawings for the meter enclosure to be designed and installed by the customer.
 - 3.2.6. A level standing space on the property of the customer shall be provided in front of meter to permit ready access to the meter. This space must be at least 30 x 36 inches and contain no working obstructions (see page A-3)
 - 3.2.7. Underground conduit between instrument transformer pedestals and meter enclosure pad.
 - 3.2.8. Isolating switch to isolate SMUD's 69kv metering equipment from customer's facilities.
 - 3.2.9. Appropriate protective devices to detect and remove electrical faults on customer facilities from SMUD system.
 - 3.2.10. AC power supply, 120 volt 20 ampere, installed in conduit to SMUD's metering enclosure location. Installation details subject to SMUD approval.
 - 3.2.11. If meter communication cannot occur due to meter location, the customer must supply means for communication to occur with the metering equipment (relay, additional conduit, and antenna, etc...).

4. Customer Document Submittals

- 4.1. The Customer shall submit to SMUD two (2) complete sets of plans and specifications showing the information requested in this requirement for SMUD review and approval. One set of documentation will be returned with SMUD comments. A minimum of ten (10) working days shall be required for submittal review. Submittals marked "NOT APPROVED" shall be corrected and resubmitted.

NOTE: SMUD approval is limited to design aspects that directly affect the reliability, protection and safe operation of SMUD furnished equipment and the safety of SMUD personnel in operating and maintaining such equipment. Approval by SMUD does not mean that SMUD concurs with all of the design and construction details shown on the drawings. SMUD assumes no responsibility for the correct application and safety aspects of owner-installed equipment and facilities.

- 4.2. After approval, the plans shall be resubmitted in AutoCAD format for SMUD records. Site work shall not begin until all documents required below have been received and approved by SMUD.
- 4.3. The following information shall be required to be shown on the documents submitted for review.
 - 4.3.1. Site plan showing location of foundations and grading.
 - 4.3.2. Layout plan showing conduits, grounding, and fencing. There shall be a minimum of two 2-inch conduits between the instrument transformers and the revenue meter.
 - 4.3.3. Detail drawings of grounding, including fence, gate, and gate swing area grounding.
 - 4.3.4. Equipment plans and elevations showing connections to and from metering instrument transformers.
 - 4.3.5. Structural calculations and drawings for the metering structure(s).
 - 4.3.6. Structural calculations and drawings for the metering structure foundations.
 - 4.3.7. Detail drawings for fencing.
 - 4.3.8. One-line diagram from 69kV SMUD line to customer's main breaker or fuse, showing customer's isolating and protective devices.
 - 4.3.9. Electrical schematics showing 69 kV metering connection, isolating switch, and protective devices.
 - 4.3.10. Detailed grounding calculation with supporting drawings and data showing compliance of ground grid design with safety requirements of IEEE Standard 80.

5. Structural Design Requirements

5.1. Seismic Load Criteria:

5.1.1. The instrument transformer support shall be designed in accordance with the seismic criteria of IEEE Std 693, latest edition. The supports shall be qualified at the “moderate seismic qualification level in accordance with Annex F for < 69 kV (Static Coefficient Analysis). All necessary instrument transformer vendor information to perform the analysis shall be obtained from SMUD.

5.2. Wind Load Criteria

5.2.1. Conductor wind load shall be determined in accordance with General Order No. 95 and NESC.

5.3. Equipment and Structures

5.3.1. The design wind pressures shall be in accordance with California Building Code, latest edition.

5.4. Conductor Tension

5.4.1. SMUD will provide conductor design tension and tension angle for the Customer’s deadend structure.

5.5. Load Combinations:

5.5.1. Per California Building Code, latest edition.

5.6. Steel Design

5.6.1. All structural steel design shall be in accordance with California Building Code, latest edition and AISC Steel Construction Manual, latest edition.

5.7. Concrete Design

5.7.1. All concrete design shall be in accordance with the California Building Code, latest edition and ACI 318, latest edition.

6. SMUD Scope of Work

6.1. SMUD shall furnish and install the following at Customer’s expense:

6.1.1. All 69kV line work to the dead-end structure and instrument transformers and to the customer’s isolating switch structure. A tail will be left for the customer to connect at that structure.

