INSTALLATION DETAILS FOR SERVICE TO POLE-MOUNTED COMMUNICATION EQUIPMENT

<table>
<thead>
<tr>
<th>Asset Type:</th>
<th>Electric Distribution</th>
<th>Function:</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issued by:</td>
<td>Daniel W. Jantz (DWJ7)</td>
<td>Date:</td>
<td>11/01/18</td>
</tr>
</tbody>
</table>

Rev. #11: This document replaces PG&E Document 027911, Rev. #10. For a description of the changes, see Page 14.

Purpose and Scope
This document illustrates the minimum design and construction requirements for providing service, supplied from overhead facilities, to antenna and communication equipment installed above or below supply lines (primary, secondary or service) on PG&E or joint distribution wood poles and wood streetlight poles.

General Information

1. Only service connections and arrangements described and shown in this document are approved design installations. Alternate connections, arrangements, or designs will not be allowed.

2. For the design and construction requirements for antenna and communication equipment installed on PG&E or Municipal owned steel streetlight poles served from an underground service, refer to TD−027911B−003 and TD−027911B−004 listed in the reference documents on page 2.

3. It is the responsibility of the constructor to ensure the antenna installation meets the requirements of PG&E and CPUC General Order 95.

4. Before installation, the location of the equipment and the vertical run are to be mutually agreed upon between representatives of the communication company and PG&E.

5. 3rd party (non-PG&E) owned antenna's are not allowed to be installed above the communication level on poles that have PG&E operable equipment installed and connected to the primary voltage lines.

   Operable equipment includes primary risers, cut outs, switches, as well as other types of equipment not listed here that can be operated.

6. The metering provision contained herein is an exception to the Greenbook requirement and is designed primarily for CATV power supplies and other telecom equipment requiring metering. The metering equipment must be mounted on the same pole as the PG&E service and communication equipment. Remote metering is not allowed. Refer to TD-027911B-002 listed in the reference documents on page 2 for the SmartPole metering options. The potential exists for governmental entities to inquire as to metering for traffic or surveillance cameras, or possibly lighting load if mounted on PG&E or joint poles. In all cases, field representatives shall request the telecommunication company to provide documentation that authorizes them to occupy the space on the pole (e.g., contract permit issued by PG&E or joint owner for tenants).

7. When pole metering is unacceptable because it does not meet the PG&E criteria and requirements, the alternative method is to install approved pad-mounted pedestal metering served from a PG&E underground service. Some examples of unacceptable situations include locations:
   - Where access to the meter is impaired.
   - Where meters may be subject to obvious traffic hazards or unsafe working conditions.
   - Where hillside pole locations render metering unsafe.

8. It is not intended to serve communication equipment loads with voltages other than 120 V and 120/240 V. Other than single-phase, 2-wire, 120 V and 3-wire, 120/240 V are not to be pole-mounted for these applications.

9. Pole steps shall be placed so that runs or risers do not interfere with their free use. Attention is directed to the following requirements of General Order (G.O.) 95.
A. The position of the climbing space shall not be shifted more than 90° around the pole within a vertical distance of less than 8 feet. Refer to Rule 93 of G.O. 95.

B. Vertical runs are not permitted in climbing spaces through conductors in rack construction.

C. Vertical runs of supply lines shall have a clearance of not less than 1-1/2 inches from vertical runs of communication lines.

D. The coaxial cable leads to and from amplifier units shall not be carried under the same protective covering with the 120/240 V supply conductors. The leads should be carried outside the molding in cable rings. The leads are not required to be covered unless they are within a vertical distance of 3 feet above or 6 feet below unprotected supply conductors.

E. The ground wire is required to be covered.

10. Units shall be fused or otherwise protected against short-circuit currents. A fused switch or circuit breaker, approved for service entrances, is required. Communication type fuses and fuse holders are not satisfactory means of disconnecting the power source.

11. Power Supply Units: Power supplies, or any amplifier which has or is connected to a backup power supply, must have a disconnecting device to separate it from PG&E’s system. Power units are to have the communication company’s name and emergency phone number on them.

