

Customer Requirements Commercial Secondary Service

C-SV-3200

Application

Installation requirements for commercial services from Tacoma Power overhead or underground facilities. It applies to new construction or upgrades of older services. Electrical service may be provided in the following three methods:

- I. **Overhead Service**
- II. **Underground Service from Padmount Transformer**
- III. **Underground Service from Polemount Transformer (UGP)**

In This Standard

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Terms

Term	Definition
Construction Inspector	Representative from Tacoma Power T&D Construction Staff. A pre-construction meeting with the Construction Inspector must happen prior to any construction. Call 253-381-3023.
Electrical Inspector	Tacoma Power electrical inspection staff that inspect for compliance to the Tacoma Power standards, Tacoma Electrical Code, NEC, WAC and Electric Service Handbook requirements.
Electrical Secondary	Conduit and cables (less than 600 volts) that connect from the transformer to the SSB . Utility owned.
Electrical Service	Conduit and cables from the transformer to the service entrance or from the SSB to the service entrance. Customer owned.
New Services Engineer	Tacoma Power engineering staff that provide design, cost estimates, and coordination of the commercial secondary service project.
Secondary Service Box (SSB)	A plastic or concrete vault designed to contain the point of connection for the electrical service, which connects the electrical secondary cables to the electrical service cables.

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Responsibilities and Inspections

Construction Area	Responsibility	Inspection by
Location of SSB	The <i>New Services Engineer</i> will work with the <i>customer's electrical contractor</i> to determine the location of the SSB on the customer's property.	Construction Inspector
Installation of SSB	The <i>customer's electrical contractor</i> will install the SSB per this standard under the direction of the <i>New Services Engineer</i> .	Construction Inspector
Work in Road Right-of-Way	The <i>customer's electrical contractor</i> will be responsible for installing conduit in the road right-of-way per the requirements of the permitting agency. Permits to cut and restore the road and any other work in the road right-of-way must be obtained before work in the right-of-way can begin. A copy of the approved permit must be on site while the roadwork is being done.	Construction Inspector
Installation of Electrical Secondary Conduit and Pole Conduit Riser	The <i>customer's electrical contractor</i> will install conduit from the SSB to the pole and a portion of the conduit riser on the pole according to Customer Requirements Standard C-UG-1200, "Pole Conduit Riser".	Construction Inspector
Completion of the Pole Conduit Riser	Tacoma Power T&D Construction Staff	Not needed
Electrical Secondary Cables & Connections	Tacoma Power T&D Construction Staff will: <ul style="list-style-type: none"> • install the electrical secondary cables from the pole to the SSB or from the padmount transformer to the SSB. • make all connections at the SSB, at the pole and/or at the padmount transformer. 	Not needed
Electrical Service	The <i>customer's electrical contractor</i> will install the electrical service.	Electrical Inspector

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I – Overhead Service

An overhead service drop may be provided for services of up to 400A (the **New Services Engineer** will determine if a 600A service can be furnished) provided that it meets all criteria of the overhead service drop. Contact **New Services Engineer** for information.

II – Underground Service from Padmount Transformer

Underground service from a padmount transformer requires the installation of a primary underground system.

- Contact **New Services Engineer**.
- Pre-construction meeting with the **Construction Inspector** must happen prior to any construction.
- If the **New Services Engineer** determines an SSB is to be installed, see section “Selection of SSB” with Table 1 and Table 2 to help determine the size of SSB necessary per the size of electrical service.

III – Underground Service from Polemount Transformer (UGP)

In areas with an existing overhead electrical system, an underground service from a polemount transformer (UGP) may be provided for services in accordance with the limitations in the table below.

- Contact **New Services Engineer**
- Pre-construction meeting with the **Construction Inspector** must happen prior to any construction.

