



# Electric Service Handbook

June 2019

**Non-residential Projects  
Permanent and Temporary Service**



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## Customer service—guaranteed

PSE makes two service guarantees to you. First, we commit to keeping scheduled appointments, and second, we commit to restoring power outages as soon as we can.

- If we don't keep an appointment to install new service, reconnect existing service, or inspect natural gas equipment, you'll receive a \$50 credit on your PSE bill.
- If your electric service is out for 120 consecutive hours or longer, you may be eligible to receive a \$50 credit on your PSE bill.

These service guarantees are in addition to nine service quality measures that track PSE's performance, and are subject to certain conditions and may be suspended during unusual and exceptional circumstances.

For more information, visit [pse.com/guarantees](https://pse.com/guarantees).

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# Preface

This handbook is your guide to Puget Sound Energy's (PSE) requirements for new electric service installations of less than 600 volts for commercial, industrial, multifamily, and nonresidential applications.

This handbook provides most, but not all, of the information and requirements that you will need. It does not include all possible standards and specifications required by PSE, state, federal, or local code requirements. If you need additional information, please call PSE Customer Construction Services (CCS) at **1-888-321-7779**, your local government agency, or state inspector.

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## What this handbook contains

This handbook contains information on service installations for:

- Commercial and industrial buildings
- Apartment complexes
- Community wells
- Condominium complexes
- Barns and shops

If the type of service you need is not addressed in this handbook, please contact PSE's CCS at **1-888-321-7779**.

### PSE's service availability

General boundaries for PSE's gas and electric service areas are available on **[pse.com/construction-services](http://pse.com/construction-services)**. A CCS Representative can help you to determine the closest available service line and can provide you with cost information for establishing new service.

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## Electrical service equipment inspection

Once your service equipment is installed, the state of Washington or the city with jurisdiction over your area requires that your installation pass an electrical inspection before PSE can connect you to the system. It is your responsibility to request this inspection.

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## Codes and jurisdictions

This handbook shall not be interpreted to conflict with the regulations of the state of Washington or other regulatory bodies having jurisdiction. PSE's metering requirements may be more stringent. Local codes and requirements related to the planned work should be addressed before any construction begins.

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## Scheduling

Engineering, scheduling, and construction of the work will vary depending upon the complexity of the job and the volume of work requested by PSE customers. Contact your CCS Representative at **1-888-321-7779** for current construction scheduling.

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## Other electric service information

Any of Puget Sound Energy's handbooks are available, free of charge, from PSE.

**pse.com/construction-services**

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## How to contact Puget Sound Energy

You can obtain further information by contacting us through the following:

- Go to **pse.com/customerconstruction**
- Or call PSE Customer Construction Services (CCS) at **1-888-321-7779**  
Monday thru Friday, 7 a.m. – 5 p.m.

If you have questions about Energy Efficiency Programs:

- Go to **pse.com/savingsandenergycenter**
- Or call PSE Energy Advisors at **1-800-562-1482**  
Monday thru Friday, 8 a.m. – 5 p.m.

If you have general questions regarding your account, such as changing service or questions about your bill:

- Go to **pse.com/accountsandservices/contact-us**
- Or call Customer Service at **1-888-225-5773**; TTY **1-800-962-9498**  
Monday thru Friday, 7:30 a.m. - 6:30 p.m.

If you have an emergency or a service delivery issue, please call:

- Customer Service at **1-888-225-5773**; TTY **1-800-962-9498**  
24 hours a day, 7 days a week.

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## PSE's service providers

PSE contracts with two partner companies to provide construction services: Potelco, Inc. and InfraSource Construction LLC. The employees who install your service may work for these service providers on PSE's behalf.

## Overview: new permanent and temporary electric service hookup

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This information applies only if PSE has existing power facilities in your area.

If electric power is not readily available, please contact: Customer Construction Services **1-888-321-7779** or **pse.com/construction-services**.

### Commercial/ industrial and multifamily projects customer responsibilities

- Determine if you need overhead or underground service.
- Contact PSE to establish an account, and order your service.
- Obtain an electrical work permit.
- Determine the service rating you want (for example, 200 A or 400 A).
- Determine an approved meter location.
- Notify other utilities of your project.
- Ensure that existing underground utilities are located before you dig. Call 811 at least two business days before you dig.
- Prepare job site by providing a clear path/trench for your service line for proper vault entrance requirements per PSE standards.
- Obtain an approved electrical inspection.
- After the electrical inspection has been completed and approved, request that PSE install and energize your system.

### PSE's responsibilities

- Determine if engineering is required.
- Install your overhead or underground permanent service line conductors.
- Install your meter and energize your system.

### Scheduling/ time frame

- If engineering is not required, services are typically installed and energized 3 to 5 days after you have passed your inspection. Engineering, right-of-way permits, etc., **can extend time by 8 weeks or more.**

### Service charge

- Charges vary due to the type of service you request and the type of system we have in your area. Contact your CCS Representative for current rate information.

# Chapter 1

## Steps to a smooth permanent service installation

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### The installation process

Before a permanent service is energized, you are required to complete the following:

- Establish an account with PSE by calling Customer Construction Services (CCS) at **1-888-321-7779**.
- Determine the type of service needed and if that service will be underground or overhead.
- Install required service equipment and underground service cable (if applicable).
- Obtain an electrical inspection.
- Call PSE and request that your service be energized.

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### Setting up an account

Before PSE can provide new service, you must establish an account. Simply call CCS at **1-888-321-7779**. They will request billing information and the address for the new service from you. If you wish, we can initiate your temporary service order at the same time.

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### Submitting an application for service

Call Customer Construction Services (CCS) at **1-888-321-7779** and submit Electric Service Application Permanent Non-Residential 201E or Electric Service Multi-Family Development 400E. All forms can be downloaded at **pse.com/construction-services**.

When you fill out the application, make sure that it is as complete as possible, and include a copy of each of the following items (if applicable) with the application:

- Legal description of the property
- Title insurance policy, recorded warranty deed, or real estate contract
- Site plan
- Landscaping plan
- Water main plan
- Sewer main and profile plans
- Road and storm drainage plan
- Road cross-section plan
- Streetlight requirements

**NOTE:** Several of the above plans may be included in one CAD and Civil drawing.

## Service voltages

We offer the following standard voltages for nonresidential customers:

**Table 1** Service voltages available from PSE

Service type	Voltage
Single-phase	120/208 V, 3-wire *
	120/240 V, 3-wire **
Three-phase	120/208 V, 4-wire
	277/480 V, 4-wire

\* Available only if 120/208 secondary voltage exists at the location at the time you apply for service.

\*\* Available for loads up to a maximum demand of 100 kW.

## Know what's below: Call 811 before you dig



Before excavating, Washington law requires you to call 811 to locate underground utility lines. Doing so will enable you to avoid potential injury, fines, costly repair of PSE utility facilities, and electric or natural gas service disruptions. Call 811 a minimum of two full business days prior to digging. (For example, call Wednesday to dig on Monday.) When you call, an operator will record information about your dig and notify affected utility companies, including PSE. PSE locates and marks its own lines for free, but privately owned utility lines must be located by a separate vendor, typically for a fee.

The locate service uses the following color codes to identify underground utilities:

**Table 2** Color codes for locating utilities

Color	Utility
White	Proposed excavation area
Pink	Temporary survey markings
Red	Electric power lines, cables, conduit, and lighting cables
Yellow	Natural gas, oil, steam, petroleum, or gaseous materials
Orange	Communication, alarm or signal lines, cables, or conduit
Blue	Potable water
Purple	Reclaimed water, irrigation, and slurry lines
Green	Sewers and drain lines

**NOTE:** Use white paint to mark the area within which you want utility locations.

Once all utilities are located:

- Do not dig with machinery within 3 feet of the locate marks.
- Hand dig to expose all utilities to be crossed.

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## Cost for service

Contact your CCS Representative or PSE Project Manager to determine the cost for service.

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## Additional service costs

### Voltage flicker and size of transformer

Commercial/industrial customers—If the system will serve a facility that is purposely built to serve a single specific customer, and that customer will operate the facility and is knowledgeable about flicker, then the system shall be designed to deliver no more than 3 percent voltage flicker at the point of service.

Multifamily customers—If a transformer is built to serve multiple customers, a maximum of 3 percent or less is specified at the point of service. This is common to all customers.

In your Application for Service, you must provide PSE with the locked rotor starting currents for the largest single-phase and three-phase motors. After we determine the size of transformer required to serve the new load of the facility, we will calculate the percent voltage flicker (from the motor's starting current) at the point of service and provide that number to you.

If this voltage dip exceeds PSE's limits based on facility type, the transformer size must be increased to compensate for this. **You will be responsible for the difference in cost of the larger transformer**, or you will need to install sufficient controls to bring flicker back within PSE's limits.

**NOTE:** We will size PSE's facilities to provide a level of voltage flicker that is normally acceptable to customers. If you need to be served with a higher quality of service, contact your CCS Representative or PSE Project Manager.

### Voltage drop calculations

You are responsible for calculating the overall voltage drop to your facility and determining what is an acceptable level for your facility. If you determine that the voltage drop is unacceptable, you must determine a solution. Some possible solutions are:

- Run separate services from PSE's transformer for motor loads.
- Modify or upgrade your equipment or underground service cables (if applicable).
- Pay PSE to increase the size of our transformer.
- Pay PSE to provide a second transformer.

## Chapter 2

### Permanent underground services

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This chapter provides you with information on PSE's underground service installation. Please follow these requirements to avoid a delay in your service hookup. If you have any questions about this information, call Customer Construction Services (CCS) at **1-888-321-7779**.

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#### Service equipment installation responsibilities

<b>Puget Sound Energy</b>	PSE is responsible for furnishing, installing, and maintaining the primary voltage system equipment. This equipment includes primary conduit and cables, service conductor connectors at the transformer, current transformers (CT), meter(s), and meter wiring.
<b>Customer</b>	<p>You are responsible for furnishing, installing, and maintaining all required service entrance equipment, including the service entrance conduits* from the meter socket or current transformer enclosure to PSE's designated point of delivery.</p> <p>For services where current transformers are required, you will also need to run gray electrical conduit from the CT enclosure to the meter base. Refer to Chapter 4, Section 3, Current Transformer (CT) Metering (up to 800 amps) for more information.</p> <p><b>NOTE:</b> PSE will supply, install, and maintain the CTs and meter wiring.</p> <p>*DO NOT run a grounding wire to PSE's point of connection at the transformer or handhole. PSE will not connect it.</p>

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#### Preparing for your service hookup

The following list will help you prepare your project for the installation of an underground service. After you complete these items, PSE will connect your service and install the metering equipment.

1. Check for any local ordinances/covenants that may prevent you from obtaining an underground service.
2. Complete Electric Service Application Permanent Non-Residential 201E or Electric Service Multi-Family Development 400E.
3. Supply site drawings and load information to your CCS Representative (refer to the submitting an application for service section in Chapter 1, Steps to a Smooth Permanent Service Installation).
4. Contact CCS to determine where your underground service will originate.
5. Determine an approved meter location (refer to the meter locations section in Chapter 4, General Metering Requirements).



6. If required by CCS, provide an easement for any permanently installed PSE equipment located on your property.
7. Provide payment for any preconstruction costs determined by your CCS Representative.
8. Provide all excavation for PSE's facilities and get an approval for the proper vault entrance location of your conductor/conduit.
9. Provide service conductors.
10. Install required service entrance equipment.
11. Connect the meter sockets and permanently label them to indicate the part of the premises they serve, such as unit number.
12. Obtain an approved electrical inspection.
13. Call CCS at **1-888-321-7779** to initiate a connection and energize your new service.

## Cable limits for transformers

The maximum number of secondary conductors allowed for a specific transformer size is limited to those listed below in Table 3.

**Table 3** Maximum cable runs per transformer

Transformer Size and Voltage (PSE-provided)	*Maximum secondary cable connections (Customer-provided)
45 thru 300 kVA, 120/208 V secondary	12 Runs #2 – 500 mcm OR 10 Runs 501 – 750 mcm
45 thru 300 kVA, 277/480 V secondary	12 Runs #2 - 500 mcm OR 10 Runs 501 - 750 mcm
500 thru 750 kVA, 120/208 V secondary	18 Runs #2 – 500 mcm OR 14 Runs 501 – 750 mcm
500 thru 750 kVA, 277/480 V secondary	12 Runs #2 - 500 mcm OR 10 Runs 501 - 750 mcm
1000 kVA, 120/208 V secondary	24 Runs #2 – 500 mcm OR 18 Runs 501 – 750 mcm
1000 kVA, 277/480 V secondary	18 Runs #2 - 500 mcm OR 14 Runs 501 - 750 mcm
1500 thru 2500 kVA, 277/480 V secondary	24 Runs #2 - 500 mcm OR 18 Runs 501 - 750 mcm

\* These are maximum allowed per the transformer size and voltage, however, the sizing of the vault and training of the cable might reduce these runs. The availability of open position shall be verified. Contact your CCS representative or Project manager for your specific requirements.

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## Customer-provided trenches

### Trench width for PSE facilities

The minimum trench width is 18 inches; however, the excavator may need to increase the trench width depending on the other conduits/lines being installed in the trench.

When increasing the trench width, remember to allow a minimum of 12 inches of horizontal separation between PSE's electrical conduits/cables and gas lines.

PSE will allow **customer-owned facilities** within an electric power trench, if the following minimum horizontal clearances from PSE facilities are maintained:

- 18 inches minimum for customer-owned tight-line sewer (not tile), natural gas lines, propane gas lines, fuel oil lines, and water mains up to 6 inches in diameter.
- 12 inches minimum for water service, irrigation pipes, lighting, security and electric supply circuits, communications lines, culverts, and closed system roof drains/storm drains (not French drains).

**NOTE:** When constrained by obstructions or clearances from other buried utility lines/facilities, the horizontal clearance between PSE power and communications may be reduced to 4 inches with mutual agreement from the participating communications providers. It is your responsibility to obtain agreement from participating communications providers for a reduced clearance when needed.

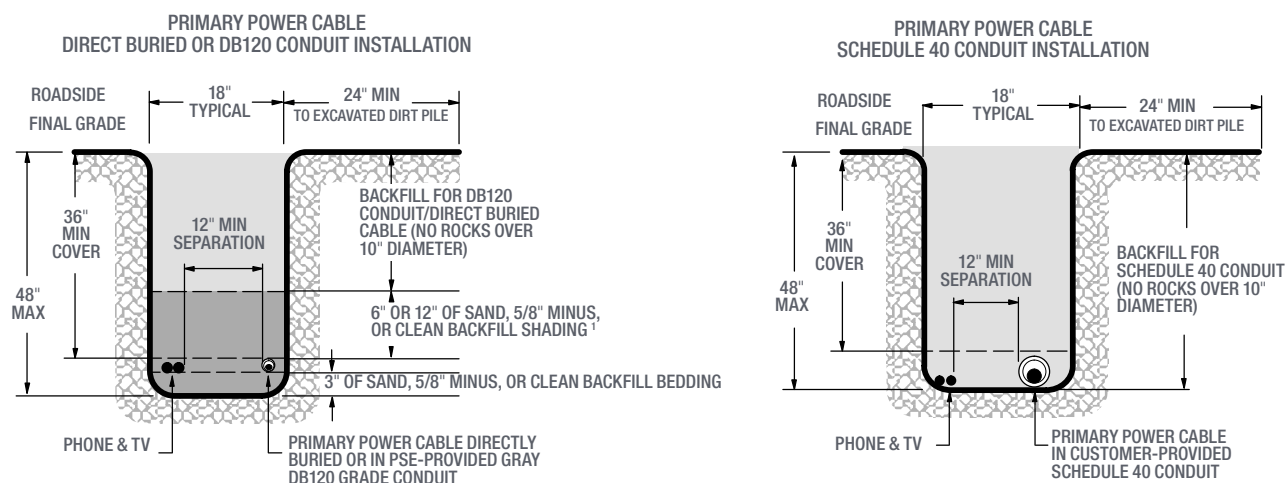
Figure 1 illustrates PSE's width and depth requirements for primary cable voltage line extension trenches on private property with and without a gas line present.

For trenching requirements with a gas line present, refer to the Joint Utility Mainline Trench Excavation Requirements.

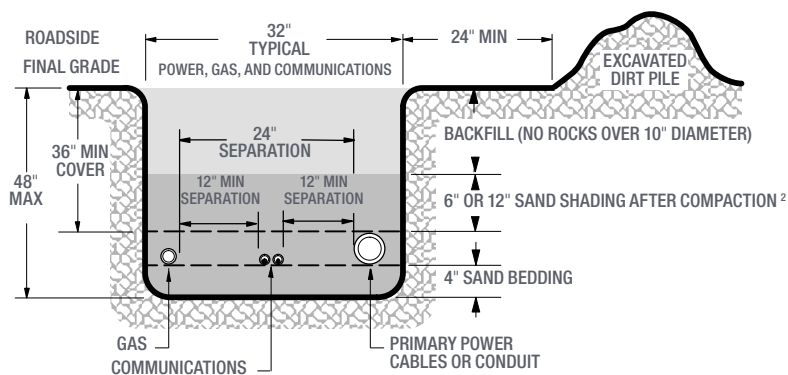
### Trench routing/ clearances

The routing of a customer-provided trench must maintain a minimum of 5 feet from septic tanks and a minimum of 10 feet from drain fields.

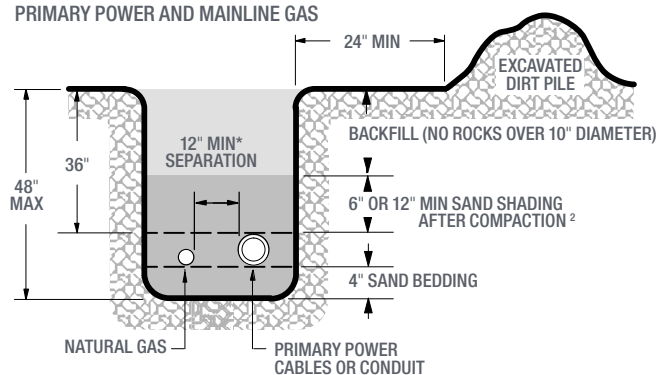
**Figure 1** Typical joint utility trench with primary voltage cable on your private property (cross-section view)



#### PRIMARY POWER, MAINLINE GAS, AND COMMUNICATIONS



#### PRIMARY POWER AND MAINLINE GAS



**NOTE 1**  
SEE TRENCH AND BACKFILL REQUIREMENTS FOR PRIMARY ELECTRIC LINE EXTENSION TRENCHES (NO PSE GAS) ON PAGE 11.

**NOTE 2**  
SEE TRENCH AND BACKFILL REQUIREMENTS FOR PRIMARY ELECTRIC LINE EXTENSION TRENCHES (WITH PSE GAS) ON PAGE 11.

### Trench excavating requirements for PSE facilities

The following requirements for the trench must be met before power conduits/cables will be installed.

- When you trench in the right-of-way on PSE's behalf, the governing jurisdictions issue public roadway use permits to PSE. PSE requires that you provide a signed Excavation Requirements & Final Grade Certification document that is supplied by your PSE Project Manager.
- For trench work provided by you within a public right-of-way or a PSE easement, PSE requires that you use a Washington State licensed and bonded contractor and complete and sign a PSE trenching agreement form.

**NOTE:** Acquiring permits for excavation-related activity can take up to a month or longer depending on the amount of material being excavated, the location of the excavation, and the jurisdiction issuing the permit. To avoid schedule delays, contact your PSE Project Manager for an estimated time frame for acquiring your permits.

- The trench shall be excavated according to the trench detail, and PSE's work sketch.
- The trench shall be straight and the trench bottom shall be smooth, level, and free from debris, garbage, sharp objects, or rocks larger than 4 inches.
- If PSE cable will be direct buried or in gray DB120 conduit, you must provide at least 3 inches of sand bedding on the bottom of the trench.
- Excavated or loose material shall be placed at least 2 feet from the field edge of the trench.
- Water shall be removed by pumping or draining.

**Restrictions:** When PSE's project scope requires the manipulation of an existing primary cable or circuit, customers or third-party contractors shall not uncover and expose existing buried primary voltage power lines or ducts in an energized state. PSE shall coordinate with the customer and service provider for the lines to be de-energized and grounded, or PSE shall provide qualified workers to perform exposure of energized buried lines. These restrictions apply to both direct-buried cables and cables in conduit.

### Trench and backfill requirements for primary electric line extension trenches (no PSE gas)

PSE will not energize its facilities until the backfill is complete.

When PSE primary cables are directly buried, or installed in gray DB120 grade conduit, you are responsible for the following:

- Providing a minimum 3-inch bedding layer of sand, 5/8-inch minus, or clean backfill (with rocks or solid material no larger than 5/8 inch in diameter and no sharp objects) placed below cables/conduits.
- A 12-inch shading layer of the same material above the directly buried cables or DB120 conduit.
- If native backfill is completely free of foreign objects and rocks in excess of 8 inches in diameter, shading with sand, 5/8-inch minus, or clean backfill can be reduced to 6 inches.
- The remaining trench shall be backfilled with soil that is free of rocks larger than 10 inches in diameter and foreign objects.

When PSE primary cables are installed in gray Schedule 40 grade conduit, you are responsible for the following:

- Backfilling the trench with soil that is free of foreign objects and rocks larger than 10 inches in diameter. Bedding and shading of the conduit with sand, clean backfill or select fill as 5/8-inch minus crushed aggregate is not required.

### Trench and backfill requirements for primary electric line extension trenches (with PSE gas)

You must provide a 12-inch layer of sand above and a 4-inch layer of sand bedding below the utilities before backfilling (see Figure 1). If native backfill is completely free of foreign objects and rocks in excess of 8 inches in diameter, sand shading over utilities can be reduced to 6 inches after compaction.