12. Antennas: Antennas installed on distribution poles must have an ownership label with a contact number, site identification information, and a disconnect switch which will shut off RF transmission. The disconnect switch is to be used in an emergency when the normal practice of arranged power-down cannot be accomplished.

References

"Procedures for Working Around Antennas ............ TIL ................................. TD–2001P–01
SmartPole Meter for Service to Pole-Mounted
Communication Equipment .......................... TIL ................................. TD-027911B-002
Service to Communication Equipment
on PG&E Owned Steel Streetlight Poles
with Antenna Provisions .............................. TIL ................................. TD–027911B–003
PG&E Metering and Service Connections For
Non–PG&E Owned Steel Streetlight Poles With
Antenna and Communication Equipment .......................... TIL ................................. TD–027911B–004
Pole–Top Extension for Wood Poles ................. OH:Framing .......................... 028691
Notification of Abnormal Conditions Caused by
Third–Party Utility ................................. TIL ................................. TD–2014S
Moldings, Conduits, and Attachments for Use on
Wood Poles and Crossarms .......................... OH: Risers/ UG-1: Terminations 021924
Requirements for Customer–Owned Poles ............ OH:Services/Greenbook/EMWP 025055
Compression-Type Connectors for Overhead
Distribution and Transmission ........................ OH: Conductors 041010
Fired Wedge Connectors for Primary and Secondary
Distribution Lines ................................. OH: Conductors ........................ 066194

Design and Construction:

13. The following requirements apply to antennas installed on solely owned, jointly owned, wood distribution poles.

A. Antennas above supply lines: Third party antennas are only allowed above supply lines or at pole top (above supply facilities) under a license agreement and in accordance with the design and construction requirements outlined herein.

B. Antennas below supply and/or communication lines: Third party antennas are allowed in or below the communication space on joint use poles in accordance with the design and construction requirements outlined herein. When the requesting party is a member of the NCJPA and requests attachment to a PG&E solely–owned distribution wood pole, that party is required to submit a joint pole preliminary Form 2 intent. When the requesting party is not a member of the NCJPA, they must obtain a license agreement for pole attachments. Refer requests from non–members to PG&E’s New Revenue Development Department (NRD).
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C. PG&E owned antennas: Antennas associated with PG&E’s SCADA system or the SmartMeter™ project shall be installed in accordance with the applicable engineering documents; 054422 PG&E Overhead SCADA and PDAC Installation, 068190 Antenna and DCU Installation Details for SmartMeter™ Network, 072145. SmartMeter™ Electric SSN Network Nodes on Distribution Infrastructure.

D. Third party antennas are not allowed on streamline poles. PG&E owned antennas are allowed on streamline poles on an exception basis when no other options are available.

14. Design and Construction Requirements for 3rd Party Antennas on Distribution Poles; Above or Below Supply Lines.
   The following requirements apply to antennas installed on joint use poles supporting circuits up to 50 KV and are in accordance with G.O. 95 Rule 94. Antennas and their related crossarms, brackets, hardware, risers, control boxes, etc. shall meet the requirements detailed below.