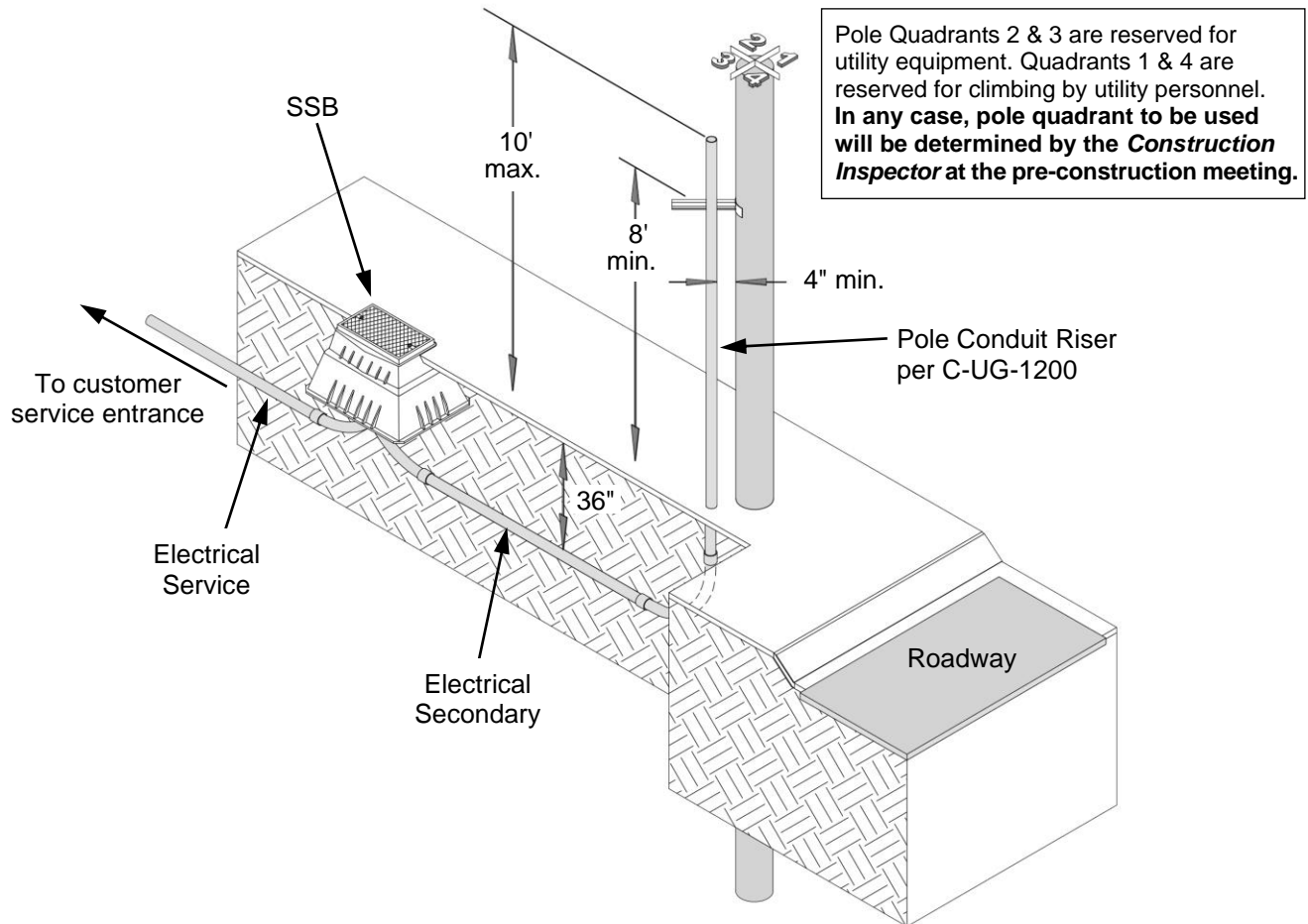
Limitations

UGP's have the following limitations:

Issue	Requirements
Maximum Service Panel Size	<ul style="list-style-type: none"> • Single Phase: 400A • Three Phase: Contact New Services Engineer
Maximum Cable Size	See section “Selection of SSB” with Table 1 and Table 2, unless approved by New Services Engineer
Minimum Wire Size	#10 AWG
Maximum Distance from Pole to SSB	200 feet
Maximum Number of Conduit Bends from Pole to SSB	270° (degrees) of bends / elbows, including the 90° pole conduit riser elbow on the pole and the 90° conduit elbow into a bottomless plastic SSB (if applicable)