You are responsible for the following:

- Completing backfill as soon as practical after facilities are placed and inspected.
- Carefully placing backfill to prevent damage or movement of the cables or conduit.
- Cost of damages to PSE facilities caused by improper backfill or compaction.
- Relocation costs due to change in grade or alignment.

**CAUTION:** Do not use a compactor directly over the power conduit(s) until at least 30 inches of backfill is in place so that the compactor will not damage the cables or conduit. Do not penetrate the soil deeper than 3 inches during compaction with a backhoe compactor.

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### Vault excavation requirements

You are responsible for the following:

- Excavating the vault or handhole location. The most commonly used vault types and the required excavation dimensions are shown in Figures 3–5.
- Removing debris and leveling the bottom of the excavation with a 6-inch base of crushed rock.
- Backfilling the excavation to finished grade at 2 inches below the vault top (if in a landscaped area), or backfilling flush with the grade (if in a hard-surfaced area).
- Installing a felt joint around the vault top or cover when concrete is poured up to the vault (e.g., when the vault is to be in a sidewalk).

## Conduit installed at vaults

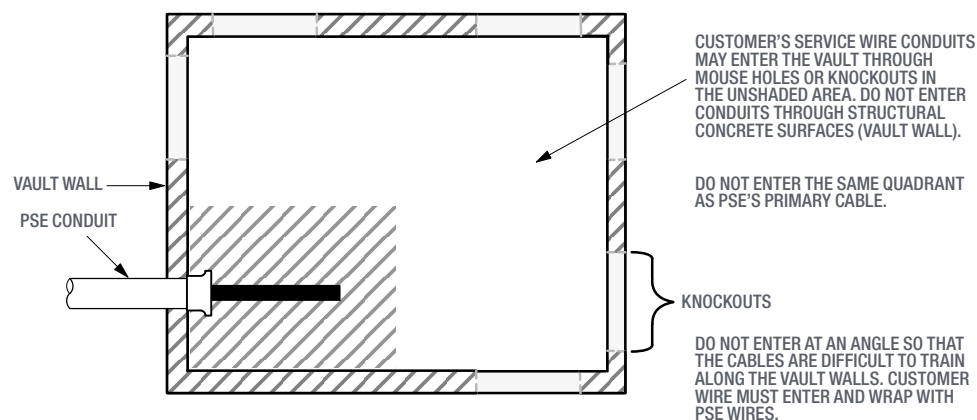
You are responsible for the following:

- Grouting around your service conduits that enter into PSE vaults (except for the vault types shown in Figure 4). Conduits may only enter through mousehole openings or knockouts (see Figure 2).
- Sealing service entry conduit at PSE's vault to prevent water from entering into your service panel.
- Contacting CCS for entry location approval and procedures prior to extending conduit or conduit bends into existing service vaults.

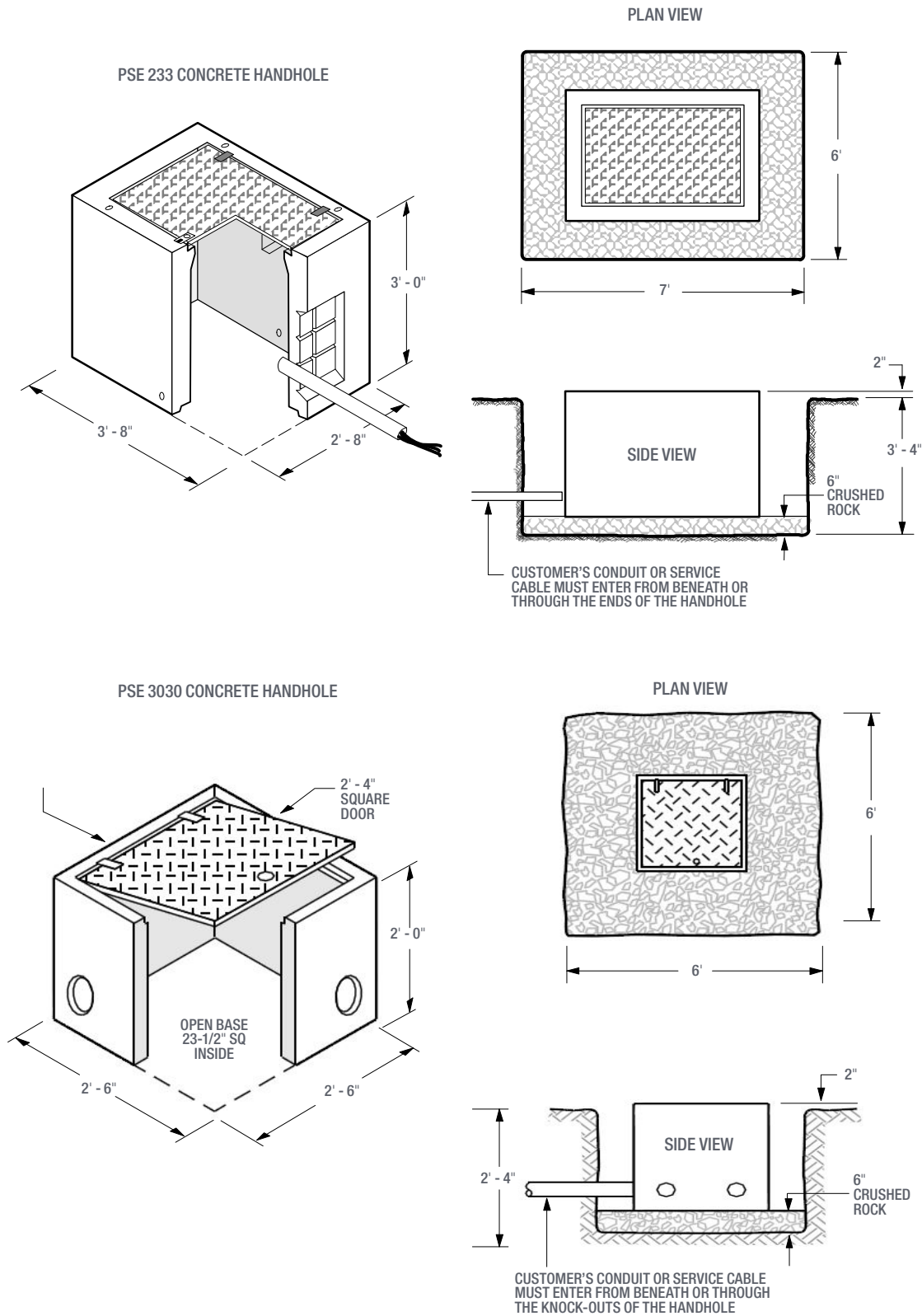
**NOTE:** Refer to the Customer wiring to energized PSE transformers section of this chapter for the proper procedure for entering a PSE vault.

**Figure 2**

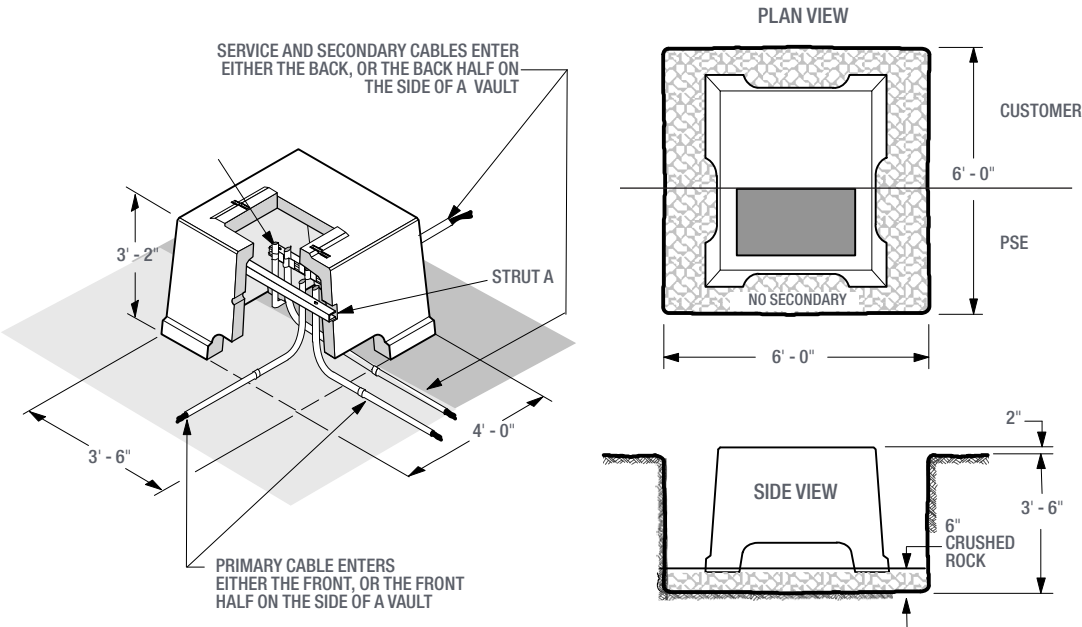
Location of customer conduit in PSE vaults



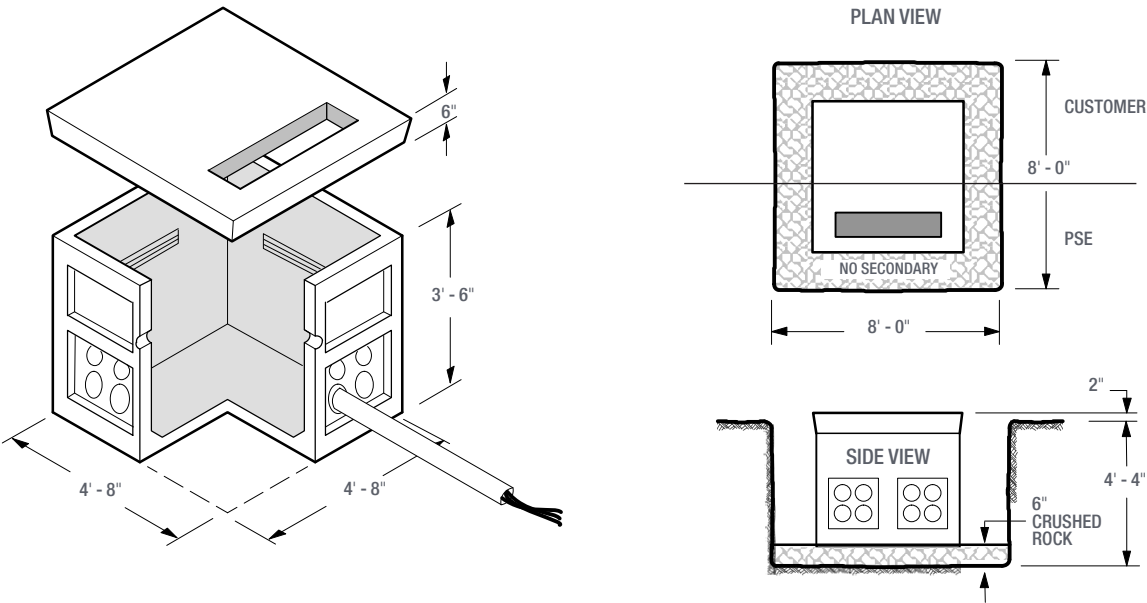
**Figure 3** Minimum dimensions and excavation requirements for small, secondary connection handholes



**Figure 4** Minimum dimensions and excavation requirements for a single-phase padmount transformer vault



**Figure 5** Minimum dimensions and excavation requirements for a three-phase padmount transformer vault, 300 kVA or less



**NOTE:** Refer to Figure 2 for the location of customer conduit entering PSE vaults.





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## Attaching a customer's service line to a power pole

### When the power pole is on private property

As a commercial customer, you may attach, own, and maintain up to two service conduit risers on a PSE power pole (see Figure 6), when the pole is located on private property. Three or more conduit service risers require an underground connection handhole (see Figure 7).

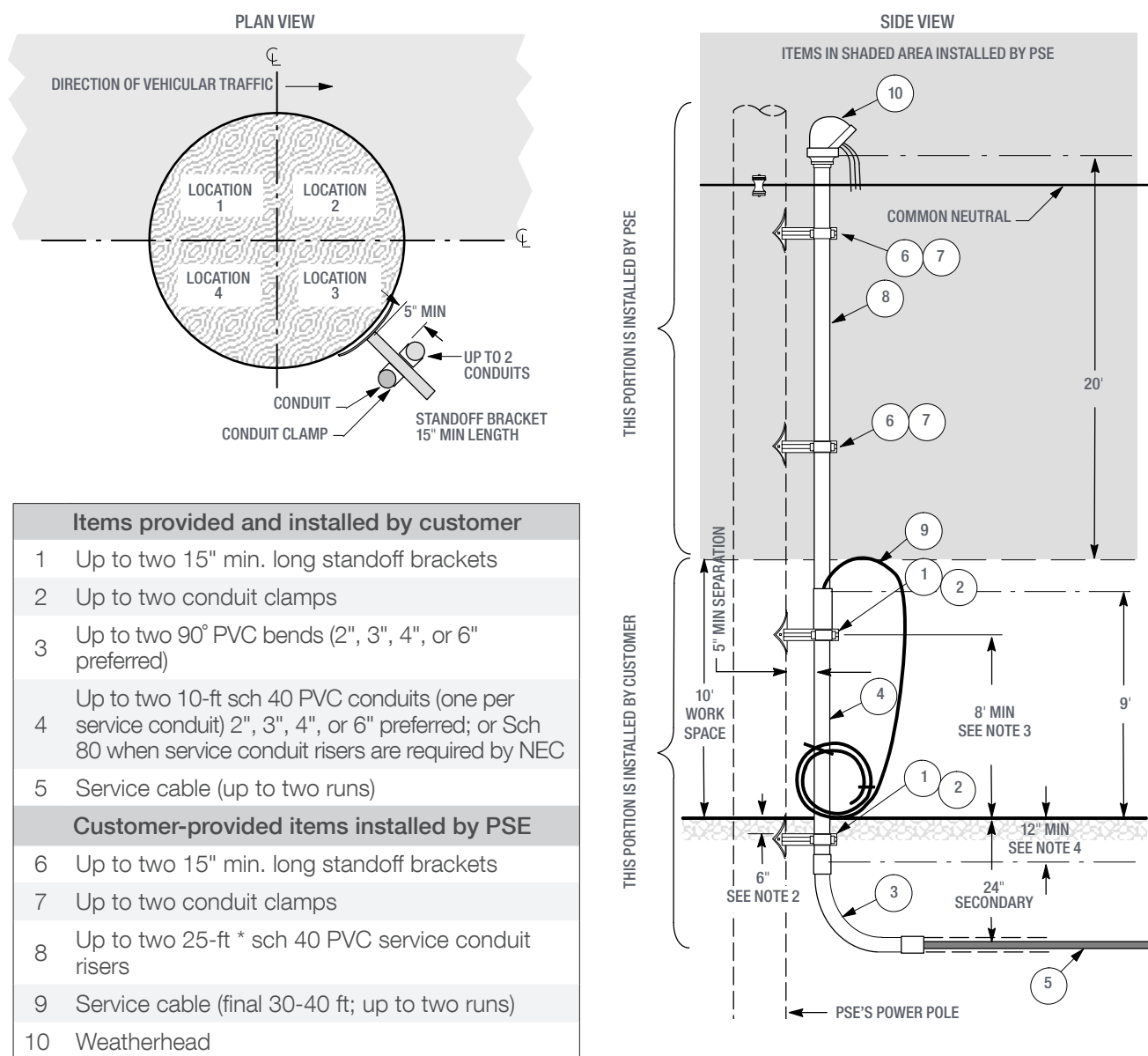
If no other risers exist on the pole, attach the first 10 feet of the conduit riser(s) in location 3 (see the plan view of Figure 6). For the location of other riser(s), contact your CCS Representative or your Project Manager for approval prior to installation.

**NOTE:** All installation work performed on the pole above 10 feet from grade shall be done by electric utility crews.

### When the power pole is in a city/county/state right-of-way

When PSE's power pole is within a governmental right-of-way, PSE will install a secondary handhole on your property to provide a point of service (see Figure 7). Call CCS for coordination and guidance before attaching service conduits to PSE power poles within a governmental right-of-way.

**Figure 6** PVC conduit riser placement when pole is on private property only

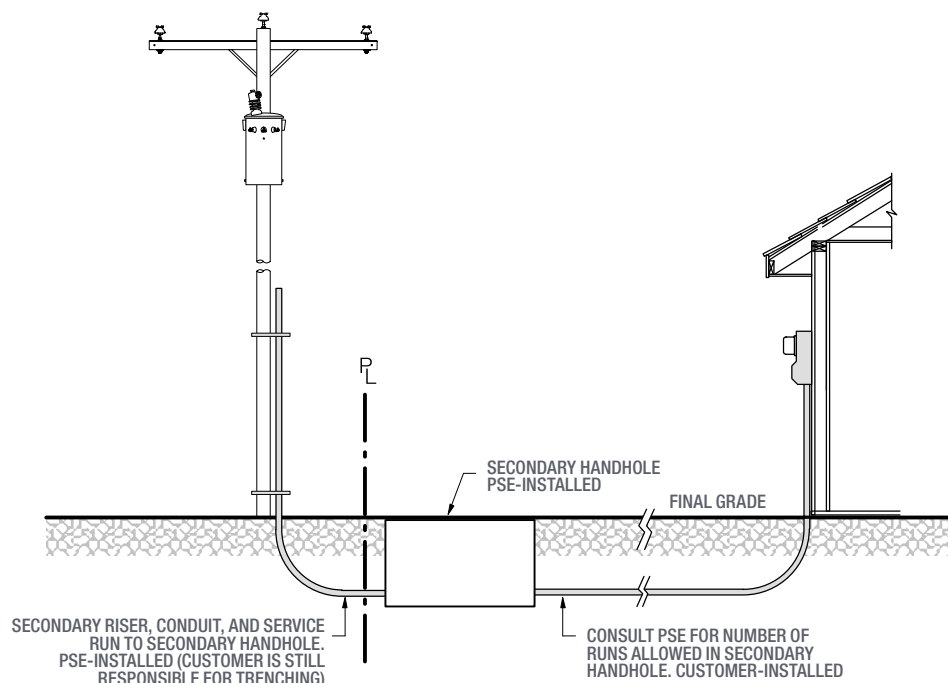


\* 25 FT ASSUMES THE PSE POLE IS 45 FT OR SMALLER. LARGER POLES REQUIRE EXTRA CONDUIT

#### INSTALLATION NOTES:

1. All customer-provided material must be on-site for PSE to install.
2. The 1st customer-installed standoff bracket must be located 6 in. belowgrade on the pole.
3. The 2nd customer-installed standoff bracket must be located 8 ft. abovegrade on the pole.
4. Customer-installed conduit riser sections shall extend 12 in. belowgrade. The remaining abovegrade conduit risers shall be installed 9 ft. abovegrade.
5. Maintain 5 in. minimum separation between the pole and conduit risers.
6. Leave sufficient service cable (Item 9) coiled for PSE crew to install through the top 25 ft. riser section and complete connection to transformer(s).

**Figure 7** PSE-installed underground connection handhole



## Racking of cable in vaults

The following applies to 7- x 7- x 6-foot vaults for three-phase padmount transformers of 500 kVA and greater, where 12 or more runs of 500 kcmil or larger cables are installed.

### Cable ladder

In all 7- x 7- x 6-foot vaults, PSE would install or provide a 30-inch x 4-foot ladder with 6-inch spacing between rungs. The cable ladder will be positioned approximately 19 inches from the left side of the vault wall under the cable access hole.

### Cable supports

Cable support racks and arms, that hold cables along the perimeter of the vault wall, are recommended but not required by PSE.

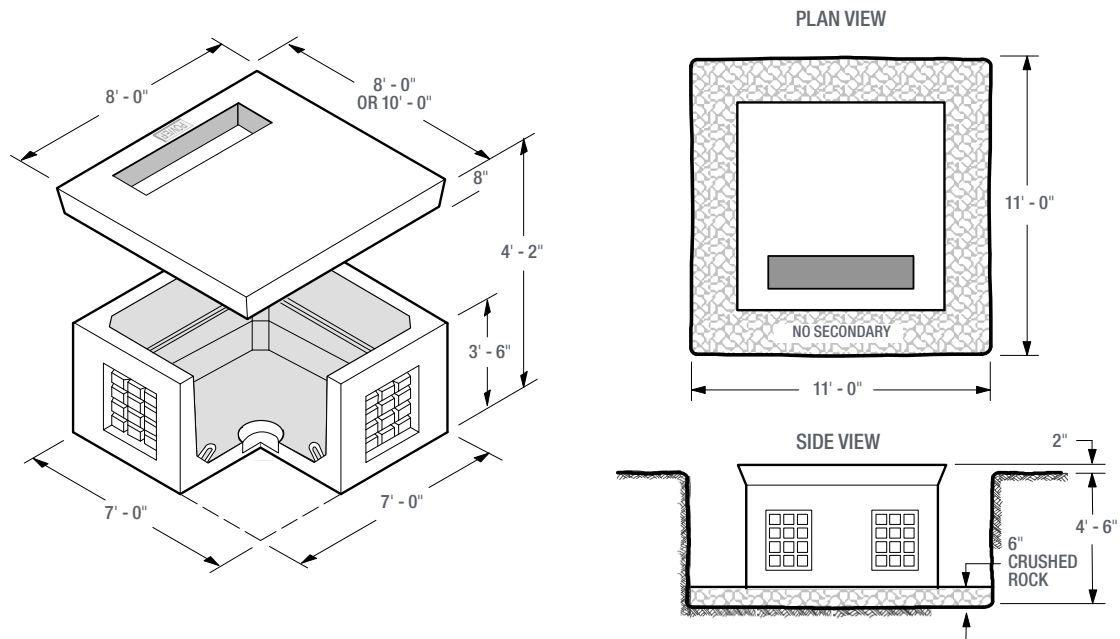
If cable supports are installed, they shall extend a maximum of 2 feet from the vault wall. The customer may install as many cable supports as they consider necessary.