6.1.2. Revenue metering instrument transformers on steel structure(s) provided by Customer.

6.1.3. Revenue meter.

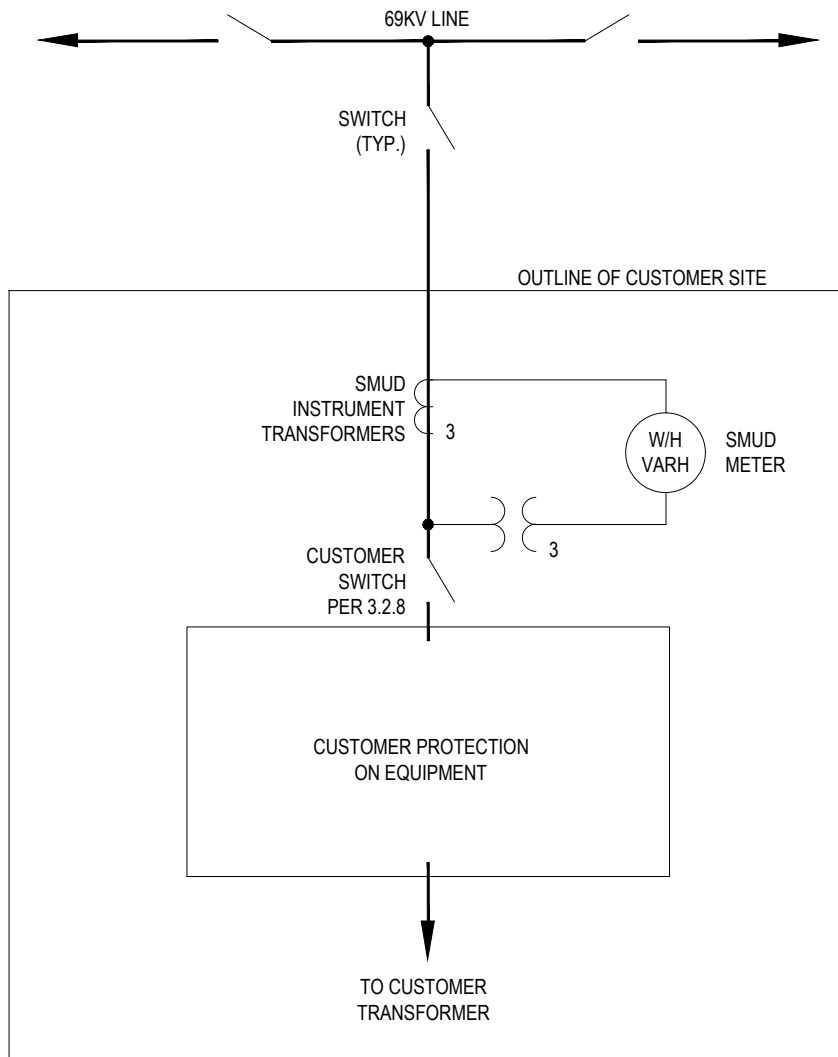
6.1.4. Secondary wiring between instrument transformers and meter location, including necessary aboveground conduit. SMUD will use underground conduit provided by Customer.

