Electric Service Requirements

Commercial Industrial

Engineering Specification T004

February 2017
Table of Contents

1. GENERAL REQUIREMENTS FOR SERVICE ........................................................................... 2
2. ABBREVIATIONS .................................................................................................................. 4
3. MINIMUM REQUIREMENTS FOR COMMERCIAL/INDUSTRIAL ELECTRIC SERVICE INSTALLATIONS .................................................................................. 4
   3.1 Underground Services, Commercial/Industrial ......................................................... 4
   3.2 Overhead Service Drops, Commercial/Industrial ...................................................... 5
   3.3 Service Head .................................................................................................................. 6
   3.4 Service Riser Conductors ............................................................................................... 6
   3.5 Service Conduit .............................................................................................................. 6
   3.6 Meter Location ............................................................................................................... 7
   3.7 Meter Room ................................................................................................................... 8
   3.8 Meter Socket .................................................................................................................. 9
   3.9 Test Bypass Devices for Self-Contained Meter Installations ...................................... 9
   3.10 Service Main Disconnect .............................................................................................. 9
   3.11 Grounding .................................................................................................................... 10
   3.12 Metering Arrangement ............................................................................................... 10
   3.13 Metering Emergency Alarm Systems ......................................................................... 10
4. METER INSTALLATIONS ON LOW VOLTAGE SWITCHBOARDS, 0-600 VOLTS, 0-4000 AMPERES ........................................................................................................... 10
   4.1 Switchboards – General ............................................................................................... 10
   4.2 Switchboard Service Section ....................................................................................... 11
   4.3 Standard Switchboard Service Section ....................................................................... 11
   4.4 Specially Engineered Service Section ....................................................................... 12
   4.5 Service Entrance Location .......................................................................................... 14
   4.6 Sequence ....................................................................................................................... 14
   4.7 Current Transformer Compartments .......................................................................... 14
   4.8 Meter Panels ................................................................................................................ 15
   4.9 Meter Sockets ................................................................................................................ 15
   4.10 Meter Height ................................................................................................................. 16
   4.11 Meter Marking .............................................................................................................. 16
   4.12 Meters and Test Facilities ............................................................................................ 16
   4.13 Self-Contained Meters ............................................................................................... 16
5. REQUIREMENTS FOR COMMERCIAL MULTIPLE METER INSTALLATIONS ................................................................................................................................. 16
   5.1 Meter Cabinets and Enclosures .................................................................................... 16
   5.2 Totalized Metering ....................................................................................................... 17
   5.3 Non-Installation of Meters ............................................................................................ 17
6. SWIMMING POOL CLEARANCES FOR SUPPLY SERVICE DROPS (INCLUDES HOT TUBS) ......................................................................................................................... 18

Appendix A: Design and Construction Drawings ................................................................. 19
1. **GENERAL REQUIREMENTS FOR SERVICE**

1.1 This is a guide to the Sacramento Municipal Utility District's (SMUD) requirements for the establishment of electric service to new or re-wired commercial/industrial installations. The requirements presented here are necessary for SMUD to supply uniform, satisfactory, and safe service. It is necessary that all written material (this text, as well as all of the notes on the drawings) be carefully read.

1.2 It is important that early arrangements be made in advance of 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 shall 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 components required to be furnished and installed by the customer.

1.3 Where the operation of the customer's equipment will require unusually stable voltage regulation, beyond that supplied by SMUD in the normal operation of its system, the customer shall be responsible to protect their own equipment. Any special or auxiliary equipment required by the customer shall be installed on the load side of the meter. The customer, at their own expense shall install, own, operate and maintain this special or auxiliary equipment.

1.4 In addition to SMUD's own requirements, the customer is responsible for complying with applicable provisions of City and County ordinances, the California Electric Code (CEC), the National Electric Code (NEC) and all applicable orders, rules and regulations of the State of California. All meter panel and customer service switchboard equipment shall meet SMUD and EUSERC requirements and be UL approved. For information on EUSERC, see [www.euserc.com](http://www.euserc.com).

1.5 No service can be connected until approved by the appropriate Authority Having Jurisdiction. Only authorized SMUD employees are permitted to make connections between SMUD wiring and customer wiring.

1.6 SMUD will normally require a new commitment after one year unless a customer has requested and received written approval for a longer period of time from a SMUD Engineering Designer.
1.7 Building plans and definite load information for commercial and industrial installations must be furnished to SMUD Engineering Designer EA105 at P.O. Box 15830, Sacramento, 95852-0830, as soon as possible. Delays in supplying this required information could cause an unnecessary inconvenience for the customer.

1.8 Commercial and Industrial contracts and/or agreements with SMUD shall be executed in accordance with the provisions of SMUD Rules and Regulation 16.

1.9 The customer's service voltage shall be determined by SMUD's Engineering Designer. Multiple service voltages to one building or parcel of property shall only be granted upon approval of SMUD's Engineering Designer and local inspection authorities.

1.10 Normally, only one service point shall be granted to one building or one parcel of property. Multiple service points may be granted to one building or multiple buildings on one parcel, provided they meet the requirements of the CEC and NEC, as well as the requirements of SMUD and local inspection authorities.

1.11 All commercial meter installations with a service main disconnect or combined breaker ratings greater than 200 amps must be reviewed and approved by SMUD. These drawings shall show the customer's name and job address. Submit two copies to: SMUD Meter Shop EB102, P.O. Box 15830, Sacramento, CA 95852-0830 prior to fabrication. One copy shall be returned to the sender with approvals or required corrections.

1.12 Meter locations for all installations shall be designated by the SMUD Engineering Designer. The meter(s) shall be located within 3 feet of the corner of the building closest to the SMUD service point and shall be a minimum of 3 feet from all property lines. Meter locations other than described above shall not be allowed without advance written permission from the Engineering Designer. Any deviations shall be made only for special structural requirements and must be approved by the Engineering Designer. Meter locations other than those described above are subject to additional charges, payable prior to meter installation.

1.13 This guide may not cover all situations or installations. If an installation is not addressed or identified within this guide the customer shall seek approval from a SMUD Engineering Designer prior to construction.
2. **ABBREVIATIONS**

The following abbreviations may be used throughout these Service Requirements:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>A Type Meter</td>
</tr>
<tr>
<td>Amp or A</td>
<td>Amperes</td>
</tr>
<tr>
<td>Ag. Can</td>
<td>Agricultural Meter Can</td>
</tr>
<tr>
<td>C.C.</td>
<td>Circuit Closing</td>
</tr>
<tr>
<td>CEC</td>
<td>California Electric Code</td>
</tr>
<tr>
<td>Cl.</td>
<td>Class of Meter</td>
</tr>
<tr>
<td>Comb. Can</td>
<td>Combination Can</td>
</tr>
<tr>
<td>D.B.</td>
<td>Direct Burial</td>
</tr>
<tr>
<td>E.B.</td>
<td>Encased Burial</td>
</tr>
<tr>
<td>El.</td>
<td>Element</td>
</tr>
<tr>
<td>EUSERC</td>
<td>Electric Utility Service Committee</td>
</tr>
<tr>
<td>G.O.</td>
<td>General Order</td>
</tr>
<tr>
<td>I.M.T.</td>
<td>Intermediate Metallic Conduit</td>
</tr>
<tr>
<td>Int.</td>
<td>Interval</td>
</tr>
<tr>
<td>KW.</td>
<td>Kilowatts</td>
</tr>
<tr>
<td>L.P.</td>
<td>Lightning Protector</td>
</tr>
<tr>
<td>M.B.</td>
<td>Meter Mounting Base</td>
</tr>
<tr>
<td>M.D.</td>
<td>Maximum Demand</td>
</tr>
<tr>
<td>NEC</td>
<td>National Electric Code</td>
</tr>
<tr>
<td>O.H.</td>
<td>Overhead</td>
</tr>
<tr>
<td>R.M.T.</td>
<td>Rigid Metallic Conduit</td>
</tr>
<tr>
<td>S.</td>
<td>S Type Meter</td>
</tr>
<tr>
<td>S.P.</td>
<td>Separate Potential</td>
</tr>
<tr>
<td>S.S.</td>
<td>Safety Socket</td>
</tr>
<tr>
<td>U.G.</td>
<td>Underground</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Lab</td>
</tr>
<tr>
<td>V.</td>
<td>Volts</td>
</tr>
<tr>
<td>W.</td>
<td>Watts</td>
</tr>
</tbody>
</table>

**USE CAUTION WHEN DIGGING TO AVOID BURIED ELECTRICAL CABLES. BEFORE DIGGING, CALL U.S.A. (Underground Service Alert), 800-642-2444**

3. **MINIMUM REQUIREMENTS FOR COMMERCIAL/INDUSTRIAL ELECTRIC SERVICE INSTALLATIONS**

3.1 **Underground Services, Commercial/Industrial**

3.1.1 City or County inspects all UG services and determines panel size, conductor size, and number of conductors required.

3.1.2 Customer to provide all conduit and conductor to a location designated by SMUD.
3.2 Overhead Service Drops, Commercial/Industrial

3.2.1 A "service drop" is the span of overhead conductors from SMUD's pole to the customer's building or structure and does not include the "drip loops". The drip loop is formed by connecting the ends of the customer's service entrance conductors to the service drop.

3.2.2 Unless special permission is granted by SMUD's Engineering Designer, the length of the service drop is not to exceed 100 feet (distance measured from the nearest SMUD pole to the point of attachment). In addition, the point of attachment shall be located on that part of the building nearest to and facing SMUD's pole.

3.2.3 The height of the point of support or attachment on the customer's building must be sufficient to provide the necessary ground clearances prescribed by all applicable orders, rules and regulations of the State of California, General Order 95 of the California Public Utilities Commission, the CEC and NEC, and City and County ordinances.

3.2.4 In the area accessible to pedestrians only, where the 12 foot minimum clearance applies, clearances shall be measured from either the lowest point of the drip loops or the lowest point of sag of the service drop conductors, whichever is lower. Where proper height cannot be maintained by going to the highest point on the face of the building, a periscope type service riser shall be used (See Page A-5).

3.2.5 In addition to the required ground clearances, the service drop must have a "radial clearance" of 3 feet from any building exit, window, door or other opening at which human contact might be expected. In the case of a service drop located above the horizontal plane through the top extremity of such an opening, the 3 foot minimum clearance may be reduced to the maximum practical radial clearance. In no event, however, shall it be less than 1 foot (See Page A-4).