### Cable training and identification

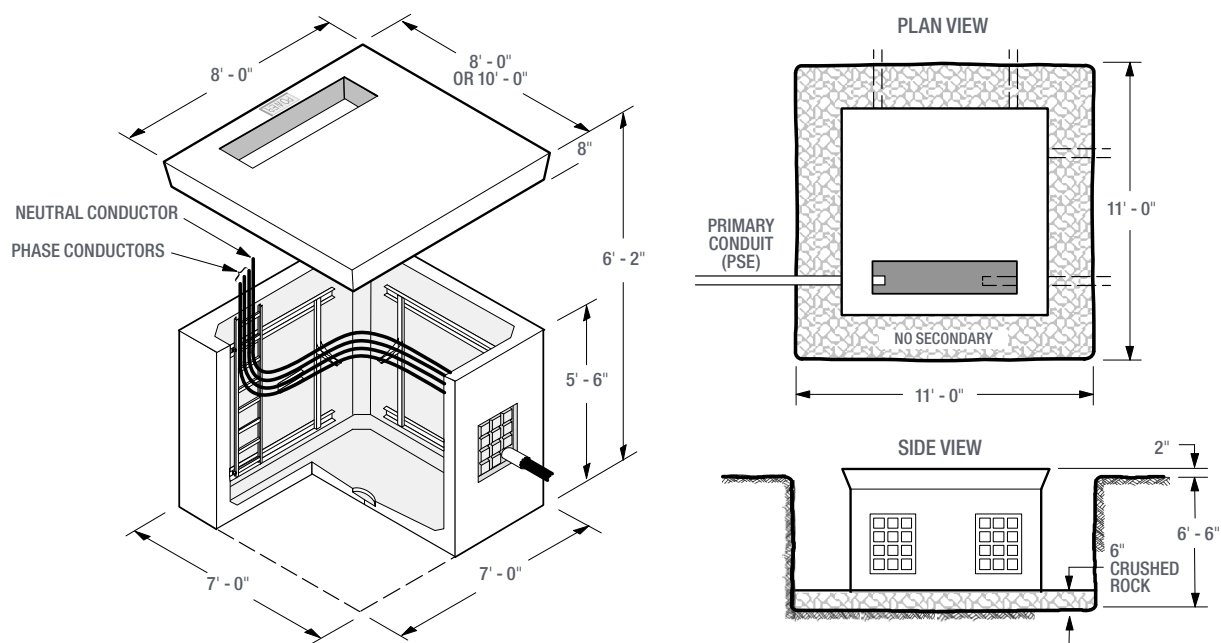
The requirements for cable training and identification are shown below.

- The cable shall extend a minimum of 7 feet above the transformer pad.
- All cables shall be bundled together by phase.
- Cables shall be zip tied to the cable ladder rungs.
- The neutral conductor shall be positioned on the cable ladder (see Figure 9).
- The cable shall be marked with colored tape to indicate its phase. Color extruded, jacketed conductors are also acceptable for identification.

**Figure 8** Minimum dimensions and excavation requirements for a three-phase padmount transformer vault, 500 kVA and larger



**Figure 9** Racking of cable in vaults



---

## Customer wiring to energized PSE transformers

### Excavating to expose existing buried primary voltage power

Before installing commercial service underground cable into any energized transformer, coordinate the work with PSE to ensure a safe installation.

### Single-phase minipad transformers

Your electrician may insert conduit 2 inches into an energized minipad transformer. Routinely, PSE must uncover existing buried primary power cables in order to maintain, intercept and reroute, or cut new equipment into the circuit such as transformers or J-boxes. In these situations, the excavation taking place must be coordinated with the customer with respect to the hazards a buried energized line presents.

Customers preparing a trench up to a cable intercept point shall not uncover the cable ahead of the scheduled date for line work. Customers preparing a trench route to a cable intercept point must stop 3 feet from locate marks prior to the start of PSE line construction work.

The cable shall be isolated, tested, and grounded, by qualified electrical workers, rendering the cable de-energized. Only then may a customer proceed to expose PSE's cable through normal safe work and digging practices.

For single-phase padmount transformer vaults with unistrut construction, you may, at your discretion, provide a minimum 24-inch radius PVC bend for PSE to attach to the unistrut.

Work that involves inserting or pulling cable into the minipad handhole shall be done only:

- After the transformer has been de-energized.
- With the on-site assistance of a PSE journeyman.

To train the cable and mark the runs:

- Mark the cables and group them together.
- Label the conductors with the location and service address.
- Leave no more than 8 feet of cable coiled in the vault, neatly installed and taped together.

### Three-phase padmount transformers

The customer's electrician may install and grout conduit into a vault wall or insert/pull cable into three-phase transformer vaults only:

- After the transformer has been de-energized.
- With the on-site assistance of a PSE journeyman.

To train the cable and mark the runs:

- Label each cable's phase and the neutrals.
- Depending on the entry wall and vault size, leave 20-30 feet of cable coiled in the vault. Contact your project manager for the exact cable footage.

## Transformer locations

PSE will install padmount transformers using the clearances listed in Table 4 and shown in Figures 10 and 11.

Clearances between padmount transformers and structures must be measured from the metal portion of the transformer closest to the building or structure, including any building overhangs, within the following clearances:

**Table 4**

Clearances for padmount transformers

Feature	Clearance distance
Combustible walls or roof (including stucco).	10 feet (3 feet from a combustible wall if using a reduced flammability transformer). See Figure 10.
Noncombustible walls (including brick, concrete, steel, and stone), provided the side of the transformer facing the wall does not have doors. Materials that pass UBC Standard 2-1 or ASTM E136-79 are considered to be noncombustible.	3 feet. See Figure 10.
Fire sprinkler valves, standpipes, and fire hydrants.	6 feet. See Figure 11
Doors, windows, vents, fire escapes, and other building openings.	10 feet. See Figure 11.
The water's edge of a swimming pool or any body of water.	15 feet. See Figure 11.
Individual domestic and irrigation wells.	100 feet. See Figure 11.
Facilities used to dispense or store LP or hazardous liquids or fuels.	20 feet. See Figure 12. 10 feet. See Figure 12.
Gas service meter relief vents.	3 feet. See Figure 11.

Figure 10 Clearances for transformers from structures

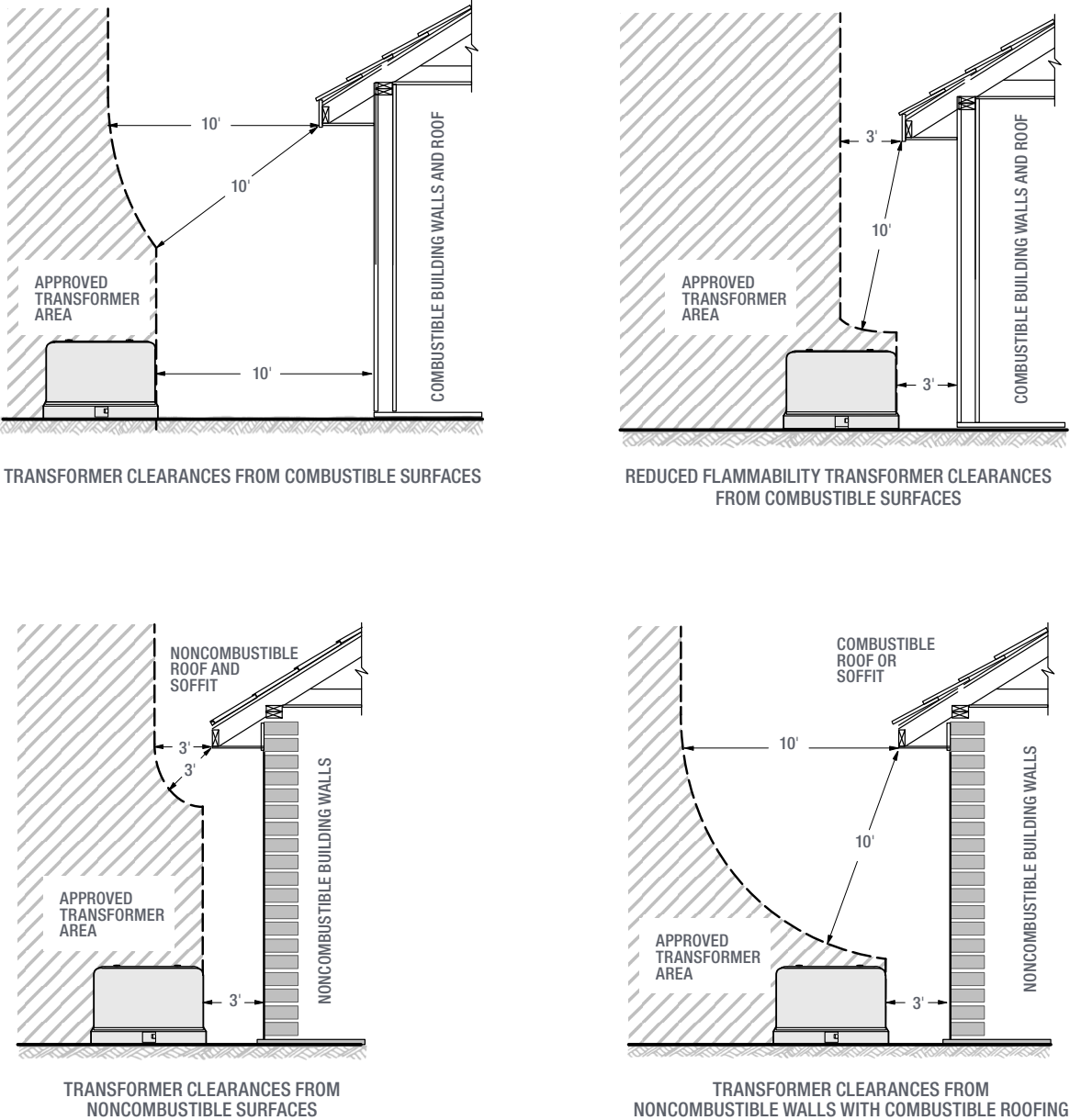


Figure 11 Clearances for transformers

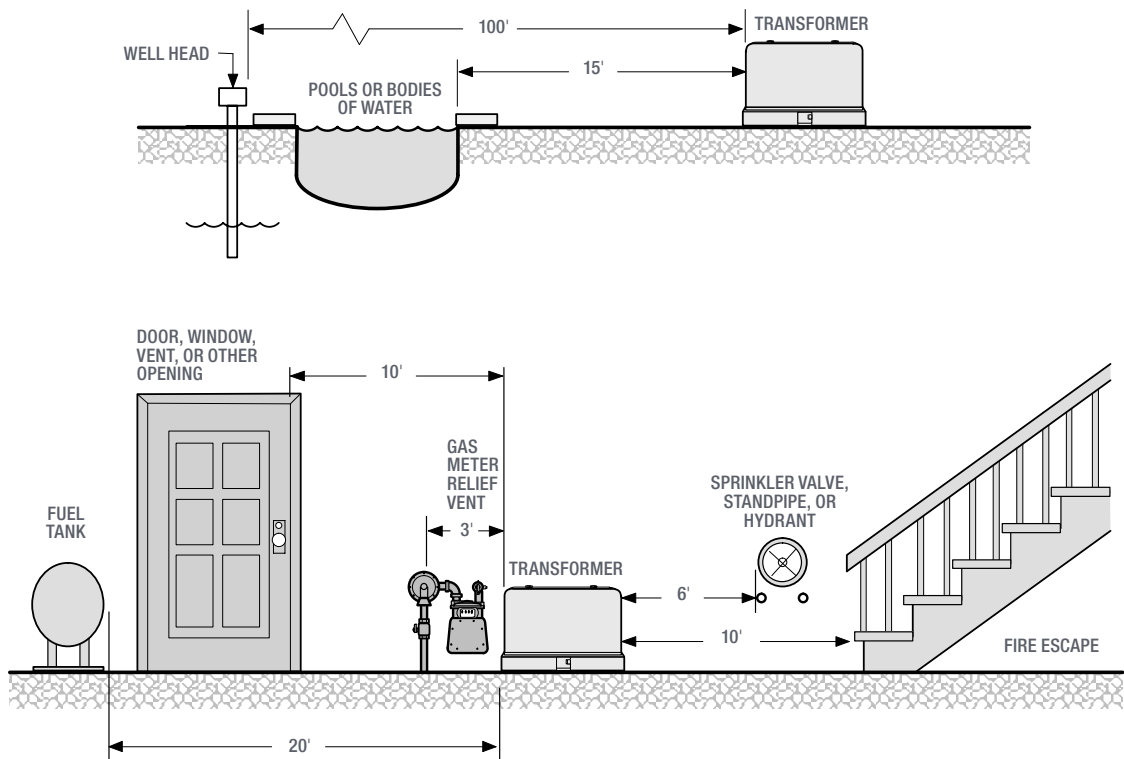
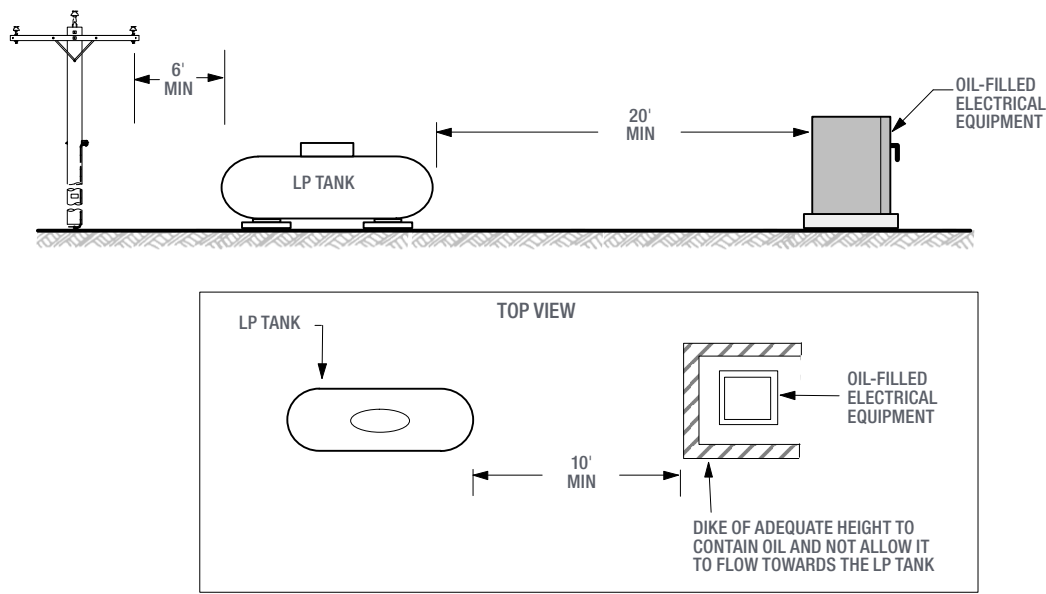


Figure 12 Minimum clearances from oil-filled equipment to LP, hazardous liquid, or fuel tanks





## Landscaping and other obstacles

Landscaping and other obstructions shall not encroach on the clearances shown in Figures 13 and 14.

## Working space

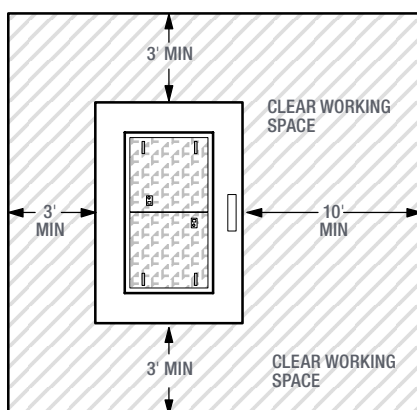
A clear and level working area equal to the full width of the equipment operating compartments shall extend a minimum of 10 feet from the compartment opening for padmount equipment and 10 feet in front of subsurface equipment in vaults (see Figures 13 and 14).

A minimum of 3 feet of clear working area for subsurface equipment and 18 inches for padmount equipment (see Figures 13 and 14) shall be provided on the sides of the electrical equipment without operating compartments (including sides with cooling fins).

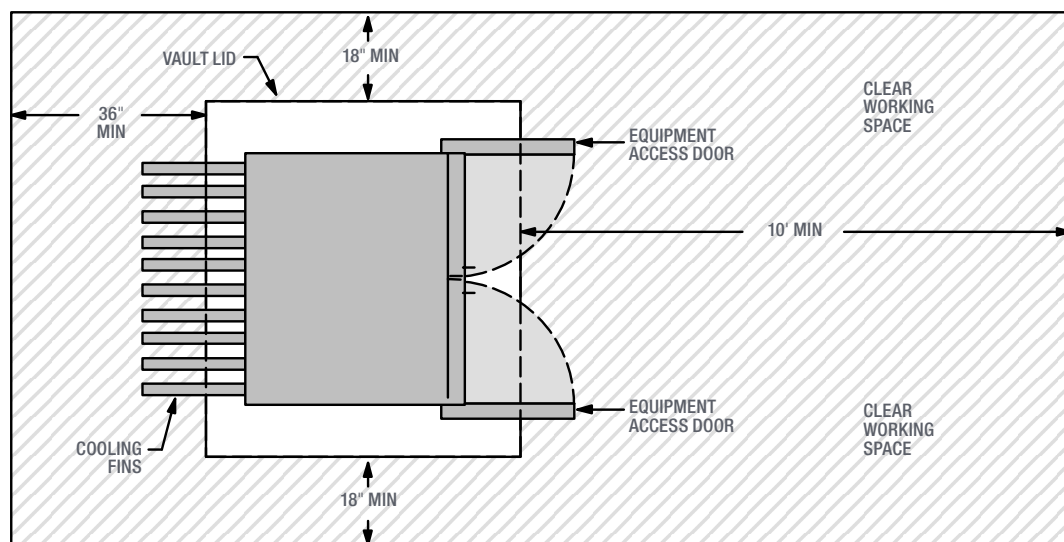
A clearance of 36 inches is required on padmounted equipment with cooling fins (see Figure 14).

**Figure 13**

Plan view of subsurface equipment clear working space



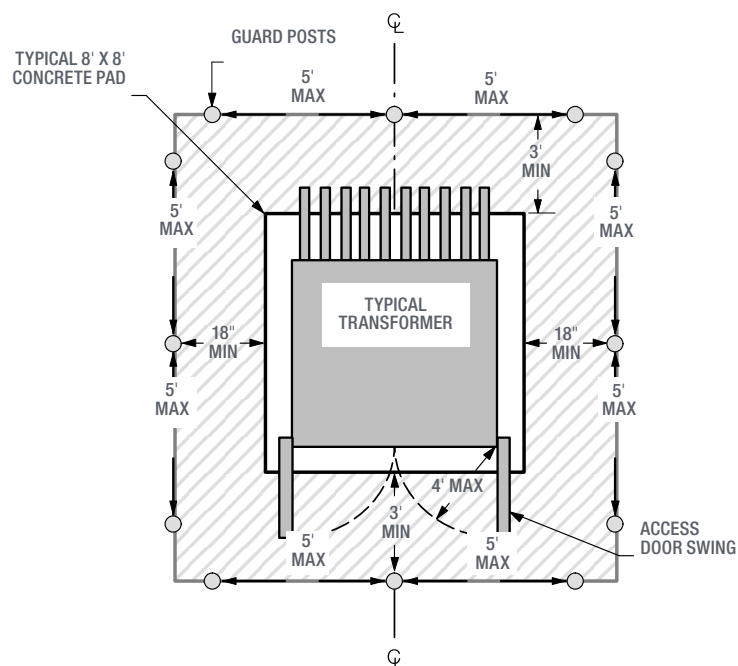
**Figure 14** Plan view of padmount equipment clear working space



### Guard posts for padmount and subsurface equipment

Washington Administrative Code (WAC) requires guard posts around padmounted equipment that is exposed to vehicular traffic. PSE guard post location requirements are shown in Figure 15. You are required to supply and install these guard posts or pay PSE to supply and install them.

**Figure 15** Guard post location requirements



**NOTE:** Installation of guard posts must be completed before the primary cable is installed and energized.

### Approved guard posts

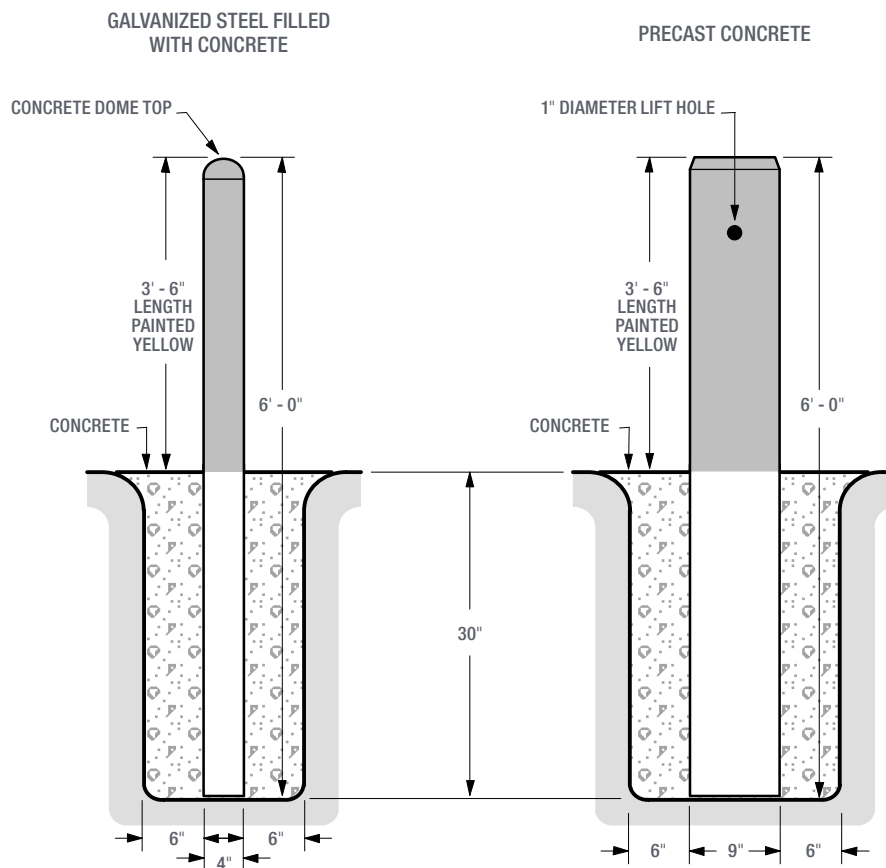
The following styles of guard posts are approved for PSE transformers:

- Schedule 40 or better galvanized steel pipe filled with concrete, 6 feet x 4 inches in diameter. The concrete shall have a minimum compressive strength of 3,000 psi after 28 days. The exposed section of the post shall be painted traffic yellow.
- Precast steel-reinforced concrete post, 6 feet x 9 inches in diameter. These posts are available from Utility Vault Company, Auburn, WA; or Hanson Inc., Tacoma, WA. The exposed portion of the post shall be painted traffic yellow.
- Set the post 30 inches deep in undisturbed soil. If soil has been disturbed, use concrete to stabilize the post.
- Backfill the holes with concrete.