Appendix A: Design and Construction Drawings

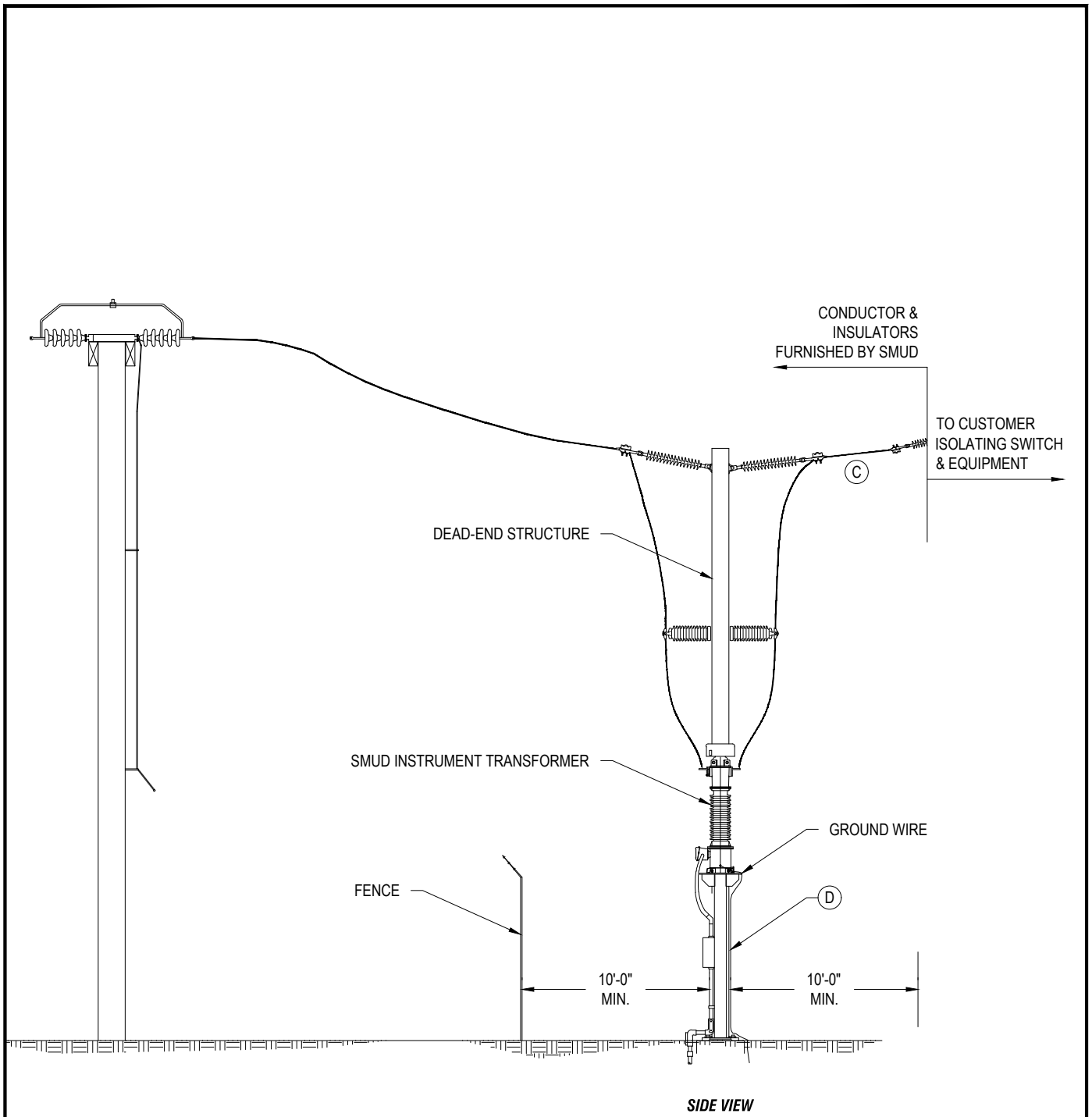
The customer and/or their representatives or contractors shall adhere to the design and construction drawings listed in the table below, unless otherwise specified in writing by a SMUD inspector or designer. The Customer shall review all drawings. Any questions or comments shall be brought to Sacramento Municipal Utility District's (SMUD) attention for clarification or resolution.

Design and Construction Drawings

Drawing Title	Drawing Identification Code	Page Number
TYPICAL SINGLE LINE DIAGRAM		A-01
PARTIAL EVALUATION - TYPICAL SITE		A-02
TYPICAL 69KV METERING INSTALLATION		A-03
SMUD 69kV Meter Panel		A-04