3.2.6 Due of the necessity of meeting these clearances and a variety of other problems, it is imperative that you contact SMUD before you decide on a point of attachment for the service drop. A SMUD Engineering Designer will help you select a point of attachment that shall meet SMUD's requirements. Call 732-5700 to request a meter spot. SMUD shall not connect to an unsuitable location selected by the customer or his representative.

3.2.7 Eye bolts or securely bolted service racks are required for support of the service drop and must be installed by the customer through a minimum of 2 x 4 inch backing. Lag screws are not permissible.
3.2.8 The point of attachment should be located at or near the corner of the building nearest and facing the pole designated by SMUD as the pole from which the service drop will be installed. In all cases, the SMUD Engineering Designer must approve the service attachment location.

3.2.9 The Engineering Designer must be consulted on all rewire jobs which involve proper service wire clearance over a swimming pool or metallic roof.

3.3 Service Head

3.3.1 An approved, rain tight service head shall be installed at a point suitable for connecting the service entrance conductors to the service drop.

3.3.2 The service head shall be located as close to the center point of the service attachment as practical. Unless it is impractical, the service head should be higher than the point of attachment (See Page A-5 for illustrations of minimum clearances above the roofline).

3.4 Service Riser Conductors

3.4.1 The Authority Having Jurisdiction must be consulted for size and type of wire.

3.4.2 The service riser conductors must be continuous and without splices. Neutral line wire (white) shall be continuous and without a splice from the service head through the bonding lug to the neutral bar in the switch. Where special permission is granted, the neutral line may be broken if the socket is equipped with an approved connection device.

3.4.3 A minimum of 24 inches of conductor must remain outside of the service head and allow for a proper drip loop at the service connection.

3.5 Service Conduit

3.5.1 The Authority Having Jurisdiction must be consulted for size and type of conduit.

3.5.2 Conduit should be in one continuous length from the service head to the meter socket. A limited number of approved type condulets shall be permitted when building construction makes a continuous run impractical. If gutters are used, they shall be equipped with sealing devices.

3.5.3 RMT or IMT conduit of 1-1/2 inch inside diameter is the minimum service riser conduit acceptable for attaching SMUD’s service cables.

3.5.4 Fire protection, in accordance with the Authority Having Jurisdiction, is required where service risers are enclosed in combustible materials.
3.5.5 Conduit may be concealed in building walls and/or attics on the Utility (line) side of the meter under the following conditions:

3.5.5.1 A semi-flush, mounted, combination meter socket main breaker is used.

3.5.5.2 A 1 1/2 inch minimum inside diameter conduit is used.

3.5.5.3 Conduit is in one continuous vertical run from the meter service entrance to a minimum of 6 inches above where the conduit leaves the concealed wall and/or attic. No condulets or sleeves are allowed in the concealed area.

3.6 Meter Location

3.6.1 A clear, unobstructed work space shall be left on all sides of the meter (See Page A-1).

3.6.2 In addition, the requirements for dedicated equipment space shall comply with the CEC and NEC.

3.6.3 It is preferred that all metering equipment be located on the outside of the building. Only with prior SMUD approval, metering equipment may be placed inside a building per section 3.7. Metering equipment shall include; metering sections, current transformer sections, potential transformer sections, pull sections, and the building’s main disconnect. Any questions regarding the location of the metering equipment, please contact Field Metering @ (916) 732-5167.

3.6.4 Electric meter installations shall be accessible to authorized representatives of SMUD for reading, testing, and inspection at all times.

3.6.5 Drive-thru lanes, carports, breezeways, covered or screened porches or any other area that might be enclosed at some future date shall not be selected as a meter location.

3.6.6 Meters or metering equipment shall not be installed in elevator shafts, ventilator shafts, clothes closets, broom closets, lavatories, in or over stairways, over doorways, windows, sinks, washtrays, gas meters or other grounded objects, in driveways, or in any other hazardous location.

3.6.7 The area on either side of a door or swinging window, equal to the width of that door or swinging window, is not acceptable as a meter location.

3.6.8 A level standing space on the property of the customer shall be provided in front of each 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-1).
3.6.9 When the meter is enclosed, the 30 x 36 inch level standing space shall be measured from the outside face of the meter enclosure (See Page A-27). Egress from unobstructed level working space shall be free from any objects that could potentially impede the safe exit of SMUD employees.

3.6.10 For enclosed meters the maximum meter-socket height measured from the center of the socket to the standing working surface is six foot three inches (75”). The minimum height is three feet (36”).

3.6.11 For egress, clearance between adjacent objects (live-bus equipment, grounded parts, walls, etc…) and the front of the meter enclosure shall be measured from the enclosure doors, in the open 90 degree position. The minimum clearance shall be 36”.

3.7 Meter Room

3.7.1 SMUD shall have external building access to the meter room.

3.7.2 Meter room access shall be keyed to SMUD “S1” key or other SMUD approved method.

3.7.3 Sufficient working light shall be provided in the meter room, with operating switches at each doorway.

3.7.4 Meter Room doors shall have a working door stop.

3.7.5 A minimum of 1-2 receptacle outlets shall be placed near the electrical service equipment.

3.7.6 All applicable clearances around meter enclosures, meter sockets, switchboards, electrical equipment, etc…shall be per CEC and NEC.

3.7.7 Required installation height of meter sockets and other electrical equipment shall be from standing grade, not equipment grade.

3.7.8 Required entrance to, and egress from, working space shall be per the CEC and NEC.

3.7.9 All egress from meter rooms shall discharge to the exterior of the building.

3.7.10 In certain cases the customer may be required per CEC and NEC to provide two (2) entrances into a meter room for appropriate egress. This is a code issue between the customer and local authorities having jurisdiction.

3.7.11 Meter Rooms shall not be used for storage.

3.7.12 If meter communication cannot occur due to meter room location, the customer must supply means for communication to occur with the metering equipment (relay, additional conduit and antenna, etc…”).
3.7.13 Where equipment in the room is rated 800A an egress door must be provided within 25ft of the edge of the working space. Doors shall open in the direction of egress and be equipped with listed panic hardware.

3.8 **Meter Socket**

3.8.1 The meter socket must be installed in a true vertical plane.

3.8.2 Any unused outlets in a meter socket must be sealed with internally removable plugs.

3.8.3 Die-cast meter sockets shall **not** be used as a wiring gutter for more than two meters.

3.8.4 Commercial, self-contained meter sockets shall be U/L approved and shall have a continuous duty current rating equal to or greater than the current rating of the associated load service equipment.

3.8.5 Neutral taps shall be connected to the service neutral conductor and shall be located behind sealed panels. Wire nuts are **not** permitted.

3.8.6 Meter sockets with extruded or cast aluminum jaws are **not** acceptable and shall not be connected.

3.8.7 Standard switchboard service sections can be used on all services having a main size of 201 amperes or more.

3.8.8 SMUD's Meter Division is to be contacted for prior approval on jobs involving anything labeled "special".

3.8.9 The customer's wiring for new service or rewiring shall include a grounded conductor or bus in the service entrance equipment. The grounded conductor or bus shall connect to the proper terminals in the service entrance meter compartment and service switch. Sizing of this conductor or bus shall be in accordance with the requirements of the Authority Having Jurisdiction.

3.9 **Test Bypass Devices for Self-Contained Meter Installations**

Approved test bypass devices are required on all SMUD designated commercial installations:

3.9.1 Exceptions: Test bypass devices are not required for single phase services to signboards, temporary power poles, and accessory buildings located on residential properties that qualify for a separate service and conform to residential zoning restrictions.


3.10 **Service Main Disconnect**

3.10.1 The service main disconnect, or main breaker, must be installed on the load side of the SMUD meter.
3.10.2 If the service main disconnect is installed outside, it shall be of an approved rain-tight type.

3.10.3 If the meter socket and service main disconnect (main breaker) are in separate enclosures, the wiring between the two enclosures must be in R.M.T., I.M.T. electrical conduit or approved sealable raceway.

3.10.4 The ampacity ratings for service main disconnects or main breakers are approved by the Authority Having Jurisdiction.

3.11 Grounding

3.11.1 An approved, concrete encased electrode (ufer ground) must be used for all new construction.

3.11.2 The Authority Having Jurisdiction must be consulted for the required ground conductor type and size and for other types of grounding.

3.12 Metering Arrangement

3.12.1 The metering arrangement approved as standard and required by SMUD provides for the line current to enter first the meter and then the disconnect (switch) and overload protective devices (fuses or circuit breakers).

3.12.2 Unmetered service wires and metered load wires shall not be combined in the same conduit, raceway, or gutter.

3.13 Metering Emergency Alarm Systems

3.13.1 SMUD policy does not allow connections to a customer’s service preceding the electric meter. In those cases when it is impractical to install an emergency alarm system on the load side of the service meter, a separate house meter for the emergency system shall be required.

4. METER INSTALLATIONS ON LOW VOLTAGE SWITCHBOARDS, 0-600 VOLTS, 0-4000 AMPERES

4.1 Switchboards – General

4.1.1 Use of a reactive, volt-ampere-hour meter to measure power factors may be necessary, depending upon the rate under which service is rendered and the amount of load. Some rate schedules call for measurement of the power factor if a certain demand is exceeded for 3 months consecutively. SMUD shall provide specific information on these subjects upon request.

4.1.2 All compartments containing unmetered conductors shall be sealable. When a raceway or conduit for "the wiring between the meter and the current transformers" is necessary, it shall be sealable and used exclusively for revenue metering.
4.2 **Switchboard Service Section**

4.2.1 A service section is defined as the section of a customer's switchboard provided specifically for housing the metering current transformers (if required), the revenue meters and test facilities, and the service main disconnect or main breaker. SMUD shall accept them only if the following requirements are met:

4.2.1.1 Metered and unmetered wiring shall be separated (not cabled together) so that it is readily apparent that the entire load is being metered.

4.2.1.2 Factory, "harness style" wiring (or equivalent) shall be used between the "hot gutter" and the line terminal of each meter socket and also between the load terminals of each meter socket and the line side of the corresponding circuit breaker.