Figure 16 illustrates both styles of guard posts.

**Figure 16**

Typical guard posts



## Fault current levels

The most commonly used padmounted transformers installed by PSE are shown in Tables 5, 6, and 7.

The tables below also show the maximum available short-circuit current at the transformer's secondary connection point.

**Table 5** Maximum short circuit current (in amps) for single-phase transformers, padmounted

Type	Secondary Voltage	kVA	R/X	120 V Winding		240 V Winding	
				Min %Z	Fault Current	Min %Z	Fault Current
1-Phase PM	240/120	25	0.8	2.23	9300	1.7	6100
		37.5	0.7	2.23	14000	1.7	9200
		50	0.6	2.23	18700	1.7	12300
		75	0.5	2.34	26700	1.8	17400
		100	0.5	2.30	36200	1.8	23100
		167	0.5	2.43	57300	1.9	36600

**Table 6** Maximum short circuit current (in amps) for three-phase transformers, padmounted

Type	Secondary Voltage	kVA	R/X	Minimum %Z	3 Phase &/or L-G Fault Current
3-Phase PM	208Y/120	45	0.8	1.65	7600
		112.5	0.3	1.65	19000
		150	0.3	1.55	26900
		225	0.2	2.15	29100
		300	0.3	2.10	39700
		500	0.2	2.30	60300
		750	0.1	5.30	39300
		1000	0.1	5.30	52400
	480Y/277	45	0.8	1.65	3300
		112.5	0.3	1.65	8200
		150	0.3	1.55	11600
		225	0.2	2.15	12600
		300	0.3	2.10	17200
		500	0.2	2.30	26100
		750	0.1	5.30	17000
		1000	0.1	5.30	22700
		1500	0.1	5.30	34000
		2000	0.1	5.30	45400
		2500	0.1	5.30	56700

**Table 7** Maximum short circuit current (in amps) for Y-Y grounded transformers

Type	Secondary Voltage	kVA	R/X	Minimum %Z	3 Phase &/or L-G Fault Current
Three 1-phase OH & UG Banks	208Y/120	30		2.10	4000
		45	0.9	2.00	6200
		75	0.8	1.70	12200
		112.5	0.7	1.70	18400
		150	0.6	1.70	24500
		225	0.5	1.80	34700
		300	0.5	1.80	46300
		500	0.5	1.90	73000
	480Y/277	30		2.10	1700
		45	0.9	2.16	2500
		75	0.8	1.90	4800
		112.5	0.7	1.70	8000
		150	0.6	1.70	10600
		225	0.5	1.80	15000
		300	0.5	1.80	20100
		500	0.5	1.90	31700
		1000		2.20	54600
		1500		2.30	78500

## Chapter 3

### Permanent overhead services

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This chapter provides you with information on PSE's permanent overhead service installation. Please follow these requirements to avoid a delay in your service hookup. If you have any questions about this information, call Customer Construction Services (CCS) at **1-888-321-7779**.

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#### Service equipment installation responsibilities

<b>Puget Sound Energy</b>	PSE is responsible for furnishing, installing, and maintaining the primary system equipment, overhead service wire, current transformers (CT), meter(s), and meter wiring.
<b>Customer</b>	<p>You are responsible for furnishing, installing, and maintaining all required service entrance equipment, including the service entrance conductors from the meter base/ socket or current transformer enclosure to PSE's designated point of delivery. The point of delivery for overhead service is at the connectors on the weatherhead.</p> <p>For services where CTs are required, you will also need to run conduit from the CT enclosure to the meter base. Refer to Chapter 4, Section 3, Current Transformer (CT) Metering Requirements (up to 800 A) for more information.</p>

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#### Preparing for your service hookup

The following list will help you prepare your project for the installation of an overhead service. After you complete these items, PSE will install the metering equipment and connect your service.

1. Check for any local ordinances/covenants that may prevent you from obtaining an overhead service.
2. Complete Electric Service Application Permanent Non-Residential 201E or Electric Service Multi-Family Development 400E. All forms can be downloaded at **[pse.com/construction-services](http://pse.com/construction-services)**.
3. Supply site drawings and load information to your CCS Representative (refer to the Submitting an Application for Service section in Chapter 1).
4. Contact CCS to determine where your overhead service will originate.
5. Determine an approved meter location (refer to the Meter locations in Section 1, General Metering Requirements, of Chapter 4, Meter Installation).
6. Verify that the service mast height requirements have been met.
7. Provide and maintain a path, clear of obstructions, between PSE's pole and your service mast.
8. Provide payment for any preconstruction costs determined by your CCS Representative.
9. Install the required service equipment.

10. Provide and install service entrance conductors (leave a minimum of 18 inches exposed at the weatherhead).
11. Connect the meter bases/sockets and permanently label them to indicate the part of the premises they serve, such as unit number.
12. Obtain an approved electrical inspection.
13. Call CCS at **1-888-321-7779** to initiate connection and energize your new service.

## Service mast requirements

All requirements for the installation of the service mast are located in the National Electric Code (NEC) and the Washington Administrative Code (WAC) 296-46B. The following are PSE-specific requirements.

### Height requirements

PSE can assist you with determining the proper service mast height. Call CCS at **1-888-321-7779** for assistance.

### Clearances from gas meters

A minimum radial clearance of 3 feet is required between electric service equipment and the natural gas meter pressure relief vent.

### Additional mast supports

Additional mast supports, typically a guy or a brace, are required for any service line over 100 feet in length.

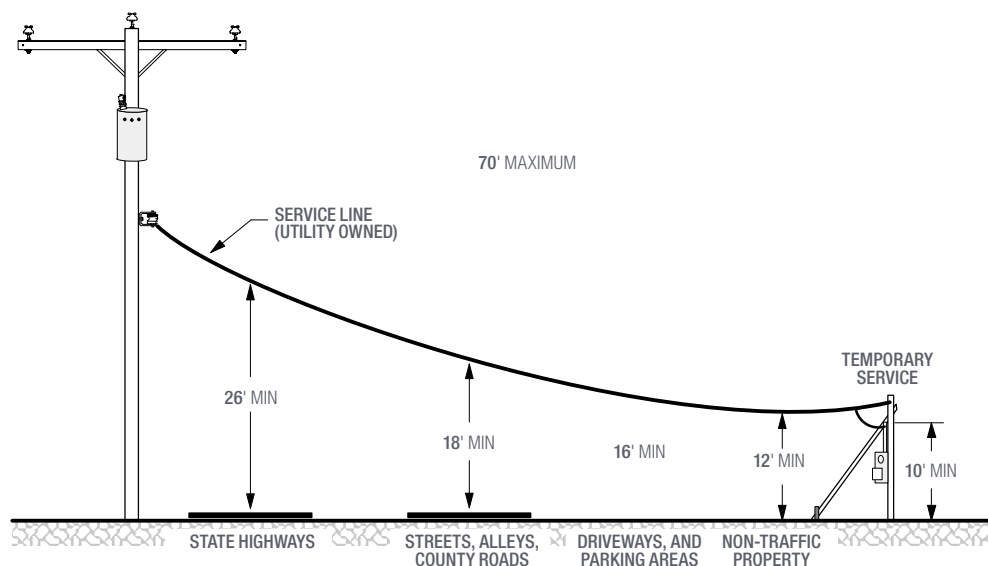
## Screw-in service knobs

For new or altered overhead service lines, you must provide a substantial point of attachment that meets NEC requirements.

Older screw-in type service knobs attached to the home's wall are often inadequate to support modern triplexed service lines. PSE may prohibit use of service knobs if deemed inadequate.

Figure 17

Minimum clearance requirements upon installation



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## Installing the service equipment

### List of customer-provided service entrance equipment

You are responsible for installing the following:

- Meter base/socket
- Current transformer (CT) enclosure and conduit between the meter base/socket, if required
- Service mast
- Insulated clevis for service attachment
- Service entrance conductor
- Ground rods

**NOTE:** PSE will install the service line and meter, as well as CTs and meter wiring if they are required.

### Terrain considerations for meter base/socket locations

Meter base/socket locations are covered in Chapter 4, Section 1 of this handbook. However, consider the type of terrain the electrical service line will cross when choosing a meter location. PSE strongly suggests avoiding service line routes that cross a driveway. Service lines crossing driveways can be hit by vehicles, causing damage to the service equipment or structure.

Contact CCS at **1-888-321-7779** for the minimum height clearance requirements of overhead service wires.

If the service line will pass through any trees, you are required to prune those trees to provide a clear path for the service line. You are also responsible for regular tree pruning, and if necessary, tree removal to keep the path clear.

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## Customer-owned meter pole

### Meter pole requirements

If a meter pole is required for the project, it is your responsibility to purchase and install it. The meter pole must meet the following requirements:

- Be sound, round, and made out of wood
- Fully pressure treated
- Class 6 or better
- 35 feet long minimum
- Minimum diameter of 5-1/2 inches at the top
- Butt gain cut 12 feet from the bottom of the pole

**NOTE:** Multiple meter installations shall be approved by PSE's Meter Department.

### Meter pole locations

Meter poles must be:

- Accessible for reading and testing the meter
- Installed within 30 feet of the commercial building (typically)

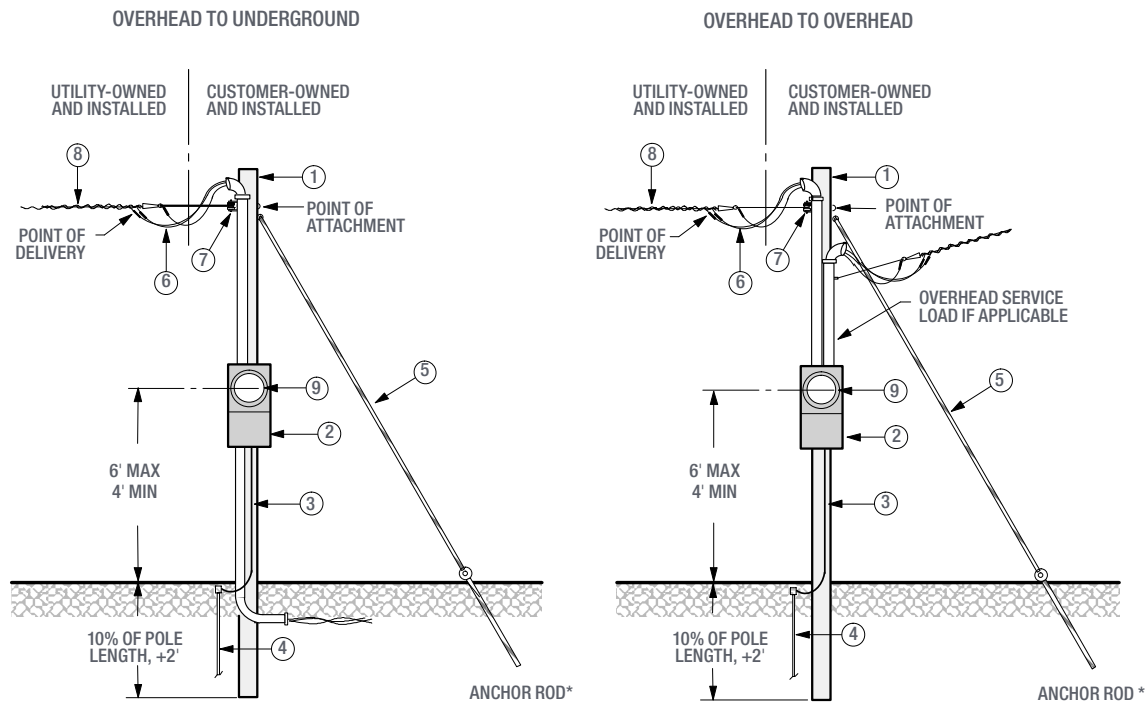
### Meter pole installation

Meter pole installations must be:

- Buried a minimum of 10 percent of the pole's length plus 2 feet. If soil conditions are poor, use crushed rock as a substitute for backfill to stabilize the pole.
- Guyed if the service line crosses a public road or if the distance between the meter pole and PSE's pole is greater than 70 feet. A push brace or pole key brace may be used if guy space is not available.



Figure 18 Permanent overhead meter pole installation



\* ANCHORS SHOULD BE EITHER SCREW TYPE OR CROSS-PLATE TYPE.

Items owned and installed by customer	
1	Customer-owned meter pole
2	Meter base/socket
3	Ground wire, in accordance with NEC/WAC
4	Ground rods, in accordance with NEC/WAC
5	Down guy, 5/16" minimum diameter noncorrosive stranded steel wire required for services over 70 ft from PSE pole. Push brace or pole key brace may be substituted for down guy.
6	Service entrance conductors - 18" out of weatherhead
7	Insulated clevis

Items owned and installed by PSE	
8	Service line
9	Meter



# Chapter 4

## Meter installation

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This chapter provides you with information on PSE's metering requirements. Please follow these requirements to avoid a delay in your service hookup. If you have any questions about this information, call Customer Construction Services (CCS) at **1-888-321-7779**.

**NOTE:** Services that require switchgear installation or CT metering require the approval of PSE Meter Engineering. A PSE Project Manager will coordinate this process.

This chapter is divided into three sections:

### **Section 1: General Metering Requirements**

Meter installations requirements such as meter location, clearances, and multiple meter installations.

### **Section 2: Self-Contained Metering Requirements**

For single-phase service 400 A or less, and three-phase services 200 A or less.

### **Section 3: Current Transformer (CT) Metering Requirements (up to 800 A)**

For services up to 800 A and switchboard metering for services over 800 A.

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## Other contacts

If you have Net Metering or cogeneration questions please email [netmetering@pse.com](mailto:netmetering@pse.com).

## Section 1: General metering requirements

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### Metering equipment responsibilities

#### **Puget Sound Energy**

PSE will furnish, install, and maintain the following equipment:

- Revenue meters
- Current transformers (CT)
- CT meter wiring
- The connectors where your service line interconnects with PSE's equipment.

<b>Customer</b>	<p>You will be responsible for furnishing, installing, and maintaining the following equipment (located beyond the point of delivery):</p> <ul style="list-style-type: none"> <li>• Meter bases/sockets</li> <li>• All necessary wiring and connections (except CT meter wiring)</li> <li>• Switches</li> <li>• Enclosures</li> <li>• Gray electrical conduit</li> <li>• Protection equipment</li> </ul>
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## Other customer responsibilities

<b>Installing or removing meters by a qualified electrician</b>	<p>Only authorized and qualified PSE personnel shall cut seals and remove or install meters.</p> <p>However, under emergency conditions, exceptions may be granted to qualified electricians by contacting CCS at <b>1-888-321-7779</b> Monday thru Friday, 7 a.m. – 5 p.m. Outside of these hours, please call Customer Service at <b>1-888-225-5773</b>.</p> <p>When this occurs, the qualified electrician shall accept all liability for damage or alteration to equipment, injury to persons or property, and loss of revenue to PSE from the time the seal is removed until 72 hours after PSE has been notified that the equipment is ready to be resealed. The customer or contractor shall promptly notify PSE when repairs or modifications are complete.</p> <p><b>WARNING:</b> Use extreme caution when removing and installing meters. Depending upon the type of service or meter base, removal of the meter does not necessarily de-energize service.</p>
<b>Inspections and approvals</b>	<p>Before a new service is energized, the installation shall be inspected and approved by the governing city or state electrical inspector.</p>
<b>Sealing provisions on enclosures</b>	<p>CT enclosures, switchgear, gutters that contain unmetered conductors, and metering equipment shall have provisions for sealing.</p>
<b>Service conductors</b>	<p>Metered circuits shall not enter raceways or enclosures containing unmetered circuits, except for meter loops on poles.</p> <p>All conductors shall be securely fastened in their terminals. Aluminum conductor connections require corrosion inhibitor (electrical joint compound).</p>
<b>Grounding</b>	<p>All meter bases/sockets, enclosures, and conduit shall be bonded and grounded in accordance with Articles 230 and 250 of the latest edition of the NEC.</p> <p>When self-contained meter bases/sockets are used, the neutral conductor shall be connected to the neutral terminal in the socket.</p>

<b>Labeling</b>	<p>Where multiple meters or remote meters are installed, meter base/sockets shall be permanently labeled to indicate the address they serve. PSE requires engraved phenolic nameplates or adhesive die-cut labels at least 1 inch high, with raised or cut-out lettering that is a minimum of 3/4 inches high. All lettering should be capitalized. Service will not be established until marking is complete.</p> <p><b>NOTE:</b> Felt-tip pens and label maker tape are not considered permanent marking.</p>
<b>Customer equipment</b>	<p>The customer's load monitoring equipment shall be installed only on the load side of PSE's metering. No customer equipment shall be allowed inside a meter or current transformer enclosure. This includes customer load monitoring and control devices and any other customer owned equipment.</p> <p><b>NOTE:</b> Meter base/socket and current transformer enclosures shall not be used as a junction box.</p>
<b>Current-limiting fuses</b>	<p>Current-limiting fuses to protect the customer's electrical system from high fault current shall not be installed in meter bases/sockets, instrument transformer enclosures, or PSE's distribution transformers. They may be installed in the customer's service panel or in a separate enclosure between the socket and the panel. Current-limiting fuses are not allowed ahead of the meter or CT enclosure.</p>

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## Meter locations

<b>Location requirements</b>	<p><b>NOTE:</b> Contact your PSE Project Manager or CCS to initiate the PSE Meter Engineering review and approval process. All meter locations shall meet the requirements written in this handbook.</p> <p>You are required to provide a location to install metering equipment. The meter location must be free from obstruction, corrosive atmosphere, and abnormal temperature or vibration, and must be convenient to PSE's distribution system.</p> <p>All meters, instrument transformers, and PSE-owned meter equipment shall be installed at ground-level locations (except for high-rise residential structures) that are accessible 24 hours a day, 7 days a week, for meter reading, maintenance, and installation or removal.</p> <p><b>NOTE:</b> Mezzanines are not considered to be at ground level and are not acceptable for the location of PSE meter equipment.</p> <p>The meter base/socket shall be installed outside on schools, churches, halls, or other similar structures that may be locked during normal business hours.</p>
<b>Prohibited locations</b>	<p>Meters or metering equipment shall not be installed at any of the following locations:</p> <ul style="list-style-type: none"> <li>• Below the first level of a building.</li> <li>• In commercial occupancies they do not serve.</li> <li>• Any place where safety may be compromised.</li> <li>• On poles owned by PSE.</li> <li>• On any line pole occupied solely by the telephone company, except to serve telephone company equipment.</li> </ul>

**Meter location requirements for manufactured commercial structures (school portables, industrial modular office, etc.)**

If you are installing an overhead service to a manufactured commercial structure, our service equipment can be installed on the manufactured commercial structure or on a customer-owned meter pole.

Meter bases/sockets installed on manufactured commercial structures are required to be:

- Located on an outside wall of your structure and accessible for reading and testing.
- Installed 4 to 6 feet above finished grade with a service mast that meets NEC requirements.
- The proper type for the service (see Table 8).

Meter bases/sockets must not be installed:

- In a breezeway.
- In an area that is subject to being fenced.

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## Electrical room requirements

Meter bases/sockets, where an exterior location is not available for metering equipment and CT enclosures, must be located inside an electrical room that shall be used solely for power and communication equipment and fire equipment as approved by NEC.

**NOTE:** The electrical room shall be accessible 24 hours a day, 7 days a week. Additionally, the equipment room shall be well lit and not used for storage.

You must provide the following:

- **Door.** A door, equipped with panic bars, that leads directly to the outside, or with prior approval from the PSE Meter Engineering, directly off a publicly accessible lobby of the structure's main entrance that is not restricted by security. The size of the door shall be a minimum of 2 feet 8 inches x 6 feet 8 inches.
- **Keybox.** A location within 6 inches of the electric meter room door for the installation of a keybox, a key fitting the electrical room door for the keybox, and a sign on the exterior of the door stating "Electrical Room." If multiple electrical rooms are needed, each electrical room door shall have a dedicated keybox with key.