TYPICAL SINGLE LINE DIAGRAM

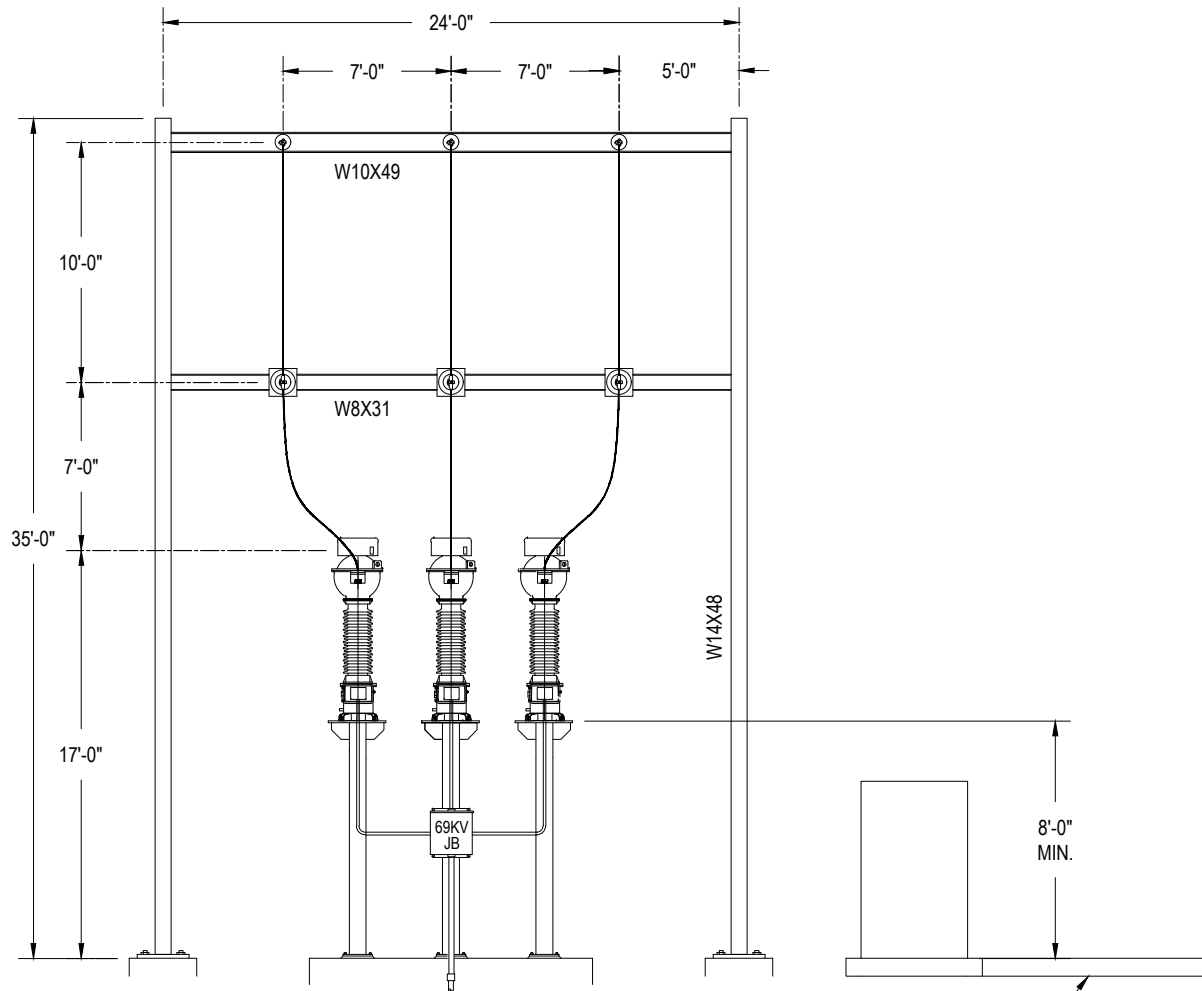


PARTIAL ELEVATION - TYPICAL SITE

NOTES:

- (A) THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS INTENDED TO AID THE CUSTOMER'S ENGINEER IN UNDERSTANDING THE SMUD REQUIREMENTS FOR SERVICE OF 69KV.
- B. 10' MINIMUM CLEARANCE AROUND METERING STRUCTURES IS REQUIRED FOR ACCESS BY TRUCK.
- C. DEADEND ON CUSTOMER A-FRAME LEAVE 25' TAIL.
- (D) STRUCTURAL SETTLE INSTALLED BY CUSTOMER.