4.2.1.3 Connecting wires between the meter socket load terminals and the circuit breaker line terminals shall be separately color coded for each position in the row.

4.2.1.4 The relation of the individual meter socket, breaker and address served shall be permanently and clearly marked with the meter panels in place.

4.2.1.5 When the installation is completed, all panels must be removable for inspection of wiring.

4.2.1.6 Panel design shall permit convenient replacement of any individual meter socket or jaw assembly.

4.2.2 When two or more switchboard service sections (standard or specially engineered) are supplied from one set of service conductors, the supply bus and any connections to it shall be located above the current transformer position in a separate sealable enclosure outside of the current transformer compartment. The supply bus it to be arranged so that it is readily accessible and may be worked upon without disturbing the current transformers and the associated secondary wiring.

4.3 **Standard Switchboard Service Section**

4.3.1 The general arrangement of a standard switchboard service section is shown on Page A-8.
4.3.2 The standard section now utilizes a hinged meter panel located in front of the current transformer compartment to minimize the overall space requirements. It should be noted that hinged meter panels must be sealable and easily removed with the hinges readily interchangeable from the right or left side on the job site. They must also have handles and open a minimum of 90° on the side that it is hinged with meters and test switches mounted to permit safe and ready access to the instrument transformer (See pages A-9 and A-10).

4.4 **Specially Engineered Service Section**

4.4.1 Switchboard designs which do not conform to the standard switchboard arrangements are considered specially engineered. Specially engineered service sections include installations:

4.4.1.1 Any service greater than 600V.

4.4.1.2 Over 1000 amperes.

4.4.1.3 Where more than one bus (multi-leaf) is used per phase.

4.4.2 Various arrangements for specially engineered service sections are suggested in the illustrations on pages A-11 through A-16.

4.4.3 When a specially engineered service section is necessary, three drawings of the proposed section shall be submitted to SMUD metering for approval prior to manufacture. The drawings shall indicate the contractor's and the customer's name and address and the installation address.

4.4.4 The general arrangement of a specially engineered switchboard service section should follow as nearly as practical that of the standard section. In designing a specially engineered service section, the following general requirements shall be observed:

4.4.4.1 Socket meters, used with current transformers, shall be mounted on hinged panels. Self-contained meters shall be mounted on non-hinged panels.

4.4.4.2 When a hinged meter panel is located behind a door, a clear space of at least 11 inches is required between the meter panel and the door, as well as a 90° opening with meters and test switches in place. The access door shall be provided with a single latching device. The access door(s) shall be equipped with devices to accommodate two padlocks.
4.4.4.3 A clear space in back of the meter panel, at least 4 inches deep, shall be provided for secondary wiring and for the back of the phase shifting device required for determination of power factor. If recording or graphic demand metering is required, SMUD must be consulted to determine any additional space requirements.

4.4.4.4 Sockets installed on switchboards shall be of a design acceptable to SMUD.

4.4.4.5 Provision should be made for mounting a reactive, volt-ampere-hour meter, unless SMUD specifically indicates that it is not required. The opening for the phase shifting device shall be covered with a flat plate fastened on the inside and painted to match the switchboard.

4.4.4.6 A minimum of 4 inches of clear space is required directly below the bottom slot of the meter test switch to permit safe connection of test leads.

4.4.4.7 Not more than two meters shall be mounted on any removable meter panel.

4.4.4.8 Panels, which provide access to instrument transformers, shall not be larger than required for good accessibility. Removable panels shall be equipped with lifting handles mounted slightly above the panel center and shall not be heavier than can be conveniently lifted by one person.

4.4.4.9 The front edges of the current transformer bus bars shall all be located in the same vertical plane.

4.4.4.10 A removable bus section and suitable transformer support shall be provided to permit the installation of window type transformers for all installations over 1000 amperes.

4.4.4.11 Busses shall be adequately supported in the current transformer compartment to withstand the mechanical stresses of short circuit. The bus supports shall not interfere with installation or removal of current transformers. Current transformers shall not be used to support the busses. The busses must be entirely self-supporting.

4.4.4.12 The busses and current transformer mountings shall be designed so that each of the current transformers may be withdrawn from its mounting position directly through the access panel without disturbing any other current transformer.
4.4.4.13 When multi-leaf busses and/or current transformers are used, the busses shall be oriented so that they appear "edgewise" when viewed from the access panel.

4.4.4.14 The general arrangement and spacing of current transformers and the methods of mounting current transformers shall conform, in so far as practical, to the illustrations on pages A-11 through A-13.

4.5 Service Entrance Location

4.5.1 In the Standard and Specially Engineered Switchboard Service Sections, the direction of feed shall be vertical and no other conductors shall pass through this compartment.

4.5.2 In addition, for underground services 801-4000 Amps or for multiple metering switchboards, bus bars shall be extended into the terminating pull section. For underground services 0-800 Amps, lug landings in the terminating pull section or pull box, connecting conductors between such landings and the current transformer compartment, shall be provided by the customer.

4.6 Sequence

The service switch shall be on the load side of the metering equipment in all cases (Meter-switch-fuse sequence).

4.7 Current Transformer Compartments

4.7.1 If either the capacity of the service switch exceeds 200 amperes or the capacity of the conductors supplying a breaker or group of breakers exceeds 200 amperes, transformer compartments shall be required.

4.7.2 Details of the size and arrangement of current transformer compartments for the Standard Switchboard Service Sections are shown on pages A-11 thru A-16.

4.7.3 The current transformers supplied by the serving agency for revenue metering shall not be utilized for any other purpose. Covers for current transformer compartments shall be made of code gauge metal. If non-hinged panels are used as covers, they shall be provided with lifting handles and be attached with sealable studs and wing nuts or by other approved means.
4.7.4 The customer shall furnish lugs and connect the cable to the line and load sides of the bus stubs in the current transformer compartment. The ends of the bus bars shall be located so that the current transformers can be connected without removing adjacent panels. The bus supports in the current transformer compartment shall be sufficiently rigid to maintain alignment of the bus after the service conductors are connected to the bus stubs and before the current transformer(s) is installed.

4.7.5 When links and supports for through type current transformers are required, the bus and removable links must be of a compatible material and hardware.

4.8 Meter Panels

4.8.1 The hinged meter panels shown on pages A-9 and A-10 are designed to accommodate only transformer rated socket meters.

4.8.2 The non-hinged meter panels shown on A-17 are designed to accommodate only self-contained socket meters.

4.9 Meter Sockets

4.9.1 The following table shows the type of meter sockets to be furnished:

<table>
<thead>
<tr>
<th>Service</th>
<th>Meter Clips/Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Contained Meters</strong></td>
<td></td>
</tr>
<tr>
<td>Single Phase</td>
<td>Two or three wire</td>
</tr>
<tr>
<td>Single Phase</td>
<td>Three wire, 120/208 volt wye</td>
</tr>
<tr>
<td>Three Phase</td>
<td>Four wire delta</td>
</tr>
<tr>
<td>Three phase</td>
<td>Four wire wye</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service</th>
<th>Meter Clips/Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meters with Current Transformers</strong></td>
<td></td>
</tr>
<tr>
<td>*Single phase</td>
<td>Three wire</td>
</tr>
<tr>
<td>Three phase</td>
<td>Four wire delta</td>
</tr>
<tr>
<td>Three phase</td>
<td>Four wire wye</td>
</tr>
</tbody>
</table>

*Service over 200A, single phase, in not available

4.9.2 When socket-type meters are used, sockets shall be furnished with approved sealing rings installed by the switchboard manufacturer.
4.10 Meter Height

4.10.1 When meters are located in a meter room or when fully enclosed in a cabinet the minimum height of the meter shall be 36 inches and the maximum height shall not exceed 75 inches. These heights are measured from the standing surface, not equipment surface, to the center line of the meter. Cabinets shall not impair working space.

4.10.2 When meters are wall or surface mounted, but not located in a meter room or enclosure, the minimum height of the meter shall be 48 inches and the maximum height shall not exceed 75 inches. These heights are measured from the standing surface to the center line of the meter.

4.11 Meter Marking

4.11.1 Where more than one revenue meter is installed in a building, each meter position shall be clearly and permanently marked by the building owner to indicate the particular location supplied by it.

4.11.2 Service shall not be established until this identification has been completed.

4.12 Meters and Test Facilities

Transformer rated meters and test equipment shall be furnished and installed by SMUD.

4.13 Self-Contained Meters

4.13.1 Self-contained meters are those having current coils designed to carry the line current. They do not require current transformers.

4.13.2 Sockets for self-contained meters and test facilities shall be wired by the switchboard manufacturer.

4.13.3 Spacing for various combinations of self-contained meters are shown on page A-17.

5. REQUIREMENTS FOR COMMERCIAL MULTIPLE METER INSTALLATIONS

5.1 Meter Cabinets and Enclosures

5.1.1 The cabinet shall be designed so that no obstruction such as door jambs, vertical posts, etc., be allowed within the cabinet opening. With the cabinet door open, a clear working space of 36 inches is required directly in front of the cabinet for installing the meter.

5.1.2 Shallow cabinets, with holes cut in the doors for meters to protrude through, shall not be permitted.
5.1.3 Clearances between the sealing flange of the meter socket and the inside of the closed cabinet door shall be a minimum of 11 inches, but not more than 15 inches for commercial and industrial meter installations (See Page A-2).

5.1.4 Hinged doors shall not exceed 4 x 4 feet and shall be provided with a device to hold them in the open position safely.

5.1.5 All doors shall be fitted properly to insure positive opening and closing and shall be equipped with adequate pulls, hinges and latches.

5.1.6 Cabinets shall be rain tight and constructed of weather resistant materials. All top openings (conduits entering and leaving) shall be flashed and sealed.

5.1.7 When cabinets are to be locked with the customer's lock, a double lock arrangement shall be provided to accommodate a SMUD padlock.

5.1.8 If the socket is installed for future use, plastic meter covers shall be used to cover energized sockets. Where extra meter sockets have been installed in multi-meter installations and have no probable future use, the internal bus must be removed from the socket and the socket opening closed.

5.1.9 For multiple-meter installations in a multi-meter enclosure, the meter sockets shall have a minimum horizontal clearance of 7-1/2 inches, center to center, and a minimum vertical clearance of 8-1/2 inches, center to center.