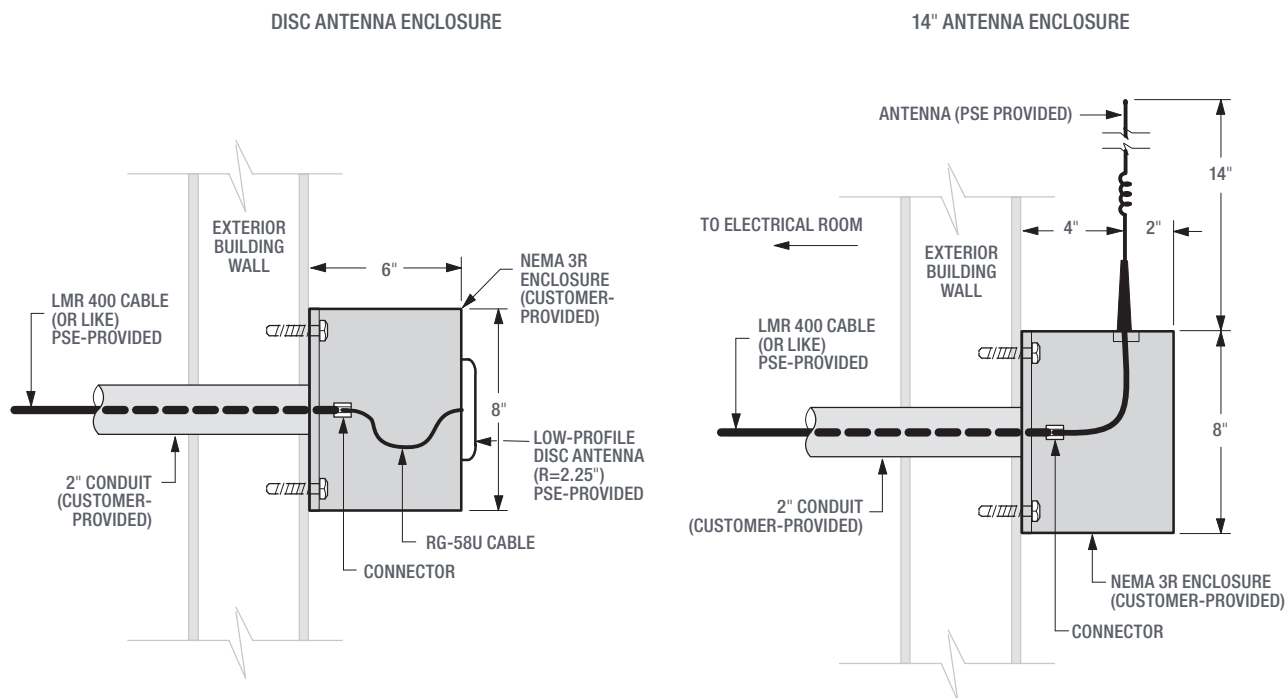
**NOTE:** If door locks are changed, it is your responsibility to contact CCS to coordinate the exchange of new keys.

- **Conduit for AMR antenna.** A 2-inch gray PVC conduit, from each electrical room to a NEMA 3R enclosure used for the automated meter reading (AMR) antenna.
  - » The conduit shall have a maximum of 360 degrees in total bends and be no more than 25 lineal feet total length.
  - » If a single meter is installed within the electrical room, the total length of the conduit may be extended to 70 lineal feet.
  - » Contact CCS if the conduit length is greater than 25 feet.
  - » Antenna enclosure requirements are shown in Figure 19.
  - » A 1/8 inch minimum pull string is to be provided in the conduit.
- Conduits for AMR antenna shall be labeled "PSE Use Only" in meter room(s).

- **Conduit pathway for high-rise residential only.** If the building has multiple aboveground electrical rooms where meters are located, a 2-inch PVC conduit pathway connecting all of the equipment rooms shall be provided for the AMR antenna cable.
  - » From the top level electrical room, provide a 2-inch conduit to a NEMA 3R enclosure mounted on the roof of the building.
  - » Mount the enclosure above the building facade and other obstructions. Preferred locations are adjacent to or on top of the rooftop mechanical room or within antenna farm locations (see Figure 19).
- **NEMA 3R antenna enclosure.** A NEMA 3R antenna enclosure shall be located on the first story outside wall 8 to 10 feet aboveground for buildings with one electrical room.
- **2-foot-square piece of 3/4-inch plywood.** A 2-foot-square piece of 3/4-inch plywood shall be mounted on the wall of the electrical room for an AMR repeater. Mount the plywood 4 to 6 feet above the floor near the antenna conduit entry location into the room. Provide a dedicated 120 V receptacle adjacent to the plywood.

Figure 19

Typical 8 in. x 8 in. x 6 in. exterior wall-mounted AMR antenna installations



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## Electrical room locations in high-rise buildings

Electrical rooms in high-rise\* buildings shall be coordinated with PSE Meter Engineering during the design stage of construction, and approved prior to construction.

\* PSE will consider buildings five stories and taller as “high-rise” for the purposes of this section.

If a high-rise building project qualifies for allowing PSE metering beyond a customer transformer, (typically a dry type 480/208 volt); a transformer loss billing agreement must be completed per PSE Standard 6325.3370 prior to PSE meter installation.

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## Meter bases/sockets

### General requirements

Meter bases/sockets and enclosures shall be acceptable to PSE, accepted by an approved testing laboratory, and must fulfill these requirements:

- All meter bases/sockets shall be ring-type and shall include either a screw-type locking ring (preferred) or a stainless steel snap ring.
- Sockets for nonresidential loads require a manual block bypass. Automatic circuit closures or lever bypasses are not acceptable.
- Any meter base/socket containing energized equipment shall be covered and sealed with a transparent cover plate if a meter is not installed.
- Meters shall be installed only in sockets that are level, plumb, and securely fastened to the structure.
- Meter base/sockets shall be permanently labeled to indicate the address they serve. PSE requires engraved phenolic nameplates or adhesive die-cut labels at least 1 inch high and lettering a minimum of 3/4 inches high. Service will not be established until marking is complete.  
**NOTE:** Felt-tip pens and label maker tape are not considered permanent marking.
- All unused openings of the meter base/socket enclosure shall be closed with plugs that are secured tightly in place from inside the enclosures before a meter is installed.
- All meter equipment exposed to weather shall be raintight according to the National Electrical Manufacturer's Association (NEMA) 3R minimum.
- Terminals shall be marked with a conductor range for aluminum or copper conductors. When aluminum conductors are used, the socket must be approved and clearly marked by the manufacturer for that use.
- CT enclosures, switchgear, gutters that contain unmetered conductors, and metering equipment shall have provisions for sealing.

**CAUTION:** Strands shall not be removed to make conductors fit undersized terminals. Meter bases/sockets shall not be jumped to provide power.

### Determining meter base/socket type

To determine meter base/socket types for specific voltages and amperage ratings use Table 8.

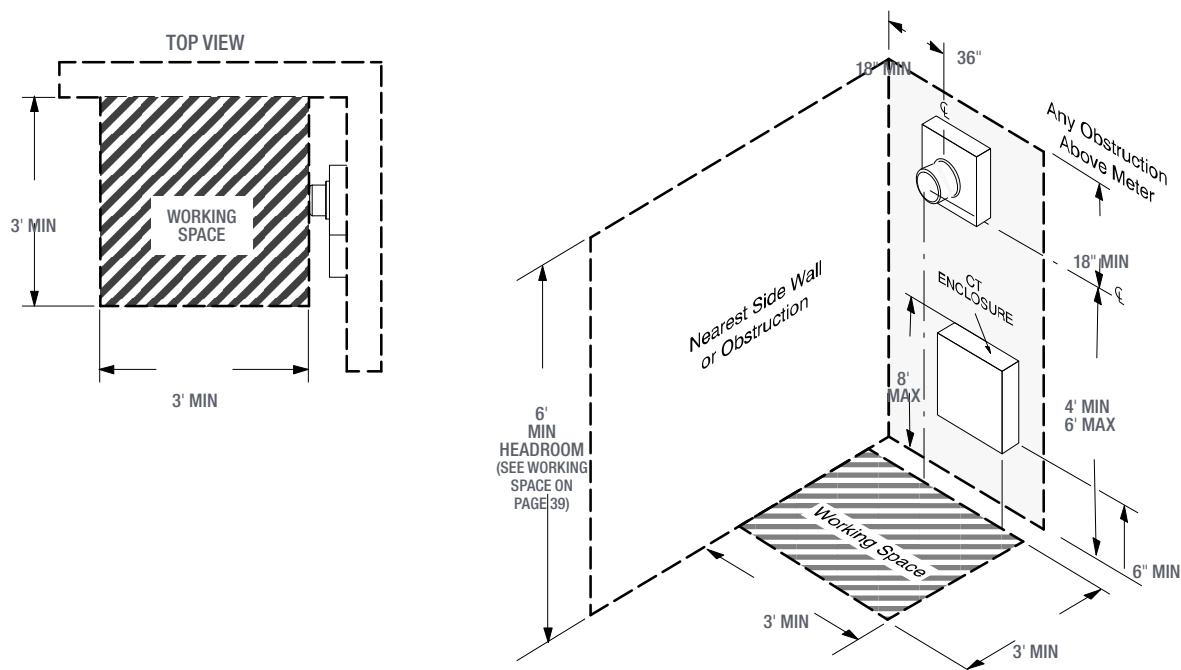
### Meter base/ socket clearances

**NOTE:** The center of the meter base/socket is always the point of reference.

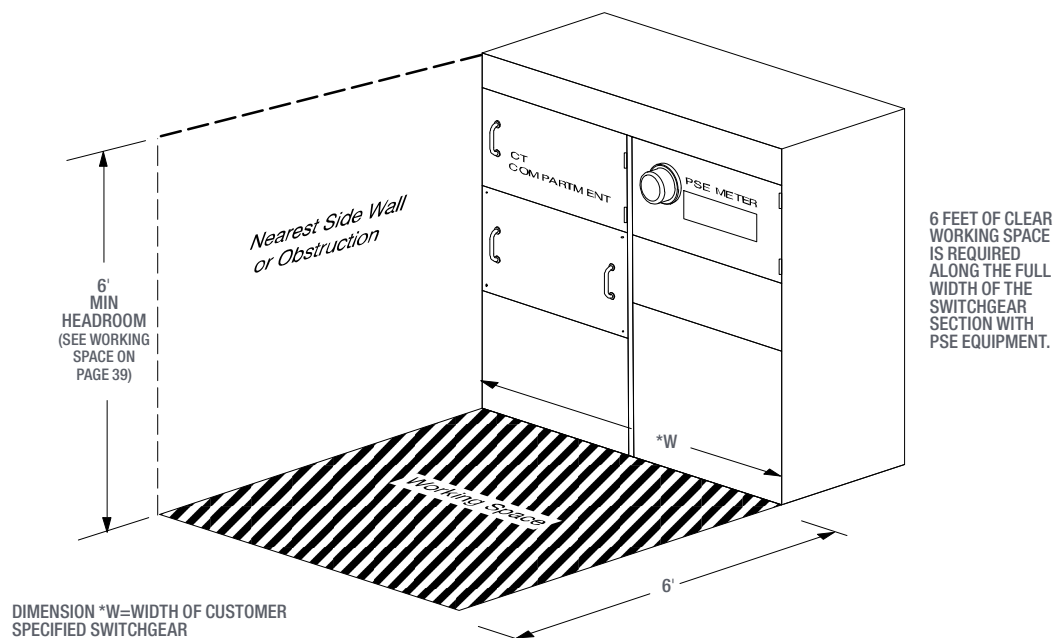
For...	Clearance
Base/Socket height	Meter base/socket height shall be 4 feet minimum to 6 feet maximum above finished grade or floor (see Figure 20).
Working space	<ul style="list-style-type: none"> <li>• Working space in front of metering equipment not installed in switchgear (including current transformer enclosures) shall be at least 3 feet wide and 3 feet deep, measured from the front of the enclosure or meter face (see Figure 20). Plants, shrubs, and trees shall not be planted in this space.</li> <li>• Working space in front of PSE metering equipment installed in switchgear shall be at least 6-feet deep and extend the full width of the section containing PSE equipment (see Figure 21).</li> <li>• All meter locations must maintain 6-feet of worker headroom.</li> <li>• The center of all meter base/socket enclosures shall be a minimum of 18 inches from adjacent walls, ceilings, or other similar obstructions (see Figure 20).</li> <li>• All service equipment, including disconnect switches, shall be a minimum of 10 inches from the meter's center.</li> <li>• Building siding shall not cover or overlap the meter base/socket.</li> </ul>
Minimum clearance from gas meter	The diagrams and the measurements provided in Gas and Electric Underground Service Installation Requirements show the required minimum distances between building features and the relief vent.
Recessed meters	When a meter base/socket enclosure is recessed in the building wall, a flush-type socket is required and mounted flush with the exterior wall. Recessed meter bases/sockets require a clearance of 10 inches in all directions between the center of the meter and the closest portion of the wall (see Figure 22).



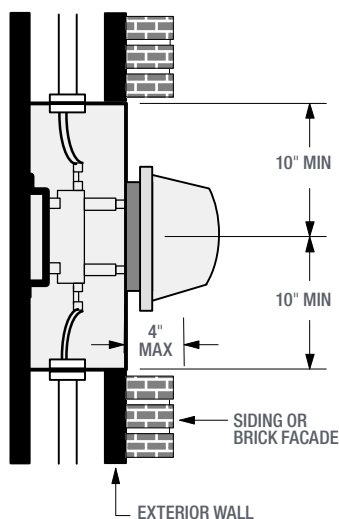
**Figure 20** Meter base/socket minimum clearances, without switchgear



**Figure 21** Switchgear installed meter and current transformer minimum clearances



**Figure 22** Minimum clearances for recessed meters



## Remote metering

Normally, a meter base/socket and associated devices (current transformers, etc.) are attached to a permanent or fixed structure, such as a building, that contains the load being served. Remote metering is allowed if there is no permanent or fixed structure for the load, or when otherwise agreed to by PSE Meter Engineering.

Remote metering consists of a meter on a meter pedestal. Safe parking must be located within 50 feet of the meter.

All remote metering requires PSE Meter Engineering approval before construction begins. Contact CCS if you require remote metering.

**Meter pedestal requirements for remote metering**

Meter pedestals must meet the specifications of EUSERC Section 300 (Metering and Service Equipment 0 – 600 V), and drawings 308, with the following additional specifications for the meter base/socket:

- The meter base/socket shall be a 200 A Form 12S with the fifth jaw in the 9 o'clock position.
- The test/bypass safety disconnect shall meet EUSERC drawings 311 or 312.
- Enclosed metering for protection from vandalism must meet EUSERC drawings 300 and 308 and PSE pedestal clearance and socket requirements. Installations that do not meet these requirements will need written permission from PSE Meter Engineering to proceed.
- Drawings shall be submitted for approval by the manufacturer, noting the EUSERC and PSE drawings and specifications used.
- Meter pedestals shall be on structures such as masonry, concrete, or metal.
- Meter pedestals exposed to vehicular traffic (other than those used for traffic management loads) shall be protected by guard posts as described in the Guard posts for padmount and subsurface equipment section in Chapter 2, Permanent Overhead Services.
- Single-phase remote services 60 A or less can be mounted on a 6- x 6-inch fully pressure-treated wood post. The minimum height of the meter shall be 3 feet.

**Meter pedestal location**

The metering pedestal must be located so that the access for the metering and pull section are free of surrounding obstructions, with at least 36 inches of working space clearance surrounding the equipment.

Safe parking shall be available within 50 feet of the meter.

**Remote service requirements based on service ampacity**

- Remote services 800 A or less for nonresidential loads shall be mounted on permanent support structures that are made of galvanized steel pipe with unistrut cross-braces, concrete, or masonry blocks. Support structures made of wood (treated or not) are unacceptable.
  - » The customer shall provide a 3-foot x 3-foot x 3-inch-thick concrete pad surrounding the meter or holes 2 feet deep that are filled with concrete to anchor the structure.
  - » The minimum height of the meter shall be 3 feet.
  - » Other requirements specified in this handbook for meter bases/sockets and CT enclosures apply.
- Remote services greater than 800 A – Remote services 800 A or greater require EUSERC outdoor switchgear. Ask your CCS Representative for more information.

## Multiple meter installations

### Multifamily

On residential multimeter panels, the minimum spacing between socket centers shall be 7-1/2 inches horizontally, 8-1/2 inches vertically, and the center line shall be a minimum of 4 feet and a maximum of 6 feet above the floor or finished grade. This configuration allows for five (5) vertical sockets maximum.

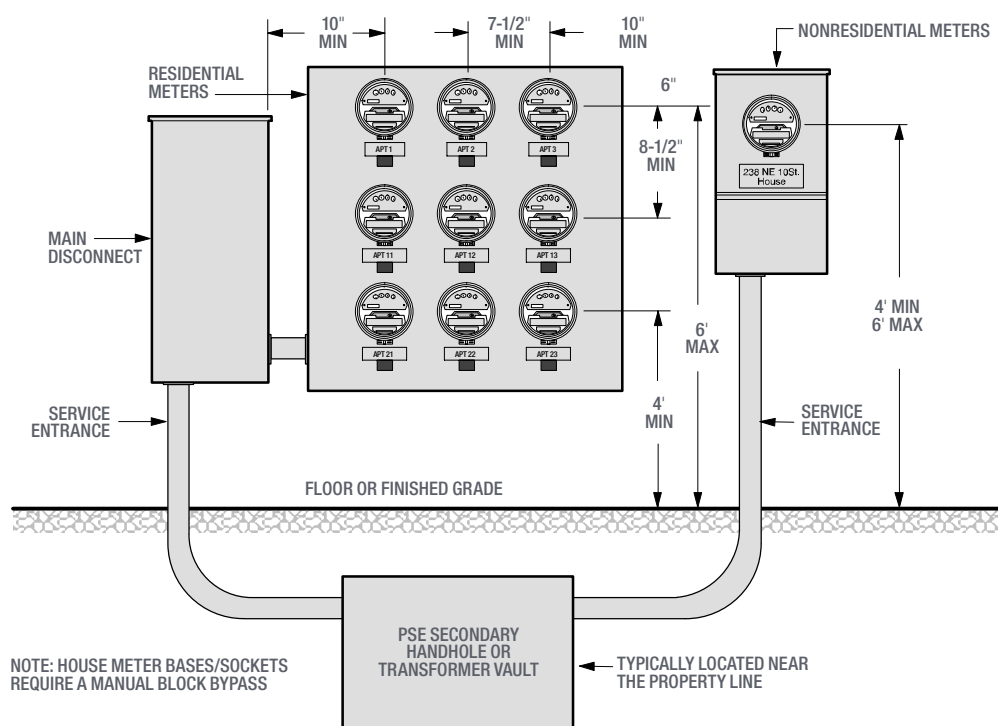
Multimeter installations serving residential living units shall comply with the equipment arrangement requirements are shown in Figure 23.

Meter base/socket jumpers shall not be used to serve house meters. House meters shall be served in the following ways:

- A dedicated set of service entrance conductors.
- A tap on the bussing of residential multimeter panels.
- All-in-one factory assembled multimeter panels.

**NOTE:** PSE requires house meters to have manual block bypasses.

**Figure 23** Typical factory-built residential multimeter panel for multifamily complex



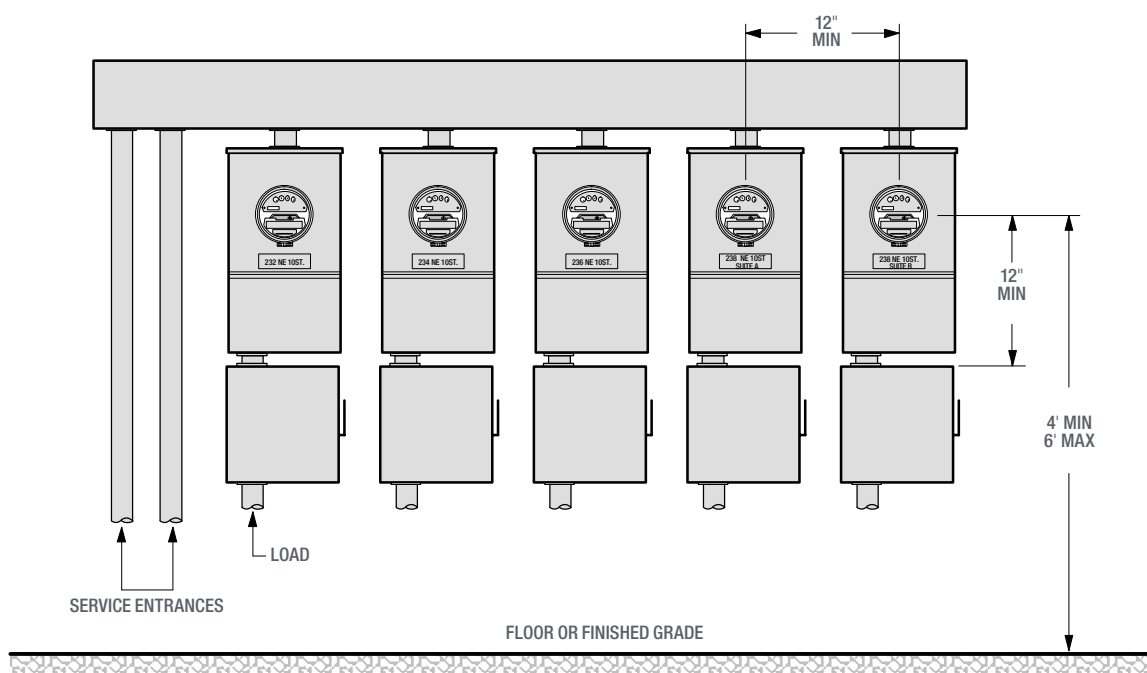
**Nonresidential**

On nonresidential multiple meter panels, the minimum spacing between socket centers shall be 12 inches horizontally, 12 inches vertically, and the meter shall be a minimum of 4 feet and a maximum of 6 feet above the floor or finished grade.

Meters shall be adequately protected from mechanical damage. Factory-built multiple meter equipment shall be approved by the PSE Meter Engineering. A typical example of a nonresidential multiple meter installation is shown in Figure 23.

**Figure 24**

Typical multiple nonresidential meter installations for services 200 A or less

**NOTES:**

Clearances in this drawing (nonresidential) also apply for factory-built multiple meter panels, except that meters may be a minimum of 4 feet above floor.

Meter bases/sockets require a manual block bypass.

More than six meters requires a main disconnect per NEC.

277/480 V series shall have a service disconnect ahead of each meter and a safety socket.