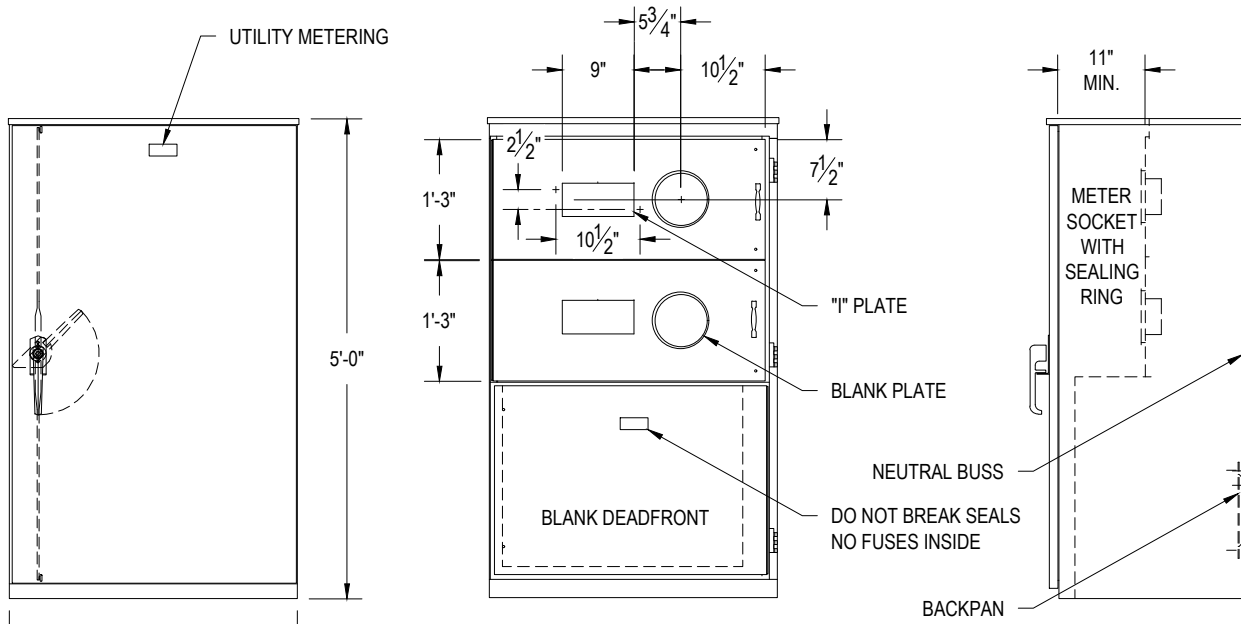
	ESR: T010	ESR PG. NO.: A-02	REV. DATE: JANUARY 2020	REV. NO.: 1
	PARTIAL ELEVATION - TYPICAL SITE		STANDARD NO.: ---	PAGE 1 OF 1