5.2 **Totalized Metering**

Totalized metering **may** be available for certain larger commercial/industrial services. Check with SMUD's Engineering Designer for information.

5.3 **Non-Installation of Meters**

5.3.1 The meter(s) shall **not** be installed until:

5.3.1.1 The customer has complied with all the requirements listed above.

5.3.1.2 The work has been passed by the proper Authority Having Jurisdiction.

5.3.1.3 Each service switch and meter position, in a multiple meter installation, has been clearly and prominently marked in a permanent manner with an oil base paint or an engraved plate has been fastened with screws to indicate the particular address supplied by it. Street address and suite, apartment number, etc., are permanently applied to the building.
6. **SWIMMING POOL CLEARANCES FOR SUPPLY SERVICE DROPS (INCLUDES HOT TUBS)**

6.1 The installation and maintenance of service drops over swimming pools is to be avoided where practical.

6.2 The customer must contact a SMUD Engineering Designer to determine SMUD’S service requirements before installing a new pool or rewiring an existing installation where a SMUD service drop is over or shall cross within 10 feet of a pool.

6.3 The clearances shown on Page A-23 are required in SMUD's Service Area.
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.

<table>
<thead>
<tr>
<th>Drawing Title</th>
<th>Drawing Identification Code</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Minimum Clearances of Meter Socket From Obstructions</td>
<td></td>
<td>A-1</td>
</tr>
<tr>
<td>Clearance for Commercial Meter Cabinet Enclosures</td>
<td></td>
<td>A-2</td>
</tr>
<tr>
<td>Ground Clearance for Supply Drops, 0-750 Volts (Commercial and Industrial Premises)</td>
<td></td>
<td>A-3</td>
</tr>
<tr>
<td>Service Drop Requirements for Windows, Doors, Fire Escapes, Stairways, Balconies, Etc.</td>
<td></td>
<td>A-4</td>
</tr>
<tr>
<td>Clearance of 0-750 Volts Service Drops from Building on Commercial or Industrial Premises</td>
<td></td>
<td>A-5</td>
</tr>
<tr>
<td>Combination Meter and Current Transformer Cabinet, Main Switch or Breaker Rated 201-800 Amperes (underground Service)</td>
<td></td>
<td>A-6</td>
</tr>
<tr>
<td>Combination Meter and Current Transformer Cabinet, Main Switch or Breaker Rated 201-400 Amperes (Overhead Service)</td>
<td></td>
<td>A-7</td>
</tr>
<tr>
<td>Switchboard Service Section with filler Panel, 0-600 Volts</td>
<td></td>
<td>A-8</td>
</tr>
<tr>
<td>Hinged Socket Meter Panel</td>
<td></td>
<td>A-9</td>
</tr>
<tr>
<td>Hinged Socket Meter and Demand Recorder Panel</td>
<td></td>
<td>A-10</td>
</tr>
<tr>
<td>Current Transformer Compartment, 0-800 Amperes (Single Phase, 3 Wire Services)</td>
<td></td>
<td>A-11</td>
</tr>
<tr>
<td>Current Transformer Compartment, 0-1000 Amperes (Three Phase, 4 Wire Services)</td>
<td></td>
<td>A-12</td>
</tr>
<tr>
<td>Current Transformer Compartment, 0-600 Volts, 1001-3000 Amperes</td>
<td></td>
<td>A-13</td>
</tr>
<tr>
<td>Drawing Title</td>
<td>Drawing Identification Code</td>
<td>Page Number</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Current Transformer Compartment, 0-600 Volts, 1001-3000 Amperes (Removable Link and Current Transformer Support)</td>
<td></td>
<td>A-14</td>
</tr>
<tr>
<td>Current Transformer Compartment, 0-600 Volts, 3001-4000 Amperes</td>
<td></td>
<td>A-15</td>
</tr>
<tr>
<td>Current Transformer Compartment, 0-600 Volts, 3001-4000 Amperes (Removable Link and Current Transformer Support)</td>
<td></td>
<td>A-16</td>
</tr>
<tr>
<td>Switchboard Service Section with Self-Contained Meter Panels</td>
<td></td>
<td>A-17</td>
</tr>
<tr>
<td>Diagram of Connections, Meter Sockets for Self-Contained Meters</td>
<td></td>
<td>A-18</td>
</tr>
<tr>
<td>Safety Socket Box with Factory Installed Test Bypass Devices, 100 Amperes Maximum</td>
<td></td>
<td>A-19</td>
</tr>
<tr>
<td>Safety Socket Box with Factory Installed Test Bypass Devices, 200 Amperes Maximum</td>
<td></td>
<td>A-20</td>
</tr>
<tr>
<td>Test Bypass Blocks for Safety Socket, 0-200 Amperes</td>
<td></td>
<td>A-21</td>
</tr>
<tr>
<td>Minimum Requirements for Customer’s Underground Service Connection from SMUD Sidewalk Box</td>
<td></td>
<td>A-22</td>
</tr>
<tr>
<td>Service Clearance Over Swimming Pool</td>
<td></td>
<td>A-23</td>
</tr>
<tr>
<td>Customer owned underground service riser, 0-750 volts</td>
<td></td>
<td>A-24</td>
</tr>
<tr>
<td>Commercial delta meter requirements</td>
<td></td>
<td>A-25</td>
</tr>
<tr>
<td>Commercial wye meter requirements</td>
<td></td>
<td>A-26</td>
</tr>
</tbody>
</table>
INDICATES BOUNDARY OF AREA WHICH MUST BE KEPT CLEAR OF OBSTRUCTIONS.

NOTES:

1. A CLEARANCE AREA AROUND THE SOCKET MUST BE MAINTAINED AS SHOWN IN THE ILLUSTRATIONS.

2. THERE MUST BE AN 8" MIN HORIZONTAL AND A 9" MIN VERTICAL (ABOVE) CLEARANCE BETWEEN THE CENTER OF THE METER SOCKET AND ANY OBSTRUCTION. (NO OBSTRUCTIONS IN THE CLEARANCE AREA, SEE DRAWING ABOVE)

3. A LEVEL STANDING SPACE, AT LEAST 36" L X 30" W SHALL BE MAINTAINED IN FRONT OF THE METER SOCKET IN ORDER TO ALLOW FOR INSTALLATION, TESTING AND READING (SEE ALSO C.S.G PAGE 7)

4. METERS SHALL BE LOCATED SO THAT THEY WILL NOT BE DAMAGED BY A SWINGING WINDOW, DOOR, OR GATE. FOR ANY DOOR OPENING, THE SURFACE OF THE WALL ON EITHER SIDE OF THAT DOOR FOR A DISTANCE EQUAL TO THE WIDTH OF THE DOOR IS UNACCEPTABLE AS A METER SPOT, OR A SUITABLE DOOR, WINDOW, OR GATE STOP WILL BE REQUIRED.

5. THE 36 INCH MINIMUM CLEARANCE MUST BE INCREASED TO 42 INCHES ON ALL 277/480Y INSTALLATIONS WHERE A GROUNDED OBJECT WILL BE BEHIND A WORKMAN IN FRONT OF THE METER.
DIMENSION "A": 9" MINIMUM TO 15" MAXIMUM FOR SINGLE-PHASE.
11" MINIMUM TO 15" MAXIMUM FOR POLY-PHASE.

DIMENSION "B": 7" MINIMUM FOR SINGLE-PHASE.
9" MINIMUM FOR POLY-PHASE.

DIMENSION "C": 10" MINIMUM.

DIMENSION "D": 8" MINIMUM.

NOTES:
1. METER SOCKETS, HAVING JAWS WHICH MUST BE TIGHTENED WITH A WRENCH, SHALL HAVE A MINIMUM "C" DIMENSION OF 10".
2. NEITHER ROOF NOR DOOR SUPPORTS SHALL INTERFERE WITH INSTALLATION OF THE METER.
3. WITH THE CABINET DOOR OPEN, A CLEAR WORKING SPACE OF AT LEAST 36" IS REQUIRED DIRECTLY IN FRONT OF THE METER, IN ADDITION TO 15" ON BOTH SIDES OF THE METER, MEASURED FROM THE ENCLOSURE.
4. WHEN THE CABINET DOOR IS LOCKABLE, A DOUBLE LOCK ARRANGEMENT IS REQUIRED.
5. THE 36 INCH MINIMUM WORKING CLEARANCE MUST BE INCREASED TO 42 INCHES ON ALL 277/480Y INSTALLATIONS WHERE A GROUNDED OBJECT WILL BE BEHIND A WORKMAN IN FRONT OF THE METER.
NOTES:

VERTICAL CLEARANCES ABOVE RAILS:

1. CROSSING ABOVE RR TRACKS WITHOUT OVERHEAD TROLLEY WIRE ........................................ 25 FEET MINIMUM

2. CROSSING ABOVE RR TRACKS WITH OVERHEAD TROLLEY WIRE:
   (A) ABOVE RAILS WHERE FREIGHT CARS ARE TRANSPORTED ........................................ 25 FEET MINIMUM
   (B) ABOVE RAILS WHERE FREIGHT CARS ARE NOT TRANSPORTED .................................. 23 FEET MINIMUM
   (C) IN EACH CASE, THE SERVICE DROP MUST CLEAR TROLLEY WIRES BY NOT LESS THAN ........ 4 FEET MINIMUM

INDICATES BOUNDARY OF CLEARANCE AREA THROUGH WHICH CONDUCTORS MUST NOT PASS.

NOTES:

1. SERVICE WIRES SHOULD NOT BE ATTACHED TO THE BUILDING WALL WITHIN THE ABOVE CLEARANCE AREAS AND SHOULD NOT PASS THROUGH CLEARANCE SPACE ILLUSTRATED IN THESE SKETCHES.

2. THE RULES FOR OVERHEAD LINE CONSTRUCTION, ISSUED BY THE CALIFORNIA PUBLIC UTILITIES COMMISSION, REQUIRE THAT:
   
   A. ALL PORTIONS OF THE SERVICE DROP SHALL HAVE A HORIZONTAL CLEARANCE OF 3 FEET FROM ANY EXIT, WINDOW, DOOR OR OTHER POINT AT WHICH HUMAN CONTACT MIGHT BE EXPECTED.
   B. SERVICE DROPS SHALL BE SO ARRANGED AS TO MINIMIZE HAMPERING AND ENDANGERING WORKMEN AND FIREMEN IN THE PERFORMANCE OF THEIR DUTIES. THIS IS INTERPRETED TO MEAN THAT SERVICE DROPS SHALL BE SO ARRANGED THAT A FIREMAN CAN PLACE A LADDER AGAINST ANY WINDOW WITHOUT INTERFERENCE OR DANGER.