Underground Service from Polemount Transformer (UGP) (continued)

Figure 1 Typical Installation of UGP



Selection of Conduit From Pole to SSB

The size and number of conduits required for the electrical secondary are listed below:

Single Phase Service		Three Phase Service
Size of Service Panel	Conduit (Quantity and Size)	Contact <i>New Services Engineer</i>
up to 200A	1 – 2.5" [1]	
300A to 400A	1 – 4" [1]	

[1] Typical installation, but needs to be confirmed with New Services Engineer

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Underground Service from Polemount Transformer (UGP) *(continued)*

Selection of SSB

The following tables will provide guidelines on how to select the type and size of SSB. In any case, the **customer's electrical contractor** shall coordinate with the **New Services Engineer** on the type and size of the SSB to be used on the project.

- Bottomless plastic enclosure SSBs **shall not be** located in driveways, areas subject to vehicular loading, or in the public right-of-way.
- All precast concrete SSBs can be located in areas not subject to any vehicular loading, off-street or incidental traffic areas, or in the public right-of-way.
- All precast concrete SSBs shall have a **non-skid** type cover (see standard C-UG-2000, Customer Requirements, Precast Concrete Vaults Approved Vendors).
- **All conduit quantities in Tables 1 and 2 are the sum total of electrical service and electrical secondary cables from customer and Tacoma Power respectively.**

Table 1 – SSB Selection for Bottomless Plastic Enclosures (No Vehicular Loading)

Tacoma Power Description	Total Conduit (Quantity and Size)	Cables (Max. Size)	Manufacturer and Model #	Dimensions
SSB (Small)	2 – 2.5" only	250 kcmil	PenCell # PE20GS500 PenCell # PE20PL517BK3	24" x 30" Bottom, 14.5" x 22.5" Top, 15" Deep
SSB (Large)	6 – 2.5" max or 4 – 4" max	350 kcmil	PenCell # PE30GSI01 PenCell # PE30PL505BK3	25.5" x 38.5" Bottom, 20" x 33" Top, 16" Deep

Table 2 – SSB Selection for Precast Concrete Vaults (Off-Street, Incidental Traffic)

Tacoma Power Description	Total Conduit (Quantity and Size)	Cables (Maximum Size)	Manufacturer and Model #	Dimensions
233 Vault	6 – 2.5" max or 4 – 4" max	350 kcmil	See C-UG-2000 "Customer Requirements, Precast Concrete Vaults Approved Vendors" for <u>Manufacturer and Model #</u> and A-UG-1150 "Precast Concrete Vaults" for <u>Dimensions</u>	
444 Vault	6 – 4" max	500 kcmil		
554 Vault	8 – 4" max	500 kcmil		
774 Vault	8 conduit max	750 kcmil		
If electrical service size exceeds 8 runs of 750 kcmil, New Services Engineer will determine quantity and size of SSBs or the use of a secondary service cabinet (see standard A-UG-1600, Secondary Service Cabinet)				

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Underground Service from Polemount Transformer (UGP) *(continued)*