FRONT VIEW

LEVEL CONCRETE WORK
SURFACE 30WX36"D

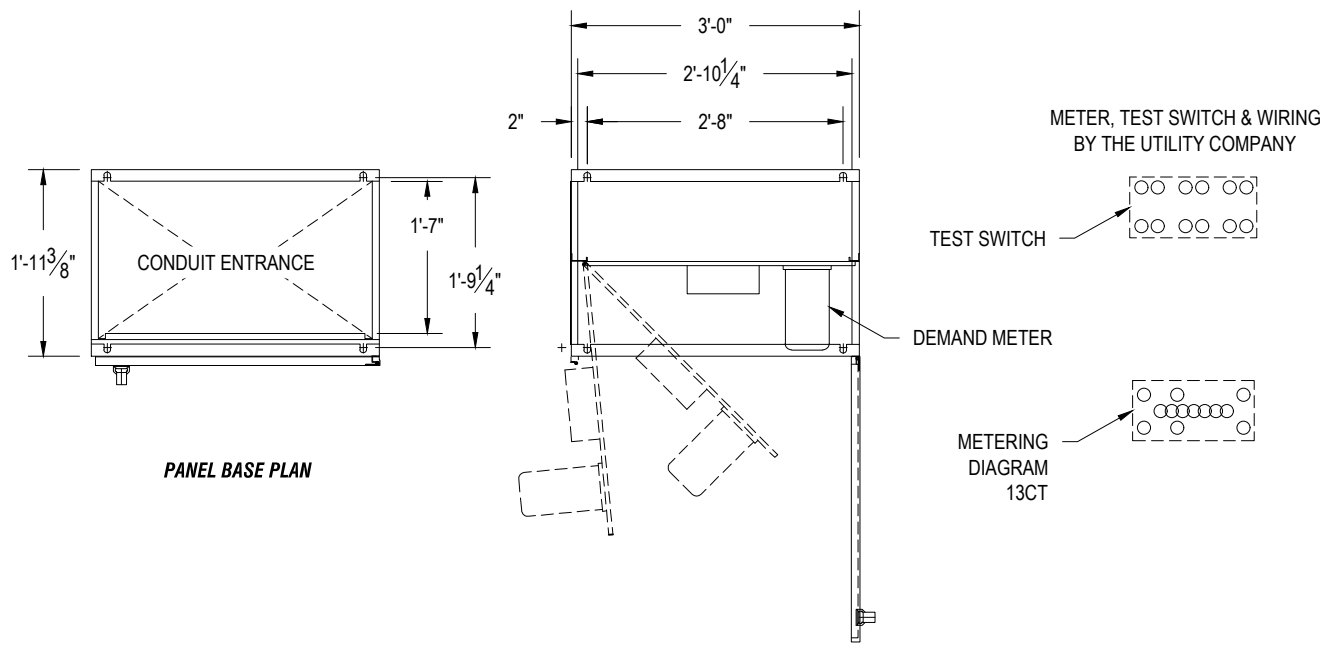
69KV METERING H-FRAME



PANEL ELEVATION

**METER SECTION
INNER DEADFRONT DOOR
(SHOWN WITH OUTER DOORS REMOVED)**

SIDE VIEW



PANEL BASE PLAN

ENCLOSURE CONSTRUCTION NOTES:

- A. EXTERIOR 12 GA. H.D. GALV. STEEL AND INTERIOR 14 GA. COLD ROLLED STEEL ELECTRICALLY WELDED AND REINFORCED WHERE REQUIRED.
- B. CONSTRUCTION WILL BE NEMA 3R, RAINTIGHT.
- C. ALL NUTS, BOLTS AND SCREWS WILL BE STAINLESS STEEL.
- D. NUTS, BOLTS & SCREWS WILL NOT BE VISIBLE FROM OUTSIDE OF ENCLOSURE.
- E. NAMEPLATES WILL BE PROVIDED AS REQUIRED.
- F. CONTROL WIRING WILL BE MARKED AT BOTH ENDS BY PERMANENT WIRE MARKERS.
- G. A PLASTIC COVERED WIRING DIAGRAM WILL BE ATTACHED TO THE INSIDE OF THE FRONT DOOR.
- H. ENCLOSURE WILL BE FACTORY WIRED AND CONFORM TO REQUIRED NEMA AND UL 508A STANDARDS.
- I. COLOR TO BE: 49 GRAY.

# XXXXXXXXX				
# XXXXXXXXX				
INDUSTRIAL CONTROL PANEL				
VOLTAGE	PHASE	WIRES	MAINS AMPERES	HZ
120/240	3	4	N/A	60
SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN:				
AMPERES		VOLTAGE		
N/A	RMS SYM.	240	V	
METER SOCKET RATING: 20CT A. CONT. ENCLOSURE: TYPE 3R				

<p>SMUD Sacramento Municipal Utility District</p>	ESR: T010	ESR PG. NO.: A-04	REV. DATE: REV. NO.: JANUARY 2020 0
	<p>SMUD 69KV METER PANEL</p>		<p>STANDARD NO.: ---</p> <p>PAGE 1 OF 1</p>