3. SMUD WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO THE BUILDING CAUSED BY RAIN OR STRUCTURAL FAILURE.
NOTES:

1. SMUD WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO THE BUILDING CAUSED BY RAIN OR STRUCTURAL FAILURE.

2. WHERE A SMUD ENGINEERING DESIGNER SPECIFIES THAT THE SERVICE DROP IS TO BE 3 SINGLE WIRES, CLEARANCE BETWEEN THE SERVICE DROP CONDUCTORS MUST BE A MINIMUM OF 6 INCHES. IF AN 8 INCH MINIMUM BETWEEN POINTS OF ATTACHMENT DOES NOT PROVIDE THE NECESSARY 6 INCH CLEARANCE BETWEEN WIRES, THE SEPARATION BETWEEN THE POINTS OF ATTACHMENT MUST BE INCREASED SUFFICIENTLY TO PROVIDE THE 6 INCH CLEARANCE.

3. ON PREMISES USED FOR INDUSTRIAL OR COMMERCIAL PURPOSES, SERVICE DROPS SHALL BE MAINTAINED AT A VERTICAL CLEARANCE OF NOT LESS THAN 8 FEET OVER ALL OR ANY PORTIONS OF BUILDINGS AND STRUCTURES. EXCEPT THAT SERVICE DROPS OF 0-750 VOLTS MAY BE LESS THAN 8 FEET, BUT NOT LESS THAN 12 INCHES, ABOVE THE METALLIC OR NON-METALLIC CORNICE, DECORATIVE APPENDAGE, EAVE, ROOF OR PARAPET WALL OF THE BUILDING SERVICED PROVIDED WITH THE FOLLOWING:
   A. THE CURRENT CARRYING CONDUCTORS ARE INSULATED FOR THE VOLTAGE BEING SUPPLIED.

   EXCEPTIONS: 3' CLEARANCE IF ROOF PITCH IS 4:12 OR STEEPER OR ROOF NOT CAPABLE OF SUPPORTING A PERSON WALKING 18" IF VOLTAGE DOES NOT EXCEED 300V AND NO MORE THAN 8 FT OF CONDUCTORS, 4 FT HORIZONTALLY, PASS ABOVE THE ROOF OVERHANG, AND THEY ARE TERMINATED AT A THROUGH-THE-ROOF RACEWAY.

4. ALL SERVICE WIRES CROSSING OVER A ROOF MUST CLEAR THE ROOF BY 8 FEET.

5. THE ABOVE METHODS OF SUPPORTING SERVICE DROPS MAY BE USED WHERE A ROOF OVERHANG IS EXPOSED. WHERE THE ROOF OVERHANG IS SEALED, THESE METHODS MAY ALSO BE USED IF THE SERVICE CONDUIT IS VERTICAL THROUGH A SEALED AREA. HORIZONTAL CONDUIT RUNS ARE NOT MADE IN A SEALED PORTION.

6. WHERE A SERVICE RISER PROJECTS THROUGH THE ROOF, THE SERVICE HEAD MUST BE A MINIMUM OF 18 INCHES ABOVE THE ROOF LINE.

7. ALL SERVICE ATTACHMENTS SHALL BE CAPABLE OF WITHSTANDING A MINIMUM SERVICE PULL OF 600 POUNDS WITHOUT DAMAGE TO THE BUILDING STRUCTURE.

8. WHERE A PERISCOPE TYPE SERVICE RISER IS USED FOR SERVICE ATTACHMENT, THE SERVICE RISER MUST BE BRACED IF THE CENTER LINE OF THE LOAD EXCEEDS 30 INCHES ABOVE THE ROOF. BRACING MUST BE OF RIGID CONDUIT WITH A BRACE KIT AS ILLUSTRATED IN FIGURE (D) ABOVE.

9. COUPLINGS OR SLEEVES WILL NOT BE PERMITTED IN THE PERISCOPE TYPE SERVICE RISER BETWEEN THE UPPERMOST POINT OF SERVICE ATTACHMENT AND THE BOTTOM SUPPORT CLAMP.

10. LAG SCREWS ARE NOT ALLOWED IN ANY PORTION OF THE SERVICE ATTACHMENT.

11. CABLE TYPE GUYS ARE NOT ALLOWED FOR SERVICE ATTACHMENT SUPPORT.

12. CONSULT SMUD'S ENGINEERING DESIGNER FOR ANY OTHER POINTS OF ATTACHMENT.
TABLE 1

<table>
<thead>
<tr>
<th>MINIMUM DIMENSIONS</th>
<th>TRANSFORMER MOUNTING BASE</th>
<th>MAXIMUM WIRE SIZE</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABINET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24&quot; x 52&quot; x 11&quot;</td>
<td>24&quot;</td>
<td>52&quot;</td>
<td>29&quot;</td>
</tr>
<tr>
<td>36&quot; x 52&quot; x 11&quot;</td>
<td>36&quot;</td>
<td>52&quot;</td>
<td>29&quot;</td>
</tr>
</tbody>
</table>

NOTES:
1. *CONDUCTORS LARGER THAN 500MCM SHALL NOT BE INSTALLED EXCEPT WHEN REQUIRED BY CODE OR ORDINANCE FOR 800 AMPERE CAPACITY.
2. SERVICE OVER 200A, SINGLE PHASE, NOT AVAILABLE.
3. CHECK WITH SMUD's ENGINEERING DESIGNER FOR AVAILABILITY OF 120/240V, 3Ø, DELTA SERVICE.
TABLE 1

<table>
<thead>
<tr>
<th>CABINET</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>TRANSFORMER MOUNTING BASE</th>
<th>MAXIMUM WIRE SIZE</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>36&quot; x 42&quot; x 11&quot;</td>
<td>36&quot;</td>
<td>42&quot;</td>
<td>19&quot;</td>
<td>Fig. D Pg. C-9</td>
<td>500,000 (1)</td>
<td>3Ø (3)</td>
</tr>
<tr>
<td>24&quot; x 42&quot; x 11&quot;</td>
<td>24&quot;</td>
<td>52&quot;</td>
<td>19&quot;</td>
<td>Fig. B Pg. C-9</td>
<td>500,000 (1)</td>
<td>1Ø (2)</td>
</tr>
</tbody>
</table>

NOTES:
1. CONDUCTORS LARGER THAN 500MCM SHALL NOT BE INSTALLED EXCEPT WHEN REQUIRED BY CODE OR ORDINANCE FOR 400 AMPERE CAPACITY.
2. SERVICE OVER 200A, SINGLE PHASE, NOT AVAILABLE.
3. CHECK WITH SMUD'S ENGINEERING DESIGNER FOR AVAILABILITY OF 120/240V, 3Ø, DELTA SERVICE.
NOTES:

1. FILLER PANELS SHALL BE USED WHERE THE SWITCHBOARD WIDTH EXCEEDS THE METER PANEL WIDTH.

2. THE FILLER PANEL AND METER PANEL SHALL BE HINGED, REVERSIBLE, INTERCHANGEABLE AND SEALABLE.

3. WHEN ONLY ONE METER PANEL IS FURNISHED, IT SHALL BE MOUNTED IN THE LOWER POSITION.

4. THE METER PANEL SHALL HAVE A HANDLE(S) ATTACHED. SEE PAGES A-9 AND A-10.

5. HINGES SHALL BE READILY INTERCHANGEABLE, RIGHT OR LEFT, ON THE JOB SITE. WHEN CLEVIS TYPE OR REMOVABLE PIN TYPE HINGES ARE USED, PROVISION SHALL BE MADE FOR REMOVING THE PIN FROM THE TOP WITHOUT REMOVING THE ADJACENT PANEL.

6. THE BARRIER SHALL BE OF INSULATING, NONTRACKING MATERIAL AND HAVE A MINIMUM OF 24 VENT HOLES OF 3/8 INCH DIAMETER.

7. THE GROUNDING CONNECTION SHALL BE MADE IN THE MAIN SWITCH OR BREAKER COMPARTMENT.

8. MUST MEET EUSEC standards.
NOTES:

1. The switchboard manufacturer shall drill, tap and slot the panel as shown for secondary test switches and shall furnish and install sockets complete with sealing rings.

2. Meter sockets installed on hinged panels shall be designed for back connection.

3. Meter panels shall be constructed of 12 gauge steel (minimum) and shall be hinged, reversible, sealable and interchangeable.

4. A handle shall be attached at the unsupported end of the meter panel with a minimum radial clearance of 1 inch from the meter socket or removable plate section.

5. Hinges must support a 25 pound load applied at the unsupported end with 1/8 inch maximum sag when open.

6. Hinges shall be readily interchangeable, right to left, on the job site.

7. A removable plate shall be secured to the rear of the panel by screws of such length that they do not protrude through the face of the panel.

8. Meter panels shall be capable of being opened 90° with meter and test facilities in place.

9. All securing screws and sealing screws on the panel shall be captive. When used, studs and wing nuts shall be sealable.
NOTES:
1. THE SWITCHBOARD MANUFACTURER SHALL DRILL, TAP AND SLOT THE PANEL AS SHOWN AND SHALL FURNISH AND INSTALL SOCKETS COMPLETE WITH SEALING RINGS. ALL HOLES ARE #10-32 TAP, EXCEPT AS NOTED.
2. REMOVABLE PLATES SHALL BE PAINTED AND ATTACHED TO THE PANEL.
3. METER PANELS SHALL BE CONSTRUCTED OF 12 GAUGE STEEL (MINIMUM) AND SHALL BE HINGED AND SEALABLE.
4. HINGES SHALL BE READILY INTERCHANGEABLE, RIGHT OR LEFT, ON THE JOB SITE. WHEN CLEVIS TYPE OR REMOVABLE PIN TYPE HINGES ARE USED, PROVISION SHALL BE MADE FOR REMOVING THE PIN FROM THE TOP.
5. HINGES MUST SUPPORT A 25 POUND LOAD APPLIED AT THE UNSUPPORTED END WITH 1/8 INCH MAXIMUM SAG WHEN OPEN.
6. THE HINGED METER PANEL SHALL NOT BE HINGED TO A FILLER PANEL.
7. THE HINGED METER PANEL SHALL BE CAPABLE OF BEING OPENED 90 DEGREES WITH METER AND TEST FACILITIES IN PLACE.
8. THE PANEL SHALL HAVE A HANDLE ATTACHED TO BOTH SIDES.
9. ALL SECURING SCREWS AND SEALING SCREWS ON THE PANEL SHALL BE CAPTIVE. WHEN USED, STUD AND WING NUTS SHALL BE SEALABLE.
10. METER SOCKETS INSTALLED ON HINGED PANELS SHALL BE DESIGNED FOR BACK CONNECTION.
11. FOR PANEL WIDTH LESS THAN 26 INCHES, CONSULT SMUD.
NOTES:

1. The stationary portion of the hinges shall be attached to both sides of the switchboard in order to permit ready interchangeability of hinged panels to the right or left side.