Installation of SSB (Bottomless Plastic Enclosure)	Step	Procedure
	1	Call Construction Inspector for pre-construction meeting prior to any construction.
	2	<p>Establish location and final grade for the SSB and install SSB.</p> <ul style="list-style-type: none"> • Select size of SSB per Table 1. <ul style="list-style-type: none"> ○ SSB covers shall have “Tacoma Power” embossed on them for identification purposes. • Bottomless SSBs shall not be located in driveways, areas subject to vehicular loading, or in the public right-of-way. • SSBs shall not be placed in a depression or in low areas that would tend to fill with water or silt. • SSBs shall not be placed in front of any padmount transformer. • Ensure there are no rocks between SSB base and cover to avoid damage to the cover. • The top of the SSB cover shall be: <ul style="list-style-type: none"> ○ 2 inches above final grade in landscaped areas. ○ flush with final grade in paved areas.
	3	Establish location of and install pole conduit riser per standard C-UG-1200 “Customer Requirements, Pole Conduit Riser”.
	4	<p>Dig trench from the SSB to the service entrance and to the pole.</p> <ul style="list-style-type: none"> • Dig service and secondary trenches to the same side of the SSB, property side of SSB preferred. • On private property, the trench shall be deep enough to maintain a minimum of 24 inches of cover over the conduit. • In road right-of-way, the trench shall be deep enough to maintain a minimum of 36 inches of cover over the conduit. • Permits from local governmental agency must be obtained before any work in the road right-of-way can begin and a copy of the approved permit on site while the road work is being done. • The trench must be deep enough at the SSB so the conduit elbow(s) can be terminated <u>vertically</u> within the SSB. • The trench should be dug as straight as possible and the trench bed leveled and free of rocks larger than 2 inches diameter. <p>Note: Permanent structures are never to be constructed or moved on top of buried Tacoma Power conduit or cable.</p>
	5	<p>Install conduit from SSB to the service entrance and to the pole.</p> <ul style="list-style-type: none"> • From pole to SSB, conduit shall be 2.5” or 4” Sch. 40 gray PVC with factory elbows/bends only. • Excavate beneath the SSB and insert the 90° conduit elbows. • All conduit must be at the same end of the SSB and grouped closely together (property side of the SSB preferred). • Conduit ends shall extend vertically 2 inches above the bottom of the SSB. • Identify conduit ends with customer building address. • Place (Do Not Glue) bell ends on the conduit ends inside SSB.

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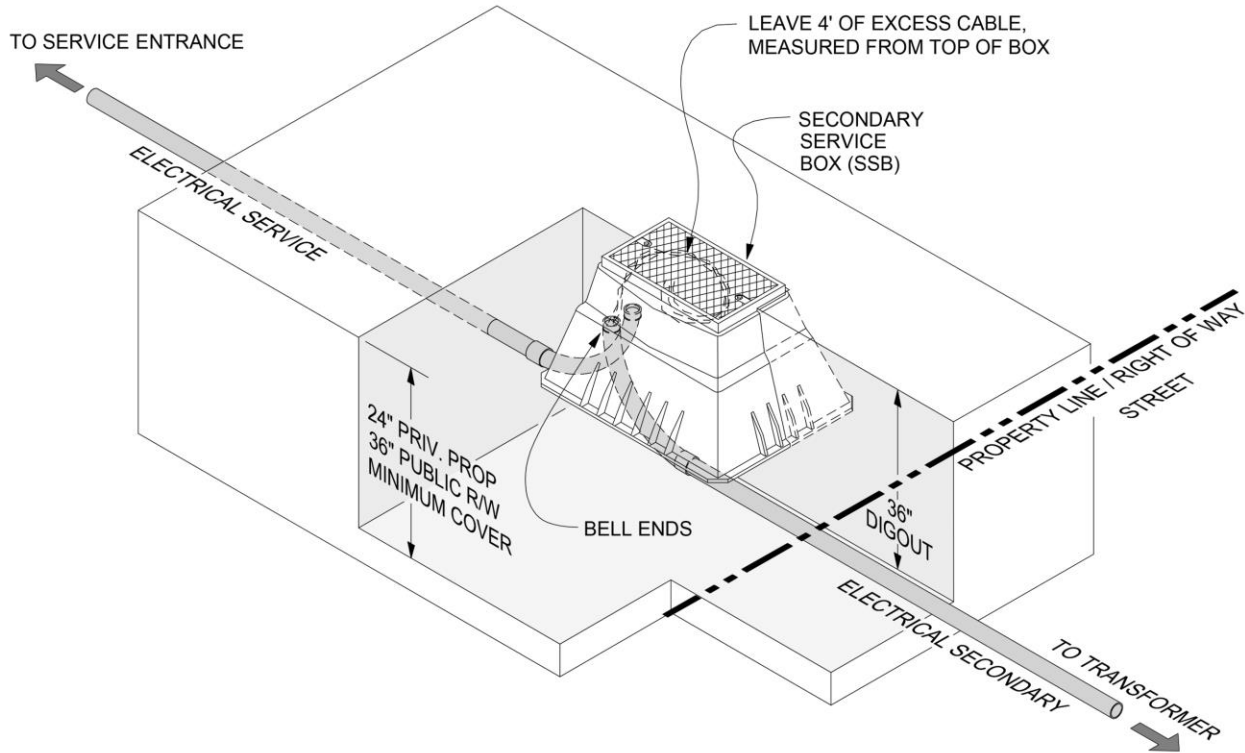
Underground Service from Polemount Transformer (UGP) (continued)