**Multiple meter base/socket labeling**

Meter bases/sockets shall be permanently labeled to indicate the part of the premises they serve (i.e., unit number). PSE requires engraved phenolic nameplates or adhesive die-cut labels at least 1 inch high. Service will not be established until marking is complete.

**NOTE:** Felt-tip pens and label maker tape are not considered permanent marking.

## Section 2: Self-contained metering requirements

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### Single-phase services: 400 A or less and three-phase services: 200 A or less

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#### Meter base/socket main disconnect combinations

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	Meter base/socket and circuit breaker combinations are acceptable for 0–320 A, single-phase, and 0–200 A, three-phase services, provided the meter base/socket section meets PSE's manual block bypass, sealing, equipment sequence, and dimensional requirements.
<b>Manual block bypass requirements</b>	<p>All self-contained nonresidential meter bases/sockets (except single-phase temporary services and Rate Schedule 8) require a manual block bypass (see Table 8). Automatic circuit closures or lever bypasses are not acceptable.</p> <p><b>NOTE:</b> Schedule 8 is used for single-family customers that have a separate service for well pumps (serving no more than two residences), barns, outbuildings, or other loads on the same property as the residence. For this type of service PSE will install the secondary service line.</p>
<b>Disconnecting means and its sequence</b>	<p>All services with self-contained meters shall have the meter ahead of the disconnect switch, except for 277/480 V services, where the safety disconnect is ahead of the meter. The safety disconnect must be colocated within 5 feet of the meter. A fused disconnect is preferred.</p> <p>Each meter shall have a corresponding disconnect. A single disconnect is not permitted for multiple meters.</p> <p>Single-phase 480 V streetlight metering requires a disconnect ahead of the meter.</p>
<b>Safety sockets</b>	A safety socket is required for self-contained 480 V sockets (see Table 8).

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#### Load balancing

When 120/208 V, three-phase transformers provide single-phase service, it is your responsibility to identify the service conductors and balance the load on the transformer.

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#### Service conductor connections

Service conductor connections should meet these requirements:

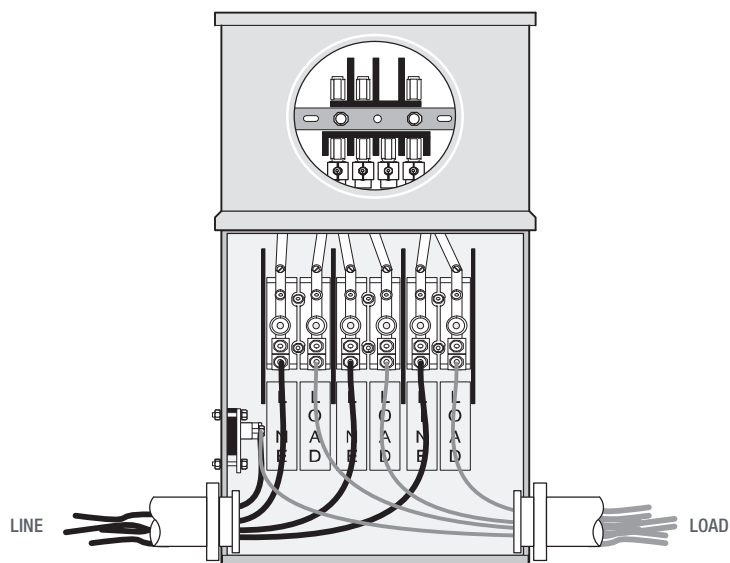
- Line-side conductors shall always be connected to the top terminals of the meter base/socket.
- You are responsible for ensuring that the connection of service entrance conductors in the meter base/socket are inspected and tightened before the service is energized.
- Where safety sockets are used, circuit-connecting nuts shall be properly torqued (see Figure 24).

**NOTE:** Meters will not be installed unless these connections are tight.

- Meters will not be installed if conductors place undue strain on the terminal facilities.
- Terminals shall be rated for the size of conductor to be used.
- Service conductors shall be arranged in the socket to avoid interfering with the meter installation or operation of the manual block bypass (see Figures 25–27).

**CAUTION:** Strands shall not be removed to make conductors fit undersized terminals.

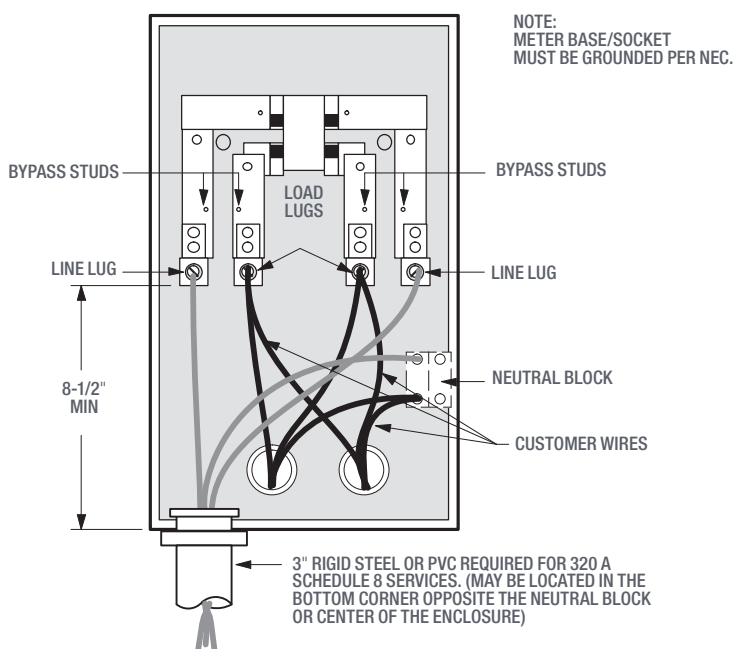
**Figure 25** Typical safety socket



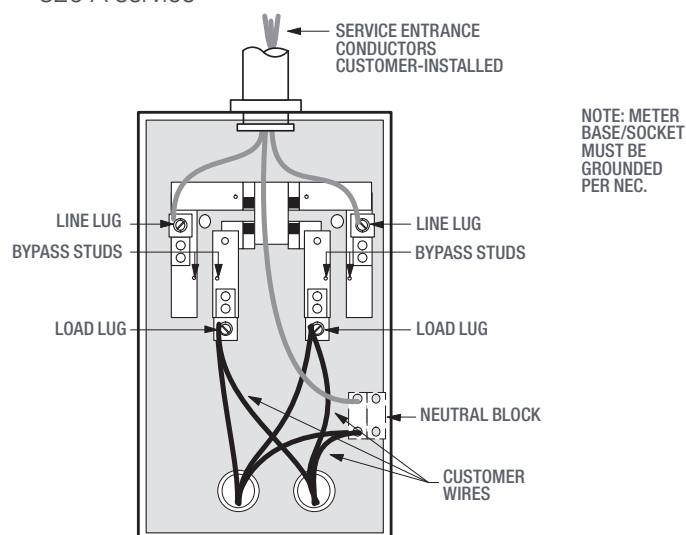
**NOTE:** All 277/480 V self-contained meters 200 A or less shall have an accessible disconnecting means ahead of each meter(s); a fused disconnect is preferred.

**NOTE:** In three-phase delta 120/240 V services, the high leg shall be only on the right side of the meter base.

**Figure 26** Typical arrangement of service conductors for underground commercial single-phase 320 A service

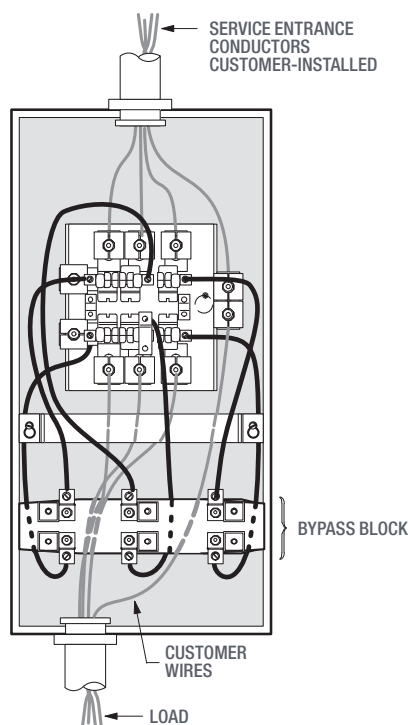


**Figure 27** Typical arrangement of service conductors for overhead commercial single-phase 320 A service



**NOTE:** Line lugs shall be turned 180° to allow proper insertion of wire and to keep from blocking bypass area.

**Figure 28** Typical arrangement of service conductors for 120/208 V three-phase self-contained 200 A service



**NOTE:** Service wires shall be installed behind bypass block so operation of bypass is not restricted.

**NOTE:** In three-phase delta 120/240 V services, the high leg shall be only on the right side of the meter base.



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## Self-contained meter base/socket requirements

<b>Single-phase services: 400 A or less</b>	A manual block bypass is required on all commercial services. Automatic circuit closures, sliders, and lever bypasses are not acceptable.
<b>Single-phase services: 120/240 V, 200 A or less</b>	A self-contained meter base/socket shall be installed on all new and remodeled single-phase services (120/240 V), where the current-carrying capacity of the service entrance conductors does not exceed 200 A, as specified in NEC (see Table 8, Meter Base/Socket Configuration A).
<b>Single-phase services: 201 to 400 A</b>	Two options are available: <ol style="list-style-type: none"> <li>1. A self-contained 320-A meter base/socket with a manual block bypass is required on all new and remodeled single-phase services (120/240 V) over 200 A, where the current-carrying capacity of the service entrance conductors does not exceed 400 A, as specified in the NEC (see Table 8, Meter Base/Socket Configuration A).</li> <li>2. Current transformer metering is available at additional cost; contact PSE's CCS office (see Table 8, Meter Base/Socket Configuration B).</li> </ol>
<b>Single-phase services: 120/208 V, 200 A or less</b>	A 5-terminal meter safety socket shall be installed where the fifth terminal is placed in the nine o'clock position connected to the socket neutral bus conductor (see Table 8, Meter Base/Socket Configuration C).
<b>Single-phase streetlight services: 120/240 V or 240/480 V pedestals</b>	<p>A 5-terminal meter safety socket shall be installed where the fifth terminal is placed in the nine o'clock position connected to the socket neutral bus conductor (see Table 8, Meter Base/Socket Configuration C).</p> <p><b>NOTE:</b> All 240/480 V services require an accessible disconnect ahead of the meter. A fused disconnect is preferred.</p>

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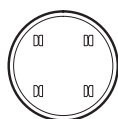
## Three-phase services: 200 A or less

<b>All three-phase services</b>	<p>A manual block bypass is required on all commercial services. Automatic circuit closures, sliders, and lever bypasses are not acceptable.</p> <p>The neutral (grounded conductor) shall be connected or tapped to the third terminal from the left on the lower terminals (see Table 8, Meter Base/Socket Configuration D).</p>
<b>Three-phase services: 120/240 V, four-wire delta (Restricted — available only for existing services)</b>	In addition to the requirements for all three-phase services, the high-leg (power leg) shall be connected through the right-hand terminals of the socket.
<b>Three-phase services: 277/480 V</b>	<p>An accessible disconnect (fused disconnect preferred) ahead of each meter base/socket and a safety socket with a manual bypass are required. Disconnect must be co-located within 5 feet of the meter.</p> <p><b>NOTE:</b> Be familiar and comply with the customer equipment restrictions provided in Section 1, Other customer responsibilities of this chapter.</p>

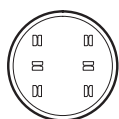
**Table 8** Single-phase (nonresidential only) and all three-phase meter base/socket types

Voltage	Wires	Service Capacity Amp	No. of Terminals	Meter Socket Config.*	Manual Block Bypass Required?	Accessible Disconnect Ahead & Safety Socket Required?	Socket
<b>Single-Phase Nonresidential</b>							
120/240	3	up to 200	4	A	Yes	No	Self-contained socket
120/240	3	201 to 320	4	A	Yes	No	Self-contained 320 A socket
120/240	3	above 320	6	B	n/a	n/a	Instrument transformer rated with provision for test switch
120/208	3	up to 200	5	C	Yes	No	Preferred arrangement
120/240	3	up to 200	5	C	Yes	Safety socket allowed but not required	Streetlight applications only
240/480	3	up to 200	5	C	Yes	Yes - fused disconnect preferred	Streetlight applications only
<b>All Three-Phase</b>							
120/208	4	up to 200	7	D	Yes	No	Self-contained socket
120/208	4	above 200	13	E	n/a	n/a	Instrument transformer rated with provision for test switch
120/240	4	up to 200	7	D	Yes	No	Self-contained socket (RESTRICTED APPLICATION) — High leg on right terminals
120/240	4	above 200	13	E	n/a	n/a	Instrument transformer rated with provision for test switch (RESTRICTED APPLICATION)
277/480	4	up to 200	7	D	Yes	Yes - fused disconnect preferred	Self-contained safety socket
277/480	4	above 200	13	E	n/a	n/a	Instrument transformer rated with provision for test switch

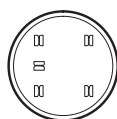
\* Meter Base/Socket Configurations



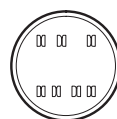
A



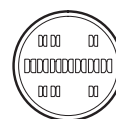
B



C



D



E



## Section 3: Current transformer (CT) metering requirements (up to 800 A)

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Single-phase services: over 400 A and three-phase services: over 200 A

### Puget Sound Energy's installation responsibilities

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PSE is responsible to provide and install:

- Instrument transformers
- Meters and test switches
- Metering circuits (wiring)

### Customer's installation responsibilities

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Provisions for current transformers shall be made when the current-carrying capacity of the service entrance conductors exceeds 400 A single-phase or 200 A three-phase, as determined by the NEC.

#### Meter base/ socket

You are responsible to provide and install the meter base/socket.

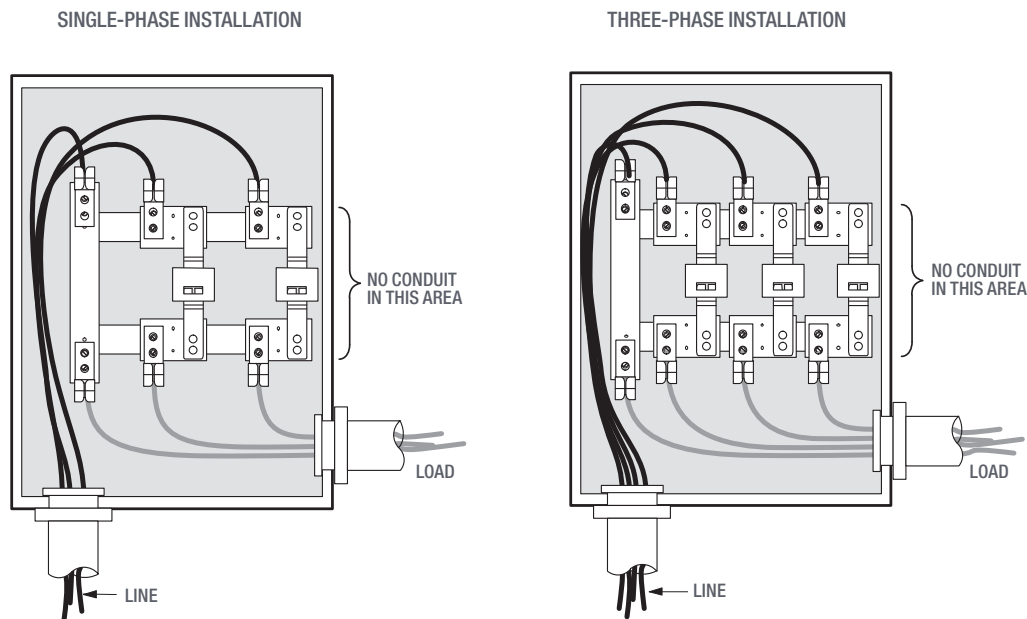
#### Metering circuit conduit

You are responsible to provide and install the metering circuit conduit. Metallic conduit (EMT or Rigid) or Schedule 80 PVC conduit is required between the meter base/socket and CT enclosure.

- The conduit shall be sized as follows:
  - » Single-phase: 1 inch minimum
  - » Three-phase: 1-1/4 inches minimum
- Conduit shall be as short as possible and shall not exceed 50 feet in length or 360 degrees in bends.
- A pull string is required in any meter conduit over 25 feet.
- When metallic conduit (EMT or Rigid) is used, grounding bushings shall be used at both ends.
- Conduit shall run from the CT enclosure and enter the test switch portion of the meter base/socket.

**NOTE:** Metering circuit conduit shall not contain LB joints, condulets, junction boxes, or flex conduit. The preferred method of installing conduits entering the CT enclosure is shown in Figure 28.

**Figure 29** Preferred method of conduit installation in a single-phase and three-phase CT enclosure



#### CT enclosure

You are responsible to provide and install a CT enclosure (see Table 9) ahead of the main disconnect on the outside of the structure, or in an approved electrical room (see Electrical room requirements section of this chapter).

- Enclosures shall not be mounted in crawl spaces, attics, any confined areas, or mounted on ceilings.
- CT enclosures require a minimum front clearance of 36 inches.
- Hinged CT enclosure doors shall not block a safe exit while open.
- The top of the CT enclosure shall be a maximum of 8 feet above the floor or finished grade; the bottom shall be a minimum of 6 inches above the floor/grade.
- The CT enclosure shall not be used as a junction box or bus gutter.
- The CT enclosure covers shall not open vertically. Covers shall open horizontally, right to left.

**Table 9** CT enclosure dimensions (minimum)

Phase	Switch Ampacity	No. of Transformers	Width	Height	Depth
1 *	401-800	2	24"	48"	11"
3 *	201-800	3	36"	48"	11"
3 **	Over 800	3	**	—	—
<p>* Enclosure with a side-opening single-hinged door is required when cabinet dimensions are greater than 24" x 48".</p> <p>** Services over 800 A require a switchboard designed to EUSERC specifications. Refer to the Remote Metering section in this chapter for more information. Services from 201-800 A may be switchboard designed to EUSERC specifications. Drawing must be submitted to PSE's Meter Engineering.</p>					

**Mounting the CT**

You are responsible to do the following:

- Install a CT mounting base on services of 800 A or less (see Figures 29 and 30).
- Provide and install two bolt lugs on the line and load sides of each phase and the neutral bus.

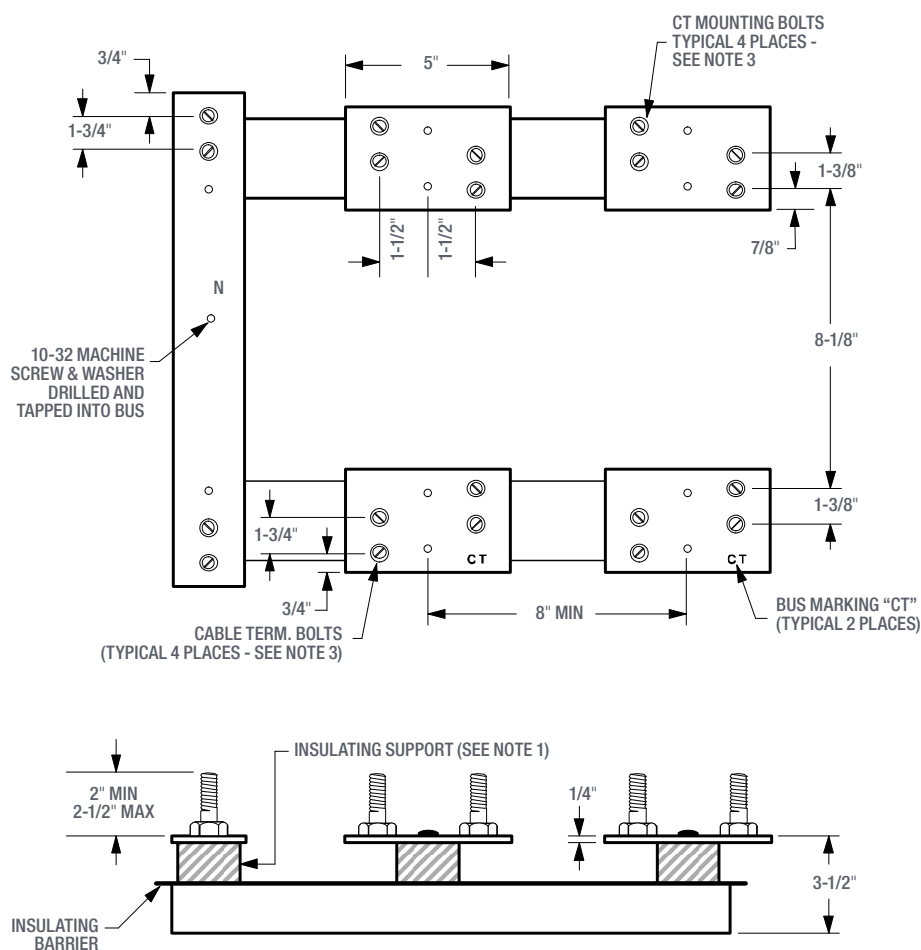
**NOTE:** An instrument transformer enclosure shall contain only the main service conductors. Two types of current transformer brackets are available for terminating main service conductors: bolted lug and molded connector type.

- Bolted current transformer mounting brackets allow two main service conductor connections per current transformer bracket. Current transformer brackets with molded connector blocks allow up to:
  - » Three main service conductor connections per bracket when individual connector blocks are used.
  - » Six main service conductor connections per bracket when stackable connector blocks are used.

A gutter or junction box is required if there are more than six main service conductors.

- All new CT brackets or rebuilt CT enclosures shall be 50 kA fault current rated.