2. The compartment shall be on the supply side of the main switch or breaker.

3. The direction of feed shall be vertical, and no other conductors shall pass through this compartment.

4. The clearance to the side of each compartment shall be increased by the amount by which the corner angle exceeds 1 inch.

5. Return flanges for the lower and upper metal panel support shall not project more than 3/4 inch up or down from the adjacent switchboard panels.

6. Each bus shall have a connector that will accept stranded conductors having the ampere capacity of the main switch or breaker.

7. The neutral may be located on the side wall or at either side.

8. The barrier shall be of insulating, non-tracking material and have a minimum of 24 vent holes of 3/4 inch diameter.

9. The bus dimensions shall be a maximum of 3/4" x 2" and a minimum of 1/4" x 2" when a laminated bus is used, there shall be no space between laminations in the current transformer compartment.

10. Any service over 200 amp, single phase, requires authorization of SMUD's engineering designer. In no case, will SMUD provide over 100 kVA to any single customer at single phase, 3-wire (417 amps).
NOTES:

1. THE STATIONARY PORTION OF THE HINGES SHALL BE ATTACHED TO BOTH SIDES OF THE SWITCHBOARD IN ORDER TO PERMIT READY INTERCHANGEABILITY OF HINGED PANELS TO THE RIGHT OR LEFT SIDE.

2. THE COMPARTMENT SHALL BE ON THE SUPPLY SIDE OF THE MAIN SWITCH OR BREAKER.

3. THE DIRECTION OF FEED SHALL BE VERTICAL, AND NO OTHER CONDUCTORS SHALL PASS THROUGH THIS COMPARTMENT.

4. THE CLEARANCE TO THE SIDE OF EACH COMPARTMENT SHALL BE INCREASED BY THE AMOUNT BY WHICH THE CORNER ANGLE EXCEEDS 1°.

5. RETURN FLANGES FOR THE LOWER AND UPPER METAL PANEL SUPPORT SHALL NOT PROJECT MORE THAN 3/4" UP OR DOWN FROM THE ADJACENT SWITCHBOARD PANELS.

6. EACH BUS SHALL HAVE A CONNECTOR THAT WILL ACCEPT STRANDED CONDUCTORS HAVING THE AMPERE CAPACITY OF THE MAIN SWITCH OR BREAKER.

7. A REMOVABLE LINK SHALL BE INSTALLED IN THE POWER LEG WHEN THE SWITCHBOARD IS TO BE USED FOR THREE PHASE DELTA SERVICE.

8. THE BARRIER SHALL BE OF INSULATING, NON-TRACKING MATERIAL AND HAVE A MINIMUM OF 24 VENT HOLES OF 3/4 INCH DIAMETER.

9. THE BUS DIMENSIONS SHALL BE A MAXIMUM OF 3/4" X 2" AND A MINIMUM OF 1/4 INCH X 2" WHEN A LAMINATED BUS IS USED. THERE SHALL BE NO SPACE BETWEEN LAMINATIONS IN THE CURRENT TRANSFORMER COMPARTMENT.
NOTES:

1. THE BUS ANCHORAGE SHALL BE SUCH THAT THE BUSSES WILL REMAIN IN POSITION WHEN REMOVABLE SECTION "B" IS OUT.

2. THE DIRECTION OF FEED SHALL BE VERTICAL, NO OTHER CONDUCTORS SHALL PASS THROUGH THIS COMPARTMENT.

3. THE TRANSFORMER COMPARTMENT SHALL BE ON THE SUPPLY SIDE OF THE MAIN SWITCH OR BREAKER.

4. BUS CORNERS SHOULD BE ROUNDED, AS NECESSARY, TO PREVENT DAMAGE TO INSULATION AND TO MAINTAIN AN OVERALL DIAGONAL DIMENSION OF NOT MORE THAN 4.49 INCHES. BUS INSULATION MUST BE ADEQUATE FOR THE VOLTAGE INVOLVED.

5. THE MAXIMUM PERMISSIBLE BUS UNIT SHALL CONSIST OF FOUR 1/2 INCH X 4 INCH BARS SPACED 1/4 INCH.

6. THE BARRIER SHOULD NOT BE LESS THAN 45 INCHES AND SHALL NOT BE MORE THAN 50 INCHES ABOVE THE STANDING SURFACE.

7. CLEARANCE TO THE SIDE OF THE COMPARTMENT SHALL BE INCREASED BY THE AMOUNT BY WHICH THE CORNER ANGLE EXCEEDS 1 INCH.

8. RETURN FLANGES FOR THE LOWER AND UPPER METER PANEL SUPPORT SHALL NOT PROJECT MORE THAN 1/2 INCH UP OR DOWN FROM THE ADJACENT SWITCHBOARD PANELS.


CURRENT TRANSFORMER COMPARTMENT, 0-600 VOLTS, 1001-3000 AMPERES (REMOVABLE LINK AND CURRENT TRANSFORMER SUPPORT)

DETAIL A
DRILLING AND SPACING BUS

DETAIL B
\( \frac{1}{2} \times 4" \) LINK
(SAME MATERIAL AS BUS)

DETAIL C
INSULATED SUPPORT FOR CURRENT TRANSFORMER
(MATERIAL: INSULATING, NON-TRACKING)

REMOVABLE LINK ASSEMBLY
(FURNISHED BY MANUFACTURER)

NOTES:

1. THE MANUFACTURER WILL PROVIDE 1/2 INCH HEX HEAD BOLTS, NUTS AND LOCK WASHERS.
NOTES:

1. THE BUS ANCHORAGE SHALL BE SUCH THAT THE BUSSES WILL REMAIN IN POSITION WHEN REMOVABLE SECTION "A" IS OUT.

2. THE DIRECTION OF FEED SHALL BE VERTICAL. NO OTHER CONDUCTORS SHALL PASS THROUGH THIS COMPARTMENT.

3. THE TRANSFORMER COMPARTMENT SHALL BE ON THE SUPPLY SIDE OF THE MAIN SWITCH OR BREAKER.

4. BUS CORNERS SHOULD BE ROUNDED, AS NECESSARY, TO PREVENT DAMAGE TO INSULATION. BUS INSULATION MUST BE ADEQUATE FOR THE VOLTAGE INVOLVED.

5. THE MAXIMUM PERMISSIBLE BUS UNIT SHALL CONSIST OF SIX 1/4 INCH X 5 INCH BARS SPACE 1/4" INCH.

6. THE BARRIER SHOULD NOT BE LESS THAN 45 INCHES AND SHALL NOT BE MORE THAN 90 INCHES ABOVE THE STANDING SURFACE.

7. CLEARANCE TO THE SIDE OF THE COMPARTMENT SHALL BE INCREASED BY THE AMOUNT BY WHICH THE CORNER ANGLE EXCEEDS 1 INCH.

8. RETURN FLANGES FOR THE LOWER AND UPPER METER PANEL SUPPORT SHALL NOT PROJECT MORE THAN 3/4" INCH UP OR DOWN FROM THE ADJACENT SWITCHBOARD PANELS.

9. THE BARRIER SHALL BE OF INSULATING MATERIAL AND HAVE A MINIMUM OF 24 VENT HOLES OF 3/8" INCH DIAMETER.

10. FOR DETAILS OF REMOVABLE SECTION "A" AND C.T. SUPPORT FOR A 4 INCH BUS, SEE PAGE A-14 AND FOR A 5 INCH BUS, SEE PAGE A-16. CONSULT SMUD FOR USE OF A BUS LARGER THAN 5 INCHES.
DETAIL A
DRILLING AND SPACING BUS

NO. OF LINKS AS
REQUIRED

LINK
SEE DETAIL B

SMUD’S WINDOW TYPE
CURRENT TRANSFORMER

INSULATED TRANSFORMER
SUPPORT
(SEE DETAIL C)

½” - 20 CAPSCREW

DETAIL B
½” X 6” LINK
(SAME MATERIAL AS BUS)

3-HOLES, DRILLED
AND TAPPED FOR
½” - 20 CAPSCREW
(OUTSIDE BUSSES ONLY)

(8) ½” HOLES

DETAIL C
INSULATED SUPPORT FOR
CURRENT TRANSFORMER
(MATERIAL: INSULATING, NON-TRACKING)

REMovable LINK AsSEMBLY
(FURNISHED BY MANUFACTURER)

Notes:
1. THE MANUFACTURER WILL PROVIDE 1/2 INCH HEX HEAD BOLTS, NUTS AND LOCK WASHERS.
2. CONSULT SMUD FOR USE OF BUS BARS LARGER THAN 5 INCHES.
NOTES:

1. TEST BYPASS BLOCKS AND BARRIERS SHALL BE FURNISHED, INSTALLED AND WIRED OR BUSSED TO THE METER SOCKET BY THE MANUFACTURER. BLOCKS AND BARRIERS SHALL CONFORM TO THE REQUIREMENTS SHOWN ON PAGE A-19 AND A-20. CONNECTION SEQUENCE IS LINE-LOAD, FROM LEFT TO RIGHT, FOR EACH PHASE.