Installation of SSB (Bottomless Plastic Enclosure) (continued)

6	<p>Inspections for conduit (BEFORE Backfill) are as follows:</p> <ul style="list-style-type: none"> From the service entrance to the SSB – inspection and approval by the Electrical Inspector. From the pole to the SSB, including the SSB – inspection and approval by the Construction Inspector.
7	<p>Backfill the trench and proof the conduits:</p> <ul style="list-style-type: none"> Per the requirements of any permits and site requirements of Tacoma Power and others. Use available clean material. Pieces of scrap cable and other construction items must not be buried in the trench. Large rocks must be removed and if native soil is rock, sand bedding may be required. Tamp the soil, leaving a slight mound to allow for settling. After <u>final grade is established</u>, the customer/contractor will be required to prove electrical secondary conduit integrity using a Tacoma Power approved mandrel and with the Construction Inspector present. After swabbing the electrical secondary conduits clean and proving that the conduits are free from debris and obstructions, the customer/contractor shall leave a silicone-coated nylon pull tape, or Tacoma Power approved equivalent, marked in feet and secured at both ends of each conduit.
8	<p>Pull in electrical service cables from the service entrance to the SSB.</p> <ul style="list-style-type: none"> Leave 4 feet minimum of cable, measured from the top of the SSB, inside the SSB. Seal electrical service conduits at SSB with a product approved for the purpose of preventing water entrance into the conduits. Ensure any parallel cables have matching phase tapes. Identify cables with customer building address.
9	<p>Ensure the following has been done:</p> <ul style="list-style-type: none"> All applicable fees are paid. All right-of-way and easement issues are resolved (if any). All inspections have been passed.
10	<p>Tacoma Power T&D Construction Staff will:</p> <ul style="list-style-type: none"> Complete the pole conduit riser. Pull in electrical secondary cables from the pole to the SSB. Energize the service.

Underground Service from Polemount Transformer (UGP) (continued)

Figure 2 Typical Installation of SSB (Bottomless Plastic Enclosure)



Installation of SSB (Precast Concrete Vault)

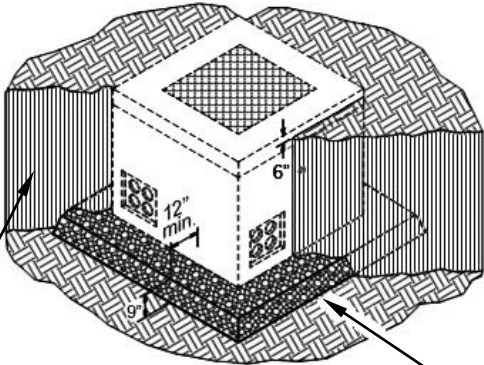
Step	Procedure
1	Call Construction Inspector for pre-construction meeting prior to any construction.
2	<p>Establish location and final grade for the SSB and install the SSB.</p> <ul style="list-style-type: none"> Select size of SSB per Table 2. <ul style="list-style-type: none"> SSB covers shall have "Tacoma Power" embossed on them for identification purposes. Concrete SSBs are to be located in areas rated for off-street/incidental (unintentional) traffic locations only. SSBs shall not be placed in a depression or in low areas that would tend to fill with water or silt. SSBs shall not be placed in front of any padmount transformer. The top of the SSB cover shall be: <ul style="list-style-type: none"> 6 inches above final grade in landscaped areas. flush with final grade in paved areas.