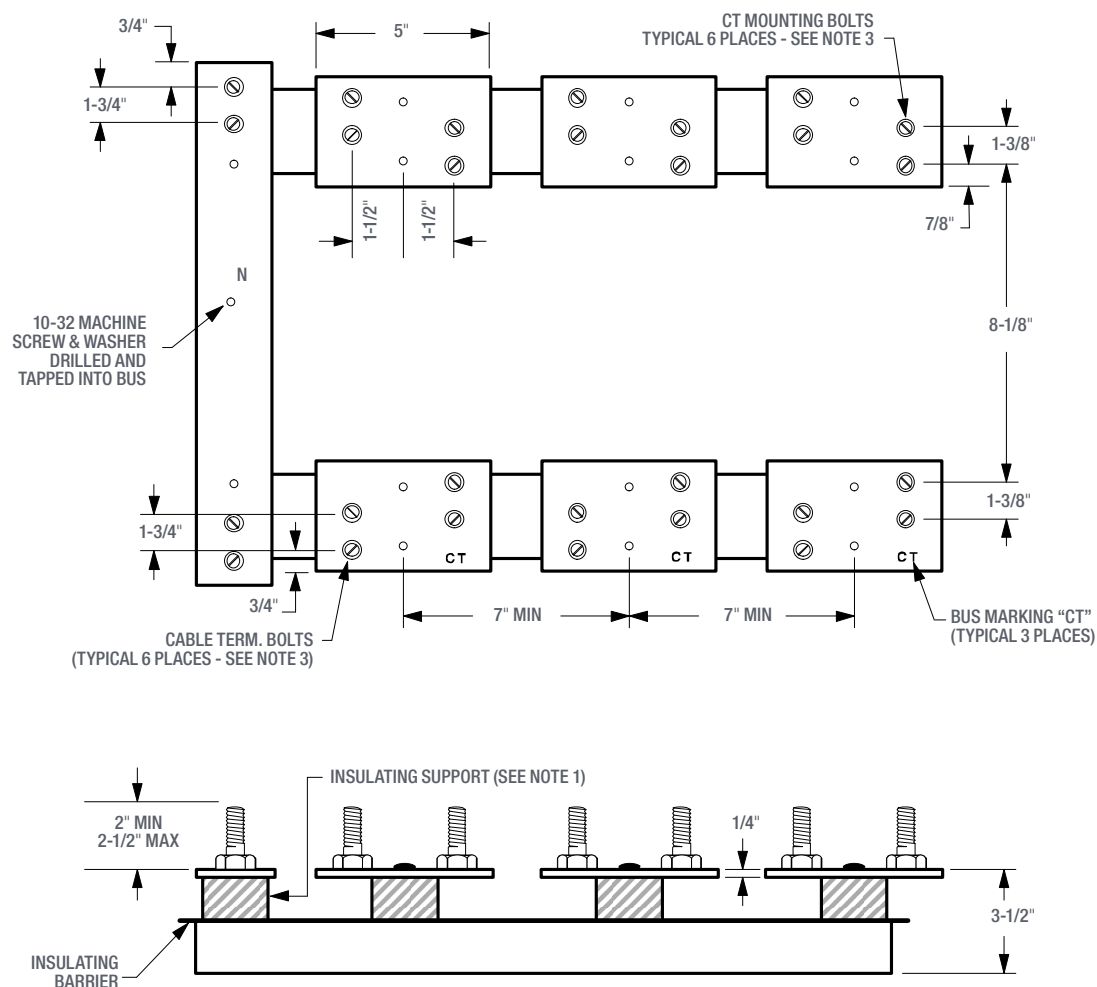
**Figure 30** Single-phase CT mounting base bracket. EUSERC 328A (shown) or 328B



**NOTES:**

1. Insulated supports shall be rated for the serving voltage and have sufficient mechanical strength for the application.
2. Mounting base accepts bar-type current transformers only.
3. Two 1/2 inch steel bolts shall be provided for each cable terminating position and each bolt shall be furnished with a spring washer and a nut. The spring washer may be either a cone-type (belleville) or a split-ring washer and a flat washer. Bolts shall be secured in place and spaced as shown. All parts shall be plated to prevent corrosion.

**Figure 31** Three-phase CT mounting base bracket. EUSERC 329A (shown) or 329B



**NOTES:**

1. Insulated supports shall be rated for the serving voltage and have sufficient mechanical strength for the application.
2. Mounting base accepts bar-type current transformers only.
3. Two 1/2 in. steel bolts shall be provided for each cable terminating position and each bolt shall be furnished with a spring washer and a nut. The spring washer may be either a cone-type (belleville) or a split-ring washer and a flat washer. Bolts shall be secured in place and spaced as shown. All parts shall be plated to prevent corrosion.

## Customer requirements for switchboard metering (over 800 A)

A custom-built switchboard constructed to Equipment Utility Service Requirements Committee (EUSERC) specifications is required for services over 800 A. Switchboard metering may be used on services from 201-800 A, at your discretion.

### Approval drawings required

Approval drawings shall be submitted for all switchboard metering prior to shipment from the manufacturer. One set of drawings shall be sent directly to the PSE Meter Engineering for their required approval.

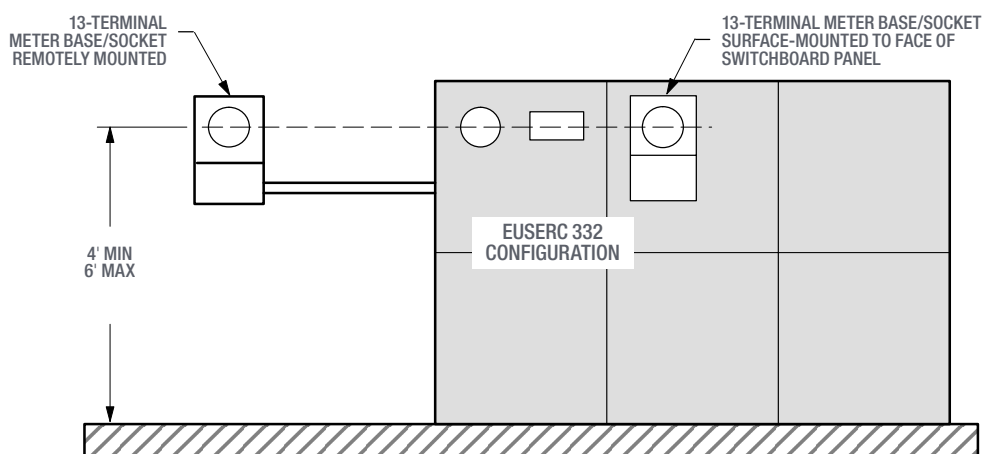
### Installing current transformers

PSE will supply the CTs to be installed by your electrician in the CT section of your switchboard for services larger than 800 A. Coordinate with your Project Manager to arrange for delivery of the CTs.

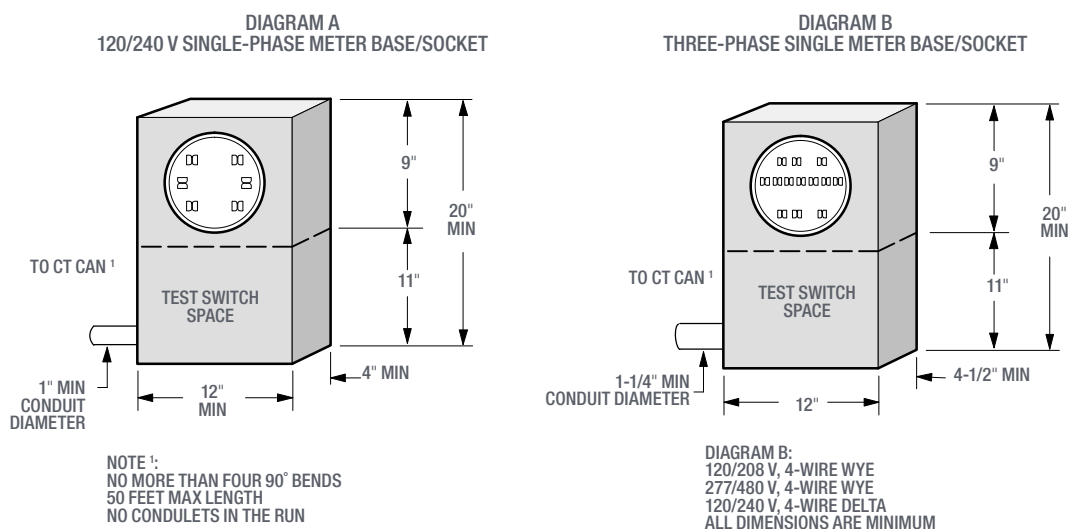
### Three-phase services

Three-phase services require 13-terminal meter bases/sockets mounted on the switchboard according to EUSERC 332 (see Figure 33, Diagram B), or mounted remotely and connected with approved conduit. The conduit shall terminate in the CT compartment and the test switch portion of the meter base/socket (see Figure 33).

**Figure 32** Options for switchboard meters



**Figure 33** Instrument-rated CT meter bases/sockets





# Chapter 5

## Customer generation

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This chapter provides you with PSE's rules and requirements to interconnect and operate customer-owned and installed generation sources in parallel with PSE's electric distribution system. Customer generation sources include fuel cell, hydroelectric, biomass, solar, or wind power generators. Customer generation does not include emergency power generators.

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### Responsibilities

<b>Puget Sound Energy</b>	Approval of customer generation installations by PSE is required ahead of construction. Failure to obtain approval ahead of construction may result in delays and unanticipated costs for any corrections necessary.  PSE's Customer Solutions and meter engineering groups will review and approve all customer installation designs. PSE will provide and install net and production meters.
<b>Customer</b>	All customer electrical equipment must comply with the NEC and any state or local code requirements. Any system capable of exceeding 25 kW may require a dedicated transformer.

---

### General requirements

Customer-owned generators up to 100 kW may be connected to and operate in parallel to PSE's facilities in accordance with Electric Tariff G, Schedule 150, Net Metering Service for Renewable Energy Systems.

The design of these systems shall meet PSE's standards for voltage flicker and harmonics and will be served by PSE at a standard service voltage (see Chapter 1, Table 1).

---

### What to submit when applying for interconnection

Customers should apply for interconnection, net metering, and production metering using Electric Schedule 150 Attachment B or EZ Agreements. Customers should read through Electric Schedule 150 and 151 for more information on how the state incentive works. A three-line wiring schematic should accompany all applications and agreements.

---

## Interconnection system diagrams

For PSE to review the installation proposal, an electric system one-line diagram must be provided with application for service. The one-line diagram shall schematically represent the following equipment and electrical connectivity:

- Generator
- Inverter
- Battery bank (as applicable)
- Disconnect switch (as applicable)
- Production meter (as applicable)
- Main electrical panel
- Sub panel (as applicable for battery back up)
- Service meter (net meter)
- Utility service point of connection

A system diagram guide can be found at:

**[pse.com/pages/customer-connected-solar#contractors](https://pse.com/pages/customer-connected-solar#contractors)**

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## Meter location

Net meters and production meters are subject to the meter location requirements defined in Chapter 4 of this handbook.

Additionally, the production meter must be located “adjacent” to the net meter except as described in three exceptions detailed in the following paragraphs. “Adjacent” is defined as between 10 inches to 6 feet center-to-center along the same wall. Installers may not round corners.

The following exceptions provide the conditions under which net and production meters are not required to be located adjacent to each other:

**Exception No. 1:** When the production system is installed on a separate structure from the service meter (net meter), the production meter may be installed on the same structure as the production system if it also has an electric subpanel. If the structure does not have an existing electric subpanel, the production meter must be colocated with the service meter (net meter).

A typical example would be a system of solar panels on a barn where the barn is served off a branch circuit from the main panel of the house. In this case, the production meter could be located on the barn rather than adjacent to the service meter at the house. Ground mount installations do not qualify as separate structures.

**Exception No. 2:** When the service meter (net meter) is remotely located on a pedestal or post (see Chapter 4, Remote Meter Requirements), the production meter may be installed on the same structure as the production system if it also has an electric panel.

For either exception, the production meter placement must still meet all standards for access and placement.

**Exception No. 3:** When there is no space available or it is extremely difficult to place the production meter adjacent to the service (net meter), the production meter may be installed where there is a line-of-sight from the service (net meter).

For these exceptions, the production meter placement must still meet all standards for access and placement. An engraved phenolic directory indicating the location of other meters shall be placed on both the production and net meters.

---

## Meter socket requirements

Customer-provided metering equipment shall meet the requirements stated in Chapter 4 of this handbook. Installers may not tap at or in the meter socket (supply side tap) except for 320 Amp service. For 320 Amp service, installer may not create the new lugs, modify the existing lugs, or tap into bypass lugs.

---

## Labeling requirements

The labeling requirements in Chapter 4 of this handbook apply to net and production metering enclosures. In addition to those requirements, meter enclosures shall be labeled with permanently affixed signage at the production meter and net meter enclosures to identify their function (i.e., net meter or production meter). Where metering is accomplished at different voltages, the signage must also identify the voltages at which the meters are energized. Labels shall conform to the requirements of NEC Article 690. All labeling should be capitalized. PSE requires engraved phenolic nameplates or adhesive die-cut labels at least 1 inch high, with raised or cut-out lettering that is a minimum of 3/8 inches high.

---

## Disconnect switch requirements

PSE must have the ability to disconnect a generator from PSE's system for employee protection. A disconnect switch is recommended to be installed for all customer generation systems, and required in some cases.

A disconnect switch is required if your system meets any of the following characteristics:

- Output is greater than 25 kW
- Electric service is three-phase
- Electric service is CT-metered

A disconnect switch is optional if your system meets all of the following characteristics:

- Output is 25 kW or less
- Electric service is single-phase
- Electric service is self-contained

**Disconnect  
switch location**

When a production system requires a disconnect switch, the following criteria shall be applied to determine the location of the disconnect switch:

- For 240 V and 120/208 V self-contained and CT-rated production meters, the disconnect switch shall be on the line side of the production meter (between the production meter and the inverter).
- In the case of 480 V self-contained production meters, the disconnect switch shall be on the load side of the production meter (between the production meter and your panel).
- In the case of 480 V CT-rated production meters, the disconnect switch shall be on the line side of the production meter (between the inverter and production meters).
- For customers that have no load between the PSE transformer and inverter (typically community solar or power purchase customers), only one bidirectional meter is necessary to monitor production credits and inverter load. The disconnect switch shall be on the load side of the generation/service meter (between the meter and the inverters).

**Exception:** For 480 V self-contained meters, the disconnect switch shall be located on the line side of the service meter.

When more than one production meter is required for the customer production system, the disconnect location shall be determined by PSE Meter Engineering.

For any of the above cases, the disconnect switch must be co-located with 5 feet of the meter.

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**Resources**

Additional information about PSE's program for interconnecting and net metering customer generation, the benefits of net metering, Electric Schedule 150 Tariff documents, and ways to contact PSE's energy advisors can be found online at:

[pse.com/green-options/Renewable-Energy-Programs/renewablesbytype-home](https://pse.com/green-options/Renewable-Energy-Programs/renewablesbytype-home)

# Chapter 6

## Temporary services

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### What this chapter contains

In this chapter you will find answers to questions such as:

- What are the installation requirements for underground and overhead service?
- What are the trenching requirements?
- How do I locate existing underground utilities before I dig?
- How do I get my temporary service energized?

### Three-phase temporary service

If you require three-phase temporary service, your Project Manager will contact PSE's Meter Department.

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## Definition

A temporary (temp) service is a means of supplying electricity to your site for less than one year. Typically, a temp service provides power for the construction phase of your project, while provisions are being made for your permanent power system. Temp service is provided underground or overhead depending on available PSE facilities.

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## Obtaining your temporary service from existing power facilities

The following information applies to your temp service installation:

- Determine if you need overhead or underground service.
- Obtain an electrical work permit.
- Order underground utility locate service by contacting the 811 "Call Before You Dig" hotline minimum two business days before digging.
- Prepare the job site and install your temp service equipment (service post, pedestal, and meter base).
- Obtain an electrical inspection approval of your temp service equipment (this is done by you or your contractor).
- Call PSE to request that your temp service be connected and energized after your electrical inspection is complete.
- Apply for permanent service.
- At your request, we will check your site to determine if engineering is required.

If you have any questions, please call Customer Construction Services (CCS) at **1-888-321-7779**

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## Scheduling

Most temp services are connected to existing power facilities and engineering is not required. In these cases temp services are typically energized 3 to 5 days after your installation has passed inspection. Depending on complexity and work volume, time frames will vary.

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## Customer charge for service

Charges vary due to the type of system we have in your area. Your CCS Representative will explain current temp service fees.

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## Temporary meter base/socket requirements

You are required to provide a meter socket with the following specifications:

- A ring-type socket that includes a screw-type, stainless steel, or aluminum meter ring (snap-type rings must be stainless steel).
- Rated 120/240 V
- Single-phase
- Minimum rating of 100 A
- Maximum rating of 200 A
- Four jaws
- Underwriters Laboratory (UL) approved

**NOTE:** A 120/208 V single-phase service requires a 5-terminal meter base with the fifth terminal tied to the neutral bus conductor. A 277/480 V three-phase service requires an accessible disconnect ahead of each meter socket and a safety socket with a manual bypass.

If you would like a service of 201 A or greater, refer to the metering requirements in Chapter 4, Meter Installation, located in this handbook.

All conductors necessary for standard service voltage, provided in Chapter 1, Table 1, must be determined

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## Temporary underground services

Temp underground service is available in PSE's service area where the existing power facilities are installed underground.

The process and cost of obtaining your temp underground service can vary, depending on the location of our existing facilities. If there is a power stubout, handhole, pedestal, or transformer located on your property, engineering may not be required. Simply install your temp service facilities (see Figure 34 and Figure 35), obtain an electrical inspection, and call PSE to connect your temp service.

**Meter location**

To properly locate your temp meter pedestal, set the meter pedestal on your property no more than 5 feet from the transformer, stubout, handhole, or pedestal.

If a distance greater than 5 feet is required, please contact a CCS Representative for approval prior to construction.

**Trenching and excavation requirements**

It is the customer's responsibility to provide the trenching needed to connect to a power stubout (shown in Figure 34). The cable you provide is to be sized according to the NEC and have a minimum 24 inches of backfill coverage.

**NOTE:** A 4-foot-square excavation is required at the stubout to provide working room for our personnel to splice your cable to ours.

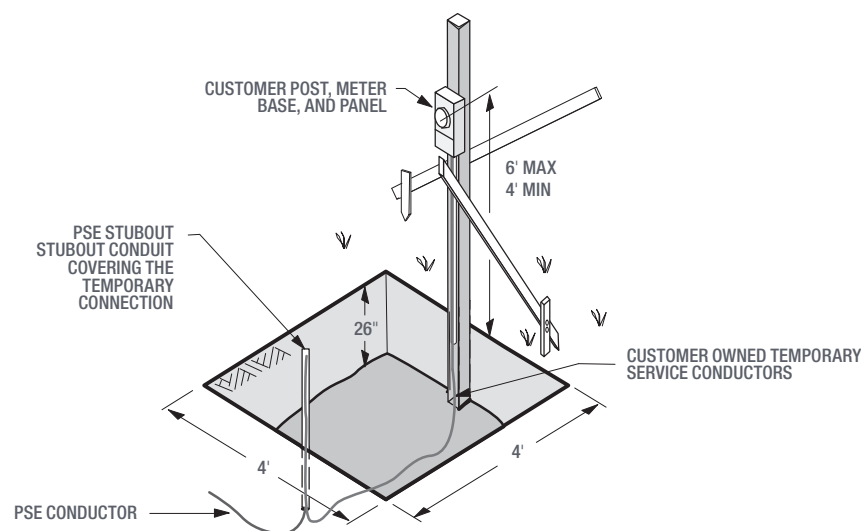
If the connection point to PSE facilities is a handhole, pedestal, or transformer; trench up to the nearest side and leave your wires exposed. If you discover any other conductors while digging your trench, please leave them covered. If further trenching is required, our personnel will complete it.

Remember to order underground utility locate service by contacting the 811 "Call Before You Dig" hotline minimum two business days before digging.

**NOTE:** Any trenching within 24 inches of existing underground facilities must be done by hand.

**Figure 34**

Trenching requirements for power stubout



**NOTE:** 4' x 4' work pit required to allow working room for the tools necessary to connect temporary service

## Underground temporary service installation process

The following items must be completed before energizing your underground temp service:

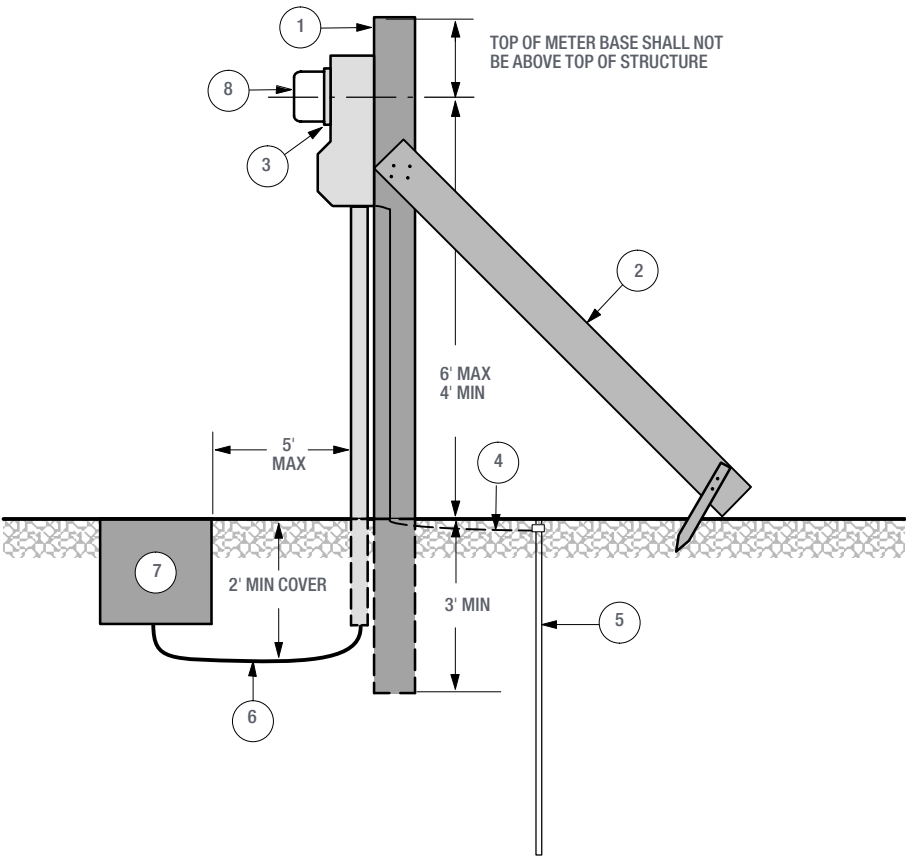
1. Contact a CCS Representative at **1-888-321-7779**, and request your temp underground service.
2. Obtain an electrical work permit from the inspecting agency.
3. Order underground utility locate service by contacting the 811 “Call Before You Dig” hotline two business days before digging.
4. Install your meter pedestal and meter base/socket in the appropriate location (see Figures 33 and 34).
5. Provide the appropriately sized conductor from your meter socket to PSE’s connection point. Please leave 5 feet of extra cable at the stubout or handhole, and 10 extra feet at a transformer. Consult the NEC for the appropriate cable sizes.
6. Obtain and pass an electrical inspection.
7. Trench up to and expose the PSE connection point at the stubout, handhole, or transformer.
8. If trenching is provided, cover your cable except in the work pit where our personnel will be splicing your cable to ours.
9. After the above items are complete, call CCS at **1-888-321-7779** and inform a CCS Representative that your installation has been inspected and that you are ready for your temp service.