2. METERED CONDUCTORS SHALL NOT PASS THROUGH ADJACENT METERING COMPARTMENTS EXCEPT IN ENCLOSED WIREWAYS.

3. METER PANELS SHALL BE REMOVABLE WITH A MAXIMUM OF TWO METERS PER PANEL.

4. TEST BYPASS BLOCK COVER PANELS SHALL BE SEPARABLE AND FITTED WITH HANDLES.

5. WHEN A NEUTRAL IS REQUIRED FOR METERING OR TESTING, AN INSULATED NEUTRAL TERMINAL SHALL BE PROVIDED BEHIND EACH TEST BYPASS COVER PANEL. THE TERMINAL SHALL BE READILY ACCESSIBLE WHEN THE COVER PANEL IS REMOVED AND SHALL BE INDIVIDUALLY CONNECTED TO THE NEUTRAL BUS WITH A MINIMUM SIZE NO. 8 AWG COPPER WIRE.

6. A FACTORY INSTALLED, FULL-WIDTH INSULATING BARRIER SHALL BE LOCATED AT THE BOTTOM OF EACH TEST BYPASS COMPARTMENT. PER EUSERC STANDARD.

7. FOR 3/8, 4 WIRE, CONNECT THE 7TH JAW TO THE BODY OF THE NEUTRAL LUG WITH NO. 8 COPPER WIRE.

8. FOR 3/8, 4 WIRE DELTA, IDENTIFY THE RIGHT-HAND TEST BYPASS BLOCK (2 POLES) AS THE POWER LEG.

9. FOR 1/8, 3 WIRE, OMIT THE CENTER TEST BYPASS BLOCK.

10. FOR 1/8, 3 WIRE, 120/208 VOLT, OMIT THE CENTER TEST BYPASS BLOCK AND CONNECT THE 5TH JAW TO THE BODY OF THE NEUTRAL LUG WITH NO. 8 COPPER WIRE.

11. METER PANELS SHALL BE REMOVABLE WHEN THE METER IS IN PLACE. THE METER SOCKET IS TO BE SUPPORTED INDEPENDENT OF AND ATTACHED TO THE METER PANEL.

12. SEPARATE LINE AND LOAD CONDUCTORS SHALL BE INSTALLED BY THE CONTRACTOR OR MANUFACTURER FOR EACH METER SOCKET.

13. EACH LINE AND LOAD POSITION SHALL BE CLEARLY IDENTIFIED BY ½" INCH MINIMUM BLOCK LETTER LABELING.

14. ALL SECURING SCREWS SHALL BE CAPTIVE ALL PANELS SHALL BE SEALABLE.

15. SEE DRAWING A-27 FOR OUTDOOR COMMERCIAL METER CLEARANCE.
SINGLE PHASE SOCKETS

(A) LOAD 120V 2-WIRE

(B) LOAD 120/240V 3-WIRE

(C) LOAD 120/208V 3-WIRE

TEST BYPASS DEVICES
SEE NOTE 3

(D) LOAD 120/230V 3Ø
4-WIRE WYE

(E) LOAD 120/240V 3Ø
4-WIRE DELTA

(F) LOAD 277/480V 3Ø
4-WIRE WYE

POLYPHASE SOCKETS

NOTES:

1. COMMERCIAL, SELF-CONTAINED METER SOCKETS SHALL BE UL APPROVED AND SHALL HAVE A CONTINUOUS DUTY CURRENT RATING LOAD EQUAL TO OR GREATER THAN THE CURRENT RATING OF THE ASSOCIATED LOAD SERVICE EQUIPMENT.

2. NEUTRAL TAPS SHALL BE CONNECTED TO THE SERVICE NEUTRAL CONDUCTOR AND LOCATED BEHIND SEALED PANELS. WIRE NUTS ARE NOT PERMITTED.

NOTES:
1. SELF-CONTAINED METER SOCKETS SHALL BE NATIONAL RECOGNIZED TESTING LAB OR UL CURRENT RATED FOR CONTINUOUS DUTY.
2. THIS DEVICE MAY BE USED AS A COMBINATION TERMINATING PULL AND METER SOCKET BOX FOR AN UNDERGROUND SERVICE.
3. ALUMINUM BODIED TERMINALS SHALL BE USED FOR #6 THROUGH #1/0 WIRE.
4. HUBS MUST BE CAPPED OFF IF USED FOR AN UNDERGROUND FEED.
5. RIGID INSULATING BARRIERS MUST BE USED.
6. INSULATED, BONDABLE VERTICAL LAY-IN, DOUBLE NEUTRAL LUG WITH NO.1/0 WIRE CAPACITY.
7. TEST BLOCKS SHALL BE BUSSED OR WIRED TO SOCKET JAWS OR TERMINALS.
8. UPPER TEST CONNECTOR STUDS.
9. ALL SECTION COVERS SHALL BE INDEPENDENTLY REMOVABLE. THE UPPER COVER SHALL BE NONREMOVABLE WHEN THE METER IS IN PLACE. THE LOWER COVER SHALL BE SEALABLE AND PERMANENTLY LABELED: "DO NOT BREAK SEALS, NO FUSES INSIDE."
10. FOR 3/Ø. 4 WIRE, CONNECT THE 7TH JAW TO THE BODY OF THE NEUTRAL LUG WITH #8 COPPER WIRE.
11. FOR 3/Ø. 4 WIRE DELTA, IDENTIFY THE RIGHT-HAND TEST BYPASS BLOCK (2 POLES) AS THE POWER LEG.
12. FOR 1/Ø. 3 WIRE, OMIT THE CENTER BLOCK AND ASSOCIATED BARRIERS.
13. FOR 1/Ø. 3 WIRE, 120/208 VOLT, OMIT THE CENTER BLOCK AND ASSOCIATED BARRIERS AND CONNECT THE 5TH JAW TO THE BODY OF THE NEUTRAL LUG WITH #8 COPPER WIRE.
14. DECALS ON THE INSIDE BACK OF THE ENCLOSURE MUST BE IN 3/4 INCH MINIMUM HIGH BLOCK LETTERS.
15. TEST BLOCK DETAILS ARE ON PAGE A-21.
NOTES:

1. SELF-CONTAINED METER SOCKETS SHALL BE NATIONAL RECOGNIZED TESTING LAB OR UL CURRENT RATED FOR CONTINUOUS DUTY.
2. THIS DEVICE MAY BE USED AS A COMBINATION TERMINATING PULL AND METER SOCKET BOX FOR AN UNDERGROUND SERVICE.
3. ALUMINUM BODIED TERMINALS SHALL BE USED FOR #1/0 THROUGH #250 MCM WIRE.
4. HUBS MUST BE CAPPED OFF IF USED FOR UNDERGROUND FEED.
5. RIGID INSULATING BARRIERS MUST BE USED.
6. INSULATED, BONDABLE VERTICAL LAY-IN, DOUBLE NEUTRAL LUG WITH #250 MCM WIRE CAPACITY.
7. TEST BLOCKS SHALL BE BUSSED OR WIRED TO SOCKET JAWS OR TERMINALS.
8. UPPER TEST CONNECTOR STUDS.
9. ALL SECTION COVERS SHALL BE INDEPENDENTLY REMOVABLE. THE UPPER COVER SHALL BE NONREMOVABLE WHEN THE METER IS IN PLACE. THE LOWER COVER SHALL BE SEALABLE AND PERMANENTLY LABELED: "DO NOT BREAK SEALS, NO FUSES INSIDE."
10. FOR 3/0, 4 WIRE, CONNECT THE 7TH JAW TO THE BODY OF THE NEUTRAL LUG WITH #8 COPPER WIRE
11. FOR 3/0, 4 WIRE DELTA, IDENTIFY THE RIGHT HAND TEST BYPASS BLOCK (2 POLES) AS THE POWER LEG.
12. FOR 1/0, 3 WIRE, OMIT THE CENTER BLOCK AND ASSOCIATED BARRIERS.
13. FOR 1/0, 3 WIRE, 120/208V, OMIT THE CENTER BLOCK AND ASSOCIATED BARRIERS AND CONNECT THE 5TH JAW TO THE BODY OF THE NEUTRAL LUG WITH #8 COPPER WIRE.
14. DECALS ON THE INSIDE BACK OF THE ENCLOSURE MUST BE IN 3/4 INCH MINIMUM HIGH BLOCK LETTERS
15. ON 480V INSTALLATIONS, LIGHTNING PROTECTORS SHALL BE MOUNTED ON THE BOTTOM OR SIDE OF THE ENCLOSURE BY SMUD.
16. TEST BLOCK DETAILS ARE ON PAGE A-21.
NOTES:

1. THE STRIKE DISTANCE BETWEEN THE UPPER AND LOWER BUS SECTIONS SHALL NOT BE LESS THAN \( \frac{1}{4} \) INCH WHEN THE SHORTING NUT IS BACKED OFF.

2. THE CIRCUIT-CLOSING NUT SHALL BE A HEX NUT \( \frac{5}{8} \) INCH ACROSS FLATS WITH PLATED COPPER WASHER ATTACHED AND HAVE THREADS COUNTER-BORED AT THE BOTTOM TO FACILITATE REINSTALLATION. THE BOLT HEAD SHALL BE SECURED IN PLACE TO PREVENT TURNING AND BACKOUT.


4. THE INSULATING WASHER SHALL BE MADE FROM DIMENSIONALLY STABLE, NONTRACKING MATERIAL AND SHALL PROVIDE A MINIMUM OF \( \frac{1}{8} \) INCH CREEP DISTANCE BETWEEN THE BOLT AND THE BUS SECTIONS. BUS SECTIONS SHALL BE PLATED.

5. WIRE STOPS SHALL EXTEND TO THE CENTER OF THE TERMINAL OPENING OR BEYOND.

6. RIGID INSULATING BARRIERS SHALL PROJECT AT LEAST 1/4 INCH BEYOND ANY ENERGIZED PARTS WHEN THE MAXIMUM WIRE SIZE IS INSTALLED.

7. TERMINALS SHALL BE ALUMINUM BODIED. THE OPENING SHALL EXTEND THROUGH THE TERMINAL BODY AND, IF THE WIRE HOLE IS ROUND, SHALL BE CHAMFERED AS NECESSARY TO FACILITATE INSTALLATION OF THE LARGEST SIZE WIRE.