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Underground Service from Polemount Transformer (UGP) *(continued)*

Installation of SSB (Precast Concrete Vault)
(continued)

3	<p>Establish location of and install pole conduit riser per standard C-UG-1200 "Customer Requirements, Pole Conduit Riser".</p>
4	<p>Dig trench from the SSB to the service entrance and to the pole.</p> <ul style="list-style-type: none"> • On private property, the trench shall be deep enough to maintain a minimum of 24 inches of cover over the conduit. • In road right-of-way, the trench shall be deep enough to maintain a minimum of 36 inches of cover over the conduit. • Permits from local governmental agency must be obtained before any work in the road right-of-way can begin and a copy of the approved permit on site while the road work is being done. • The trench should be dug as straight as possible and the trench bed leveled and free of rocks larger than 2 inches diameter. <p>Note: Permanent structures are never to be constructed or moved on top of buried Tacoma Power conduit or cable.</p>
5	<p>Install conduit from SSB to the service entrance and to the pole (see Figure 3).</p> <ul style="list-style-type: none"> • From pole to SSB, conduit shall be 2.5" or 4" Sch. 40 gray PVC with factory bends/elbows only. • Install conduit 4 inches minimum into the SSB perpendicular to the vault wall. • Identify conduit ends with customer building address. • Place (Do Not Glue) bell ends on the conduit ends inside SSB • Grout around knockouts.
6	<p>Inspections for conduit (BEFORE Backfill) are as follows:</p> <ul style="list-style-type: none"> • From the service entrance to the SSB – inspection and approval by the Electrical Inspector. • From the pole to the SSB, including the SSB – inspection and approval by the Construction Inspector.
7	<p>Backfill the SSB excavation as shown below:</p> <div style="text-align: center;">  </div> <p>Clean fill as directed by the Construction Inspector</p> <p>Vault base 9" min. of 5/8" minus crushed rock well compacted and extending 12" min. beyond the edge of the vault in all directions.</p>

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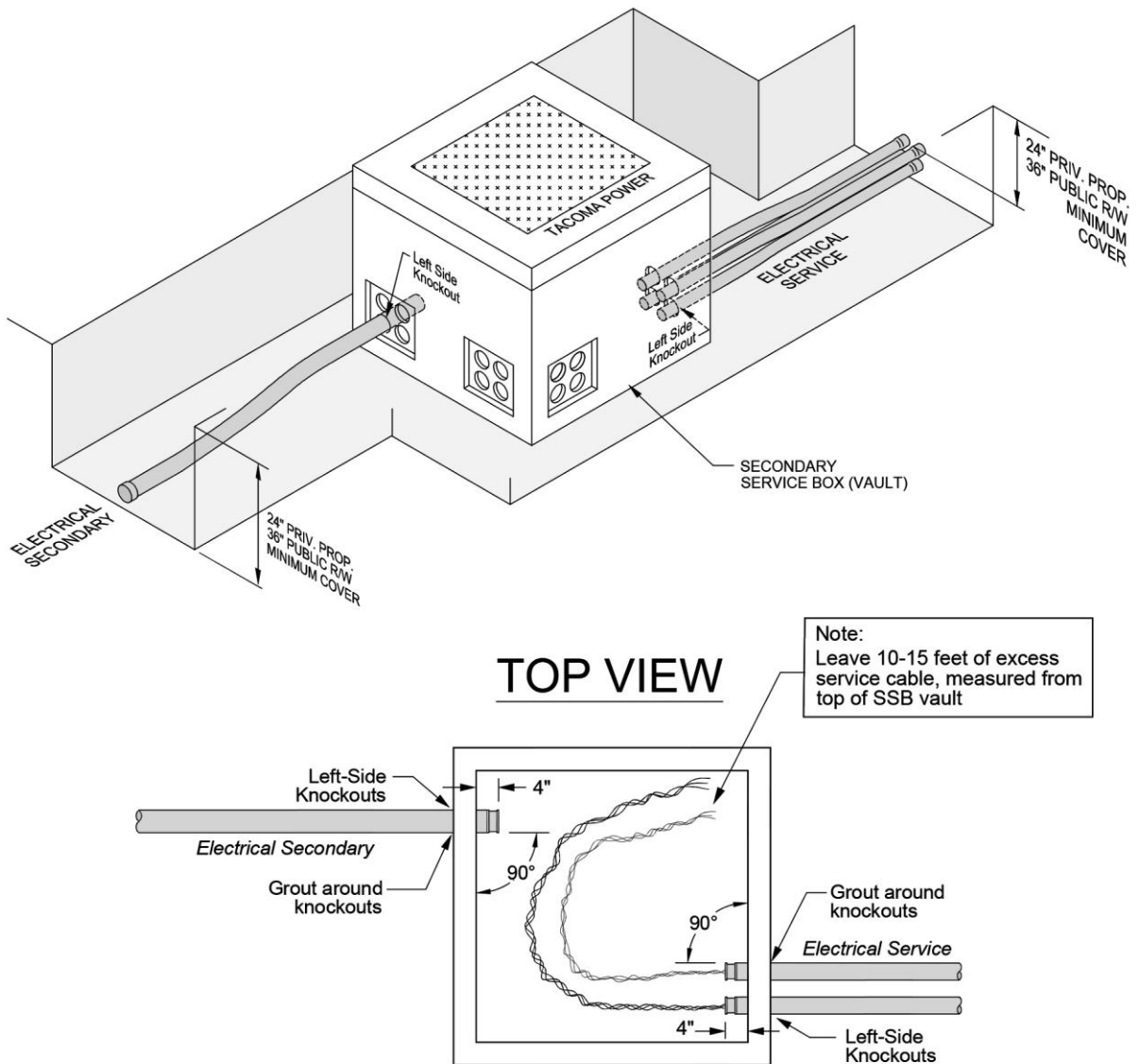
**Installation of
SSB (Precast
Concrete Vault)**
(continued)