This installation shows a safe temp service. Do not deviate from the installation standards without approval from your CCS Representative. Doing so may extend the time frame for your service hookup.

If service needs to be connected in right-of-way (ROW), a permit will be required. This can take several weeks.



Figure 35 Temporary underground service installation



Items owned and installed by customer	
1	4" x 4" x 10' continuous single structure
2	2" x 4" bracing (post should be braced from two directions)
3	Meter socket and distribution panel (up to 200 A, 120/240 V)
4	Ground wire, in accordance with NEC/WAC
5	Ground rod, in accordance with NEC/WAC
6	Service entrance conductors in accordance with NEC

Items owned and installed by PSE	
7	Transformer, handhole, pedestal, or stubout
8	Meter

**NOTE:** Trench and backfill from meter base to transformer, handhole, pedestal, or stubout is customer provided.



## Temporary overhead services

Temp overhead service is available anywhere in PSE's service area where the existing electrical system is installed overhead.

The process and cost of obtaining your temp overhead service can vary depending on the location of our existing facilities. The least complicated and cheapest way a temp service can be installed is if a transformer is located on a pole alongside your property. If this is the case, engineering may not be required. All you have to do is install your temp service equipment, have it inspected, and call Customer Construction Services (CCS) at **1-888-321-7779** to order your service. Once the above items are completed, your service will be connected within a few business days.

### Meter location

Your temp meter post should be located on your property and within 70 feet of the PSE pole that will serve you. This limitation ensures that your temp service pole can withstand the weight of the conductor. If a distance greater than 70 feet is required, or if PSE's pole is on the opposite side of the street, please call CCS for approval prior to construction. A taller, stouter post with additional bracing could be required.

### Service line path requirements

In addition to the meter post distance limitation mentioned above, the service line path requirements are:

- The path that the service line will take should not cross property belonging to other individuals.
- If the service line will pass through trees or brush, clear a path to allow our service personnel to run the line and to allow the lines to hang without contacting trees or limbs. Maintaining this clear path is the customer's responsibility.
- The service line path should avoid areas where vehicular traffic will occur, unless your temp service post height is increased to provide adequate clearance (see Figure 36).

### Clearance requirements

The National Electric Code (NEC) and the National Electric Safety Code (NESC) have established minimum clearance requirements to maintain safe heights for electrical conductors over various terrains.

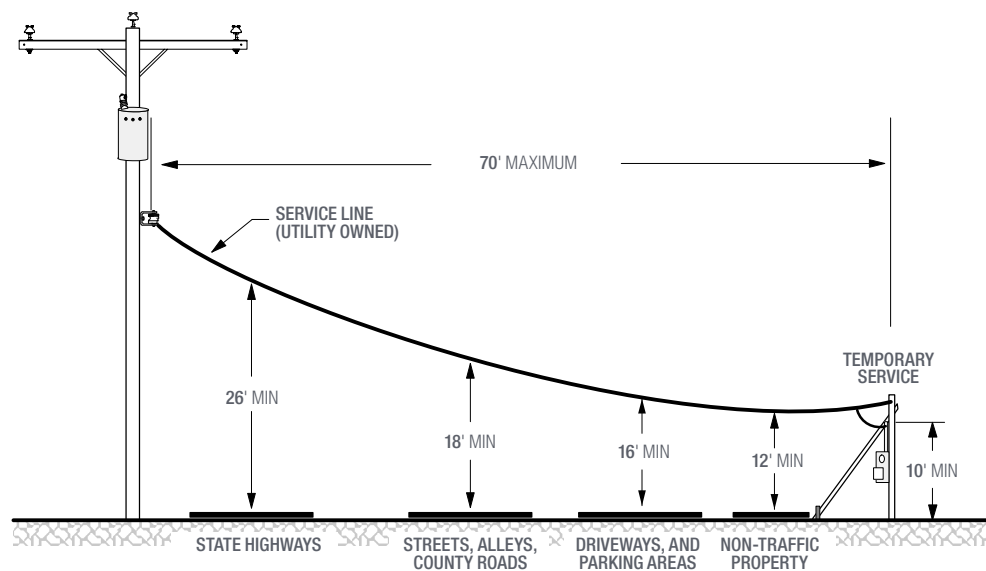
Figure 36 shows the clearance requirements for the types of terrain most commonly encountered.

The NEC and NESC require the lowest point of a service conductor to be at least 12 feet aboveground. The bottom of the drip loop must be a minimum of 10 feet above the ground.

You are required to provide a point of attachment on your service pole that will allow PSE to install the conductor and maintain the required clearances.

If you need further details, please consult the current issue of the NEC, or contact the state or local electrical inspector for your area.

**Figure 36** Minimum clearance requirements upon installation



### Overhead temporary service installation process

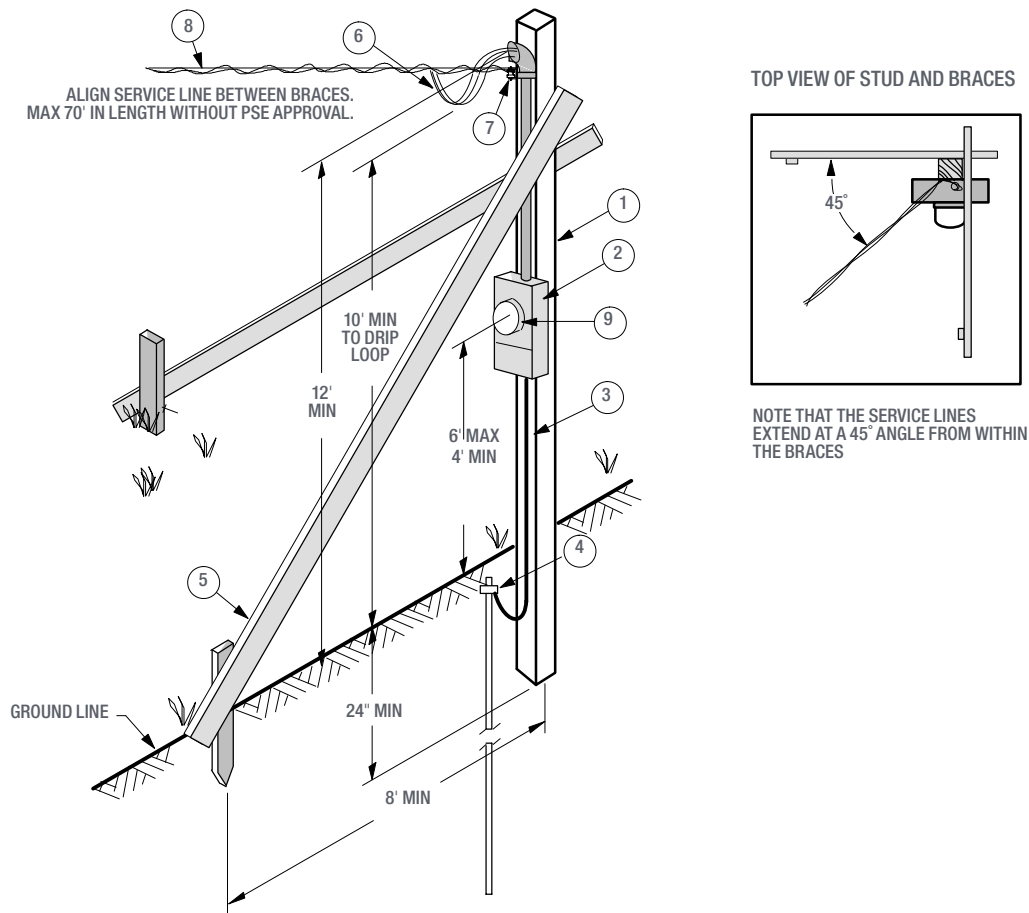
The following items must be completed before we can energize your service:

1. Contact a CCS Representative and request your temporary overhead service.
2. Obtain an electrical work permit from the inspecting agency.
3. Install a meter pole and meter socket. Temporary service equipment on trees is not acceptable.
4. Obtain and pass an electrical inspection.
5. After these items are completed, call CCS and inform a CCS Representative that your installation has been inspected and that you are ready for temp service.

Figure 37 shows a typical temp overhead service installation.

Consult with your CCS representative for non-typical installations.

Figure 37 Temporary overhead service installation



Items owned and installed by customer	
1	4" x 4" x 16' or 2" x 10" x 16' minimum, continuous single structure. No timber
2	Meter socket and distribution panel (up to 200 A, 120/240 V)
3	Ground wire, in accordance with NEC/WAC
4	Ground rod, in accordance with NEC/WAC
5	2" x 4" brace (two required)
6	Service entrance conductors - 18" out of weatherhead minimum
7	Insulated clevis (point of attachment)

Items owned and installed by PSE	
8	Service line
9	Meter

# Glossary

**Clearance** – A set distance between two objects.

**Conduit** – A listed or approved wireway with a smooth interior surface to permit easy drawing-in of the electrical conductors. A conduit may be metallic or nonmetallic, depending on its usage, in accordance with codes and Puget Sound Energy Standards.

**Corrosion Inhibitor** – Electrical joint compound used to retard oxidation of electrical connections.

**Customer Generation** – A generation facility installed by PSE customers that are interconnected and operated in parallel with PSE's electric distribution system through the electric service meter (net meter).

**Demand** – The maximum average kilowatt load used by the customer for a specific period of time during the billing period.

**Direct Burial** – The installation of electrical conductors in a trench, without the use of conduit.

**Disconnect Switch** – A single blade-type, visible and lockable disconnect.

**EUSERC** – Electrical Utility Service Equipment Requirements Committee

**Ground Mount** – A generation installation supported by its own independent structure.

**Guard Post** – A bollard or post designed to protect the meter installation or transformer from vehicular traffic.

**Guying** – Cables or braces used to relieve the strain of overhead conductors on masts and poles.

**High Leg** – (Also wild leg, delta leg) The phase leg that is at higher potential to ground than any other two-phase legs. This leg shall be identified in red.

**High-rise Building** – A structure meeting the definition set forth in the International Building Code.

**Instrument Transformer** – Current and/or potential transformers used in connection with metering equipment to monitor high current loads and/or high voltage potentials.

**Inverter** – An electronic device used to change dc current into ac current.

**Keybox or Keycards** – Permanently installed, locked box with keys enclosed, or a keycard screening monitor mounted on the outside of a building, for accessing the customer's premises to read, install, service, or remove Puget Sound Energy meters and/or electrical equipment during reasonable working hours.

**Manual Block Bypass (Circuit-Closing Block)** – A provision for paralleling the meter circuit, allowing the meter to be removed without interrupting service to the customer.

**Meter Jaw** – A spring-loaded receptacle installed inside a meter socket, interfacing the terminals of the meter to the source and load conductors of the service.

**Meter Loop** – Any provision in which an electrical meter may be installed. Does not include the service disconnect device.

**Meter Pole** – A pole which supports the metering equipment owned and maintained by the customer.

**Meter Base/Socket** – The mounting device consisting of meter jaws, connectors, and enclosure for accommodating socket-type meters. The mounting device may be either a single socket or a trough to accommodate more than one mounting unit.

**Multifamily Building** – A single structure comprised of two or more independent dwelling units having permanent provisions for living, sleeping, cooking, and sanitation.

**Municipal or State Inspector** – The qualified representative of a city or the Washington State Department of Labor and Industries, who has been authorized by governmental agencies to inspect electrical service installations on their behalf.

**NEC** – National Electrical Code

**Net Meter** – A PSE meter through which the customer generation is interconnected to the PSE electric distribution system. Net meters measure both energy delivered from PSE to the customer and energy returned to PSE from the customer.

**Nonresidential Buildings** – All structures that are not residential buildings or multifamily buildings, or where portions of such a building are intended for commercial, retail, or general public activities.

**Point of Attachment** – The point at which Puget Sound Energy's service conductors are attached to the customer's premises by an approved insulated clevis.

**Point of Delivery** – The location on the customer's premises where Puget Sound Energy's circuit and the customer's system are interconnected.

**Primary Voltage** – The higher voltage, before transformation, used to distribute electrical energy through neighborhoods and local areas. Normally in excess of 600 V.

**RCW** – Revised Code of Washington

**Safety Socket** – A three-phase self-contained meter base socket with provisions to de-energize the meter base without disconnecting the load.

**Seal** – The locking device used to secure meter and/or service entrance equipment to ensure safety and security for the unit.

**Secondary Voltage** – The lower voltage, after transformation, used to supply the customer with electrical energy. Normally less than 600 V.

**Self-Contained** – In reference to meter sockets: a device designed and rated to continuously carry the entire capacity of the service entrance equipment through the meter.

**Service Entrance Conductors** – Those conductors which extend between the customer's load center and point of delivery.

**Service Entrance Equipment** – Service conduit, conductors, weatherhead, meter base, enclosures, service disconnect, and load center.

**Service Mast** – The conduit above the meter used to provide mechanical protection for the service conductors and to support the service drop from PSE's system.

**Supply Side Tap** – A connection that is made on the line or utility side of the main service disconnect breaker.

**Temporary Service** – An electrical service installed by Puget Sound Energy to provide power to a customer on a temporary basis (12 months or less).

**WAC** – Washington Administrative Code

## **Plat Site Preparation Checklist for Estimated Costs, Job Site and Trench Requirements**

To assist our customers, the most common causes of delays are listed below. For a comprehensive list of our construction requirements please go to [PSE.com/CustomerConstruction](http://PSE.com/CustomerConstruction). All of the following must be completed before the construction crew can begin work.

*Your Project Manager will visit the site for the initial inspection for readiness a minimum of **2 work days prior to the scheduled date of construction**. If the site does not meet PSE's requirements at the time of inspection, and the necessary corrections are not minimal enough to be corrected right away (the day before our crews are to arrive), the job will be removed from the schedule and a new schedule date will be established. This could mean a substantial delay, depending upon crew availability*

### **Estimated Costs:**

Standard small-lot plat (1 acre or smaller per lot) costs are based on centerline footage within the plat. You can estimate the centerline footage costs using the following figures:

- \$65.00 per centerline foot
- Transformation fee of \$600.00 per lot, based on a 200 amp panel
- Margin allowance (refund) of \$2,136.21 per lot
- *The cost to extend facilities to the plat entrance is based on actual materials used and will not include any labor fees.*
- *Relocation of poles will incur an additional cost that will vary depending upon the age of the pole and the type of existing overhead facilities that are installed (estimated at +/- \$6,000 per pole).*
- *Multi-Family or Mixed-Use costs are based on actual materials used. Therefore, up-front estimates may not be available.*
- *Conversions of existing PSE facilities to underground are subject to separate rules for costs. Please see Puget Sound Energy rates & tariffs - Electric tariff G, Schedule 73*

### **Owners Responsibilities:**

- ☐ It is the owner/developer's responsibility to coordinate all pre-construction meetings with the other utilities, developer contractors, and any local jurisdictions.
- ☐ Once a final design has been approved, it is also the owner's responsibility to distribute the design to the other utilities and developer contractors.

### **Plat Job Site Requirements:**

- ☐ Curbs and gutters shall be installed if they are planned or required by the permitting agency.
- ☐ Roads shall be paved or have a compacted, crushed rock base in place.
- ☐ The trench shall be excavated per PSE's standards and work sketch.
- ☐ The trench shall be smooth, level, and free from rocks, obstructions, sharp objects, garbage, glass, and construction debris.
- ☐ Excavated or loose material shall be placed at least 2 feet from the field edge of the trench.
- ☐ Vault pads must be level and to grade with 6" of crushed rock base, up to the back of easement.
- ☐ Water in trench shall be removed by pumping or draining.
- ☐ The site shall be at final grade or acceptable sub-grade in the area of construction.
- ☐ PSE's heavy vehicles must have access to the site, trench line, and vault locations.
- ☐ The property line(s) nearest to the work shall be surveyed and staked. If the trenching operation might disturb the stakes, then either 10-foot or 20-foot offset stakes shall be installed.
- ☐ Finish grade stakes shall be installed at 10- or 20-foot offsets from vaults, transformers, and the ends of road crossings.
- ☐ A radius hub shall be installed for property lines at all intersections and cul-de-sacs.
- ☐ Transformers must be a minimum of 10' from any combustible wall, and a minimum of 5' from drivable surfaces.
- ☐ **100% of trench must be open and sanded to PSE standards. This must be done a minimum of 24 hours prior to the crew's scheduled arrival date for small plats (less than 10 lots) and 48 hours prior for larger plats.**
- ☐ **All site inspections should be held a minimum of 48 hrs. prior to the construction start date. This will allow extra time to correct any problems that need to be addressed to avoid delaying the job.**

*For detailed construction requirements go to [PSE.com/CustomerConstruction](http://PSE.com/CustomerConstruction)*





## Electric Site Preparation Checklist for Commercial/Industrial & Multifamily Projects

To assist our customers, the most common causes of delays are listed below. For a comprehensive list of our construction requirements please go to [PSE.com/CustomerConstruction](http://PSE.com/CustomerConstruction). All of the following must be completed before the construction crew can begin work.

*Your Project Manager or PSE representative will visit the site an initial readiness inspection a minimum of five work days prior to the scheduled date of construction. Should the site not be 100% construction ready upon initial inspection, you'll have the rest of the day to correct any issues prior to re-inspection the following day. Upon re-inspection, should the site not be 100% ready, the job maybe pulled from the schedule. Once the corrections have been made, please notify your Project Manager. Once the site is deemed ready for construction the job will be rescheduled to the next available date. For additional information on how to ensure your site is ready, please refer to the provided Commercial Service Handbook and appropriate service requirement forms (form 3061 for joint trench and form 6080 for electric only trench).*

### Trenching, conduit, and backfilling requirements:

*\*See chapter 2 in Electric Service Handbook for more details on underground primary and service installation requirements*

- ☐ For commercial construction jobs, the primary conductor and conduit is provided and installed by PSE.
- ☐ All trench excavation and backfill related to installing your underground electric cable is your responsibility and must meet PSE design and jurisdictional permitting requirements.
- ☐ Prior to backfilling a joint trench, it must to be inspected for proper horizontal and vertical clearances from other utilities.
- ☐ If trenching to a utility pole, the face of the utility pole must be exposed from grade level to the bottom of the work pit.
- ☐ Responsibilities when installing customer conduit at vaults:
  - Contact PSE for approval of entry location and procedures required prior to extending the conduit or conduit bends into existing service vaults.
  - Service conduits may only enter through "mousehole" openings or knockouts and must be grouted around.
  - Seal service entry conduit at PSE's vault to prevent water from entering into your service panel.
- ☐ Responsibilities when wiring to energized PSE transformers:
  - Contact PSE for approval of entry location and procedures required prior to installing service cable into existing transformer vaults.
- ☐ When PSE's utility pole is within a government jurisdiction's right-of-way, PSE will install a secondary handhole on your property to provide a point of service.
- ☐ When PSE's utility pole is on private property, a commercial customer can attach, own and maintain up to two service conduit risers on the utility pole. Three or more risers require an underground secondary handhole.
- ☐ If no other risers exist on the pole, the customer is to attach the first 10 feet of the conduit riser (see Chapter 2, figure 6). All installation work performed on the pole above 10 feet from grade must be done by a PSE utility crew.

### Common causes that could delay your installation:

- ☐ Meter panel is located in a fenced or walled-in area (e.g. patios, decks, porches, breezeways, backyards, and carports).
- ☐ Center of meter panel isn't between 4 and 6 feet above finished grade (5 feet is preferred).
- ☐ Meter location doesn't meet PSE requirements.
- ☐ Labor & Industries permit documentation and approved/signed sticker isn't visible and/or posted on meter base.
- ☐ Job site doesn't have drivable access (paved or rockered drive path per PSE specifications) and has objects on-site that obstruct access.
- ☐ Trench and/or work pit(s) aren't ready (e.g. - water, construction debris, and/or sloughed spoils haven't been removed).
- ☐ Site isn't at final grade or acceptable subgrade in the area of construction.
- ☐ Front property line and lot corners aren't surveyed and staked.
- ☐ Change in the size or number of service conductors.

### Permanent Overhead Service Requirements:

*\*See chapter 3 in Electric Service Handbook for more details on overhead service installation requirements*

*For detailed construction requirements go to [PSE.com/CustomerConstruction](http://PSE.com/CustomerConstruction)*