8. THE TERMINAL SCREW MAY BE OF THE ALLEN TYPE \( \frac{5}{6} \) INCH ACROSS FLATS FOR 100 AMP OR \( \frac{7}{8} \) ACROSS FLATS FOR 200 AMP. IF STUD "A" IS A PART OF THE TERMINAL SCREW, THE TERMINAL SCREW SHALL BE \( \frac{5}{8} \) INCH HEX ACROSS FLATS.

SMUD CREWS TO MAKE ALL CONNECTIONS IN SIDEWALK BOX

FINISHED GRADE

SMUD TO INSTALL SIDEWALK BOXES

A MINIMUM OF 30" OF CONDUCTOR MUST BE FURNISHED FOR CONNECTION TO SMUD'S SECONDARY

BELL TO BE USED ON END OF CONDUIT

SEE NOTE 1

NOTES:

1. CUSTOMER CONDUCTOR AND CONDUIT SIZE AND TYPE MUST BE APPROVED BY THE LOCAL INSPECTION AUTHORITIES. CONDUIT DEPTH MUST ALSO BE APPROVED BY THE LOCAL INSPECTION AUTHORITIES.
### Service Clearances Over Swimming Pool

**Clearances**

<table>
<thead>
<tr>
<th>Insulated Supply or Service Drop Cables, 0-750 Volts to Ground, Supported On and Cabled Together With an Effectively Grounded Bare Messenger</th>
<th>All Other Supply or Other Service Drop Conductors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage to Ground</td>
<td>0-15 kV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A. Clearance in Any Direction to the Water Level, Edge of Water Surface, Base of Diving Platform or Permanently-Anchored Raft.</th>
<th>22.5 feet</th>
<th>25 feet</th>
<th>27 feet (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Clearance in Any Direction to the Diving Platform or Tower.</td>
<td>14.5 feet (2)</td>
<td>17 feet (1)</td>
<td>18 feet</td>
</tr>
</tbody>
</table>

2. Revised to Conform to CPUC General Order 95 - 2000.
NOTES:

1. A CUSTOMER OWNED SERVICE RISER MAY ONLY BE USED UPON APPROVAL OF A SMUD ENGINEERING DESIGNER.

2. CONDUCTORS MUST BE CUT TO REACH 2 FEET ABOVE SMUD'S MIDDLE SECONDARY RACK, OR IF CROSSARM CONSTRUCTION, 4 FEET ABOVE SMUD'S SECONDARY ARM.

3. WHEN PART OF THE CONDUIT RUN IS NONMETALLIC, A GROUNDED TYPE BUSHING MUST BE INSTALLED AT THE UPPER END OF THE METALLIC POLE RISER CONDUIT AND GROUNDING CONDUCTOR ATTACHED TO THE BUSHING, CARRIED THROUGH THE CONDUIT RUN, AND ATTACHED TO THE SERVICE GROUND.

4. INSTALLATION MUST BE INSPECTED AND APPROVED BY THE LOCAL INSPECTION AUTHORITIES.

5. IN CASE SMUD IS FORCED BY OTHER AGENCIES TO RELOCATE A POLE ON WHICH A CUSTOMER HAS AN UNDERGROUND RISER, IT WILL BE THE CUSTOMER'S RESPONSIBILITY TO RELOCATE THAT RISER TO A NEW LOCATION.

6. USE OF PVC:
   A. SCHEDULE 80 PVC - 2-1/2 INCH MINIMUM.
   B. SCHEDULE 120 PVC - 2 INCH MINIMUM.
# Minimum Requirement for Customer's Underground Service

## Commercial Delta Meter Requirements

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Ref. Page No.</th>
<th>Main Size Amps.</th>
<th>Meter</th>
<th>Meter Socket</th>
<th>Metering and Transformers</th>
<th>Test Bypass</th>
</tr>
</thead>
<tbody>
<tr>
<td>2W-1 Phase 120V</td>
<td>A-19</td>
<td>30</td>
<td>CL 100 120V 2W 1 Phase S</td>
<td>100A 4 Point Continuous Duty Rated</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>3W-1 Phase 120V</td>
<td>A-19</td>
<td>0-100</td>
<td>CL 200 240V 3W 1 Phase S</td>
<td>100A 4 Point Continuous Duty Rated</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>3W-1 Phase 120V</td>
<td>A-20</td>
<td>101-200</td>
<td>CL 200 240V 3W 1 Phase S</td>
<td>200A 4 Point Continuous Duty Rated</td>
<td>SEE PAGE A-20</td>
<td></td>
</tr>
<tr>
<td>3W-1 Phase 120V (1)</td>
<td>A-6, A-7</td>
<td>201-400</td>
<td>SA 240V 3W 1 Phase S.P.</td>
<td>COMB. CAN BOX 6 POINT SEE A-7</td>
<td>2-2W SEE NOTE 4</td>
<td></td>
</tr>
<tr>
<td>4W-3 Phase 120V (2)</td>
<td>A-19</td>
<td>0-100</td>
<td>CL 200 240V 4W Delta 3 Phase S</td>
<td>100A 7 Point Continuous Duty Rated</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>4W-3 Phase 120V (2)</td>
<td>A-20</td>
<td>101-200</td>
<td>CL 200 240V 4W Delta 3 Phase</td>
<td>200A 7 Point Continuous Duty Rated</td>
<td>SEE PAGE A-20</td>
<td></td>
</tr>
<tr>
<td>4W-3 Phase 120V (2)</td>
<td>A-6, A-7</td>
<td>201-400</td>
<td>SA 240V 4W 3 Phase S.P.</td>
<td>COMB. CAN 13 POINT SEE A-6, A-7</td>
<td>3-2W SEE NOTE 4</td>
<td></td>
</tr>
<tr>
<td>4W-3 Phase 120V (2)</td>
<td>A-7, A-12, A-13, A-14, A-16</td>
<td>401-800</td>
<td>SA 240V 4W Delta 3 Phase S.P.</td>
<td>13 POINT</td>
<td>3-2W SEE NOTE 4</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Check with SMUD's engineering designer for availability of 3 phase delta service.
2. Test switch provided by SMUD.
3. Metering current transformers provided by SMUD.
### COMMERCIAL WYE METER REQUIREMENTS

<table>
<thead>
<tr>
<th>TYPE OF SERVICE</th>
<th>REF. PAGE NO.</th>
<th>MAIN SIZE AMPS.</th>
<th>METER</th>
<th>METER SOCKET</th>
<th>METERING AND TRANSFORMERS</th>
<th>TEST BYPASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2W-1 PHASE 120V</td>
<td>A-19</td>
<td>30</td>
<td>CL.100 120V 2W 1 PHASE S</td>
<td>100A 4 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>3W-1 PHASE 120/208V</td>
<td>A-20</td>
<td>0-200</td>
<td>CL.200 120V 3W 1 PHASE S</td>
<td>100A-200A 5 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-20</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 120/208V</td>
<td>A-19</td>
<td>0-100 UNDER 30KW</td>
<td>CL.200 120V 4W 3 PHASE S</td>
<td>100A 7 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 120/208V</td>
<td>A-20</td>
<td>101-200 UNDER 30KW</td>
<td>CL.200 120V 4W 3 PHASE S</td>
<td>200A 7 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-20</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 120/208V</td>
<td>A-19</td>
<td>0-100 OVER 30KW</td>
<td>CL.200 120V 4W 3 PHASE S</td>
<td>100A 7 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 120/208V</td>
<td>A-6, A-7</td>
<td>201-400</td>
<td>5A 120V 4W 3 PHASE S.P.</td>
<td>COMB. CAN 13 POINT SEE A-7</td>
<td>3-2W SEE NOTE 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 120/208V</td>
<td>A-20</td>
<td>401-800</td>
<td>5A 120V 4W 3 PHASE S.P.</td>
<td>S.S. BOX 13 POINT</td>
<td>3-2W SEE NOTE 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 277/480V</td>
<td>A-19</td>
<td>0-100 UNDER 30KW</td>
<td>CL.200 277V 4W 3 PHASE S</td>
<td>100A 7 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-19</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 277/480V</td>
<td>A-20</td>
<td>101-200</td>
<td>CL.200 277V 4W 3 PHASE</td>
<td>200A 7 POINT CONTINUOUS DUTY RATED</td>
<td>SEE PAGE A-20</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 277/480V</td>
<td>A-6, A-7</td>
<td>201-400</td>
<td>5A 277V 4W 3 PHASE S.P.</td>
<td>COMB. CAN 13 POINT SEE PAGE A-6, A-7</td>
<td>3-2W SEE NOTE 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-12</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 277/480V</td>
<td>A-13</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-14</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td>4W-3 PHASE 277/480V</td>
<td>A-16</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-7</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-12</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-13</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-14</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A-16</td>
<td></td>
<td></td>
<td></td>
<td>10 POLE TEST SWITCH SEE NOTE 3</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1. ANY SERVICE OVER 200A, SINGLE PHASE, 120/208, IS NOT AVAILABLE.
2. CHECK WITH SMUD'S ENGINEERING DESIGNER FOR AVAILABILITY OF 3 PHASE DELTA SERVICE.
3. TEST SWITCH PROVIDED BY SMUD.
4. METERING CURRENT TRANSFORMERS PROVIDED BY SMUD.
NOTES:

1. WITH THE CABINET DOOR OPEN, A CLEAR LEVEL WORKING SPACE OF AT LEAST 36" IS REQUIRED DIRECTLY IN FRONT OF THE METER, MEASURED FROM THE STANDING GRADE.

2. THE 36 INCH MINIMUM WORKING CLEARANCE MUST BE INCREASED TO 42 INCHES ON ALL 277/480V INSTALLATIONS WHERE A GROUNDED OBJECT WILL BE BEHIND A WORKMAN IN FRONT OF THE METER.

3. WORK SPACE SHALL BE CLEAR AND EXTEND FROM THE GRADE, FLOOR, OR PLATFORM TO A HEIGHT OF 6 1/2 FT OR THE HEIGHT OF THE ENCLOSURE, WHICHER IS GREATER, SHALL BE MAINTAINED.

4. WORK SPACE SHALL PERMIT A MIN 90° OPENING OF EQUIPMENT DOORS.

5. THE SPACE EQUAL TO THE WIDTH AND DEPTH OF THE EQUIPMENT, AND EXTENDING FROM GRADE TO A HEIGHT OF 6 FT ABOVE THE EQUIPMENT SHALL BE DEDICATED TO THE ELECTRICAL INSTALLATION.