8	<p>Backfill the trench and proof the conduits.</p> <ul style="list-style-type: none"> • Per the requirements of any permits and site requirements of Tacoma Power and others. • Use available clean material. • Pieces of scrap cable and other construction items must not be buried in the trench. • Large rocks must be removed and if native soil is rock, sand bedding may be required. • Tamp the soil, leaving a slight mound to allow for settling. • After <u>final grade is established</u>, the customer/contractor will be required to prove electrical secondary conduit integrity using a Tacoma Power approved mandrel and with the Construction Inspector present. • After swabbing the electrical secondary conduits clean and proving that the conduits are free from debris and obstructions, the customer/contractor shall leave a silicone-coated nylon pull tape, or Tacoma Power approved equivalent, marked in feet and secured at both ends of each conduit.
9	<p>Pull in electrical service cables from the SSB to the service entrance.</p> <ul style="list-style-type: none"> • Leave the following minimum length of each service cable, measured from the top of the SSB, inside the SSB: <ul style="list-style-type: none"> ○ 233 or 554 vault – 10 feet of cable ○ 774 vault – 15 feet of cable • Seal electrical service conduits at SSB with a product approved for the purpose of preventing water entrance into the conduits. • Ensure any parallel cables have matching phase tapes. • Identify cables with customer building address.
10	<p>Ensure the following has been done:</p> <ul style="list-style-type: none"> • All applicable fees are paid. • All right-of-way and easement issues are resolved (if any). • All inspections have been passed.
12	<p>Tacoma Power T&D Construction Staff will:</p> <ul style="list-style-type: none"> • Complete the pole conduit riser. • Pull in electrical secondary cables from the pole to the vault. • Energize the service.

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Figure 3 Typical Installation of SSB (Precast Concrete Vault)



Conduit Entry

Conduit entering the vault shall consistently enter the **left side** knockouts on all sides. This is for the training of cable in the vault in the same direction. The **Construction Inspector** may approve exceptions on a site-by-site basis only. In any case, **the service conduit entry and the secondary conduit entry shall allow all cables to be trained in the same clockwise or counter-clockwise direction (See Figure 3).**