A. Clearances (Also see illustrations in Figure 6 through Figure 10)
   (1) Antennas and supporting elements (e.g. crossarms, brackets) shall maintain a vertical clearance of 6 feet below Supply Conductors operating at 0 – 50kV.
   (2) Antennas and their support elements (e.g. crossarms, brackets) shall maintain a 2 ft. vertical separation from communication conductors and equipment. Antennas may be installed above or below communication conductors as long as the installation complies with the clearance requirements outlined in items (1) and (3) of this section.
   (3) Antennas, associated equipment (e.g. terminations, enclosures) and their support elements installed above supply lines and/or communication lines of different ownership shall maintain vertical clearances as specified in Rule 38 Table 2, Case 21 Columns A–H. These requirements are summarized below.
      (a) Minimum vertical clearance of antennas and associated support elements from:
         (i) Span wires, guys and messengers – 2 feet
         (ii) Communication conductors – 2 feet
         (iii) 0–750 volt conductors including service drops – 4 feet
         (iv) 750–35,000 volt conductors – 6 feet
      (b) Notes:
         (i) Vertical runs or risers associated with the antenna(s) may terminate 1 foot below the antenna or support element for conditions (a) (i) or (a) (iii) above.
         (ii) Service drops, that serve only the antenna, may terminate 10 inches below the antenna and its support elements.
   (4) Antennas, associated equipment and support elements, installed above supply lines or communication lines, shall maintain radial clearances from unattached supply and communication lines as specified in Rule 38, Table 2 Case 3. These requirements are summarized below.
      (a) Minimum radial clearance of antennas, equipment and associated support elements from:
         (i) Span wires, guys, messengers and communication conductors – 2 feet
         (ii) 0–750 volt conductors including service drops – 4 feet
         (iii) 750–7,500 volt conductors – 4 feet
         (iv) 7,500–20,000 volt conductors – 6 feet
         (v) 20,000 – 150,000 volt conductors – 8 feet
         (vi) Above 150KV see G.O. 95.
   (5) Antennas shall maintain a 2 foot horizontal clearance from centerline of pole when installed between supply and communication lines or below communication lines.
   (6) There is no horizontal clearance from centerline of pole for antennas installed between supply lines or at the top of the pole, but the antenna and support elements must be arranged so that the pole can be safely climbed.
(7) Antennas shall have a vertical clearance above ground as specified in Table 1, Column B Cases 1 to 6a of G.O. 95. This requires antennas that overhang buildings, walkable surfaces, roadways etc. meet the same vertical clearance requirements as communication conductors.

B. Climbing Space must be maintained except for the allowable climbing space obstructions. Reference G.O. 95 Rule 54.7 A (3). Antennas, associated equipment and support elements are not allowed in the climbing space. When antennas are installed above supply lines at the top of the pole, climbing space must be maintained to:

(1) The bottom of the antenna (including associated support elements) if affixed less than 8 inches from the surface of the pole.

(2) The top of the pole or pole top extension if the antennas are affixed more than 8 inches from the surface of the pole or pole top extension. When installing pole top extensions refer to document 028691 Pole−Top Extension for Wood Poles.

Note: Climbing space can be difficult to maintain with antenna installations due to antenna size, number, configuration, and orientation on the pole. In addition, most installations have multiple risers and vertical runs, grounds, equipment and metering enclosures. As always, good communication, up front, is essential to ensure adequate space is available to accommodate the antenna and all the associated equipment.

(3) Pole Steps: Stepping must be in accordance with Rule 91.3. No pole steps are to be installed in the supply space or above supply lines except for any necessary steps associated with a pole top extension bracket.

(4) Risers, grounds and vertical conductor runs on non−metallic structures:

(a) Risers, grounds and vertical runs passing supply lines and/or communication lines and/or their associated equipment shall be suitably covered throughout their length, shall be installed outside the climbing space and shall be constructed and maintained in accordance with Rule 54.6−D 1, 2, 3, and 5 (requirements for vertical runs for supply lines).

(b) The suitable protective covering (see Rule 22.8) for risers, grounds and vertical runs passing supply lines and/or equipment shall extend no less than:

(i) 3 feet above lines energized from 0 – 750 volts
(ii) 6 feet above lines energized from 750 – 35,000 volts
(iii) 9 feet above lines energized from 35,000 – 50,000 volts

(5) Risers, grounds and vertical conductor runs on metallic structures that pass supply lines and/or communication lines and/or equipment shall occur on a single structure and shall be installed outside the climbing space in accordance with Rule 54.6−D4.

(6) Signage: Antennas shall be marked with a sign or signs for each antenna installation. The sign

(a) Name / identification of the antenna operator
(b) A 24−hour contact number of antenna operator for emergency notification or other information
(c) Unique identifier of the antenna installation
(d) Indication that the antennas RF output is in compliance with the FCC General Population (G.P.) uncontrolled exposure limits or, if the antenna exceeds those limits indication of the minimum approach distance. See Utility Procedure TD−2001P−01 Procedures for Working Around Antennas for examples of typical RF signage.

(7) Disconnect switch

(a) Antennas that exceed the FCC’s General Population (G.P) Uncontrolled Limits

(i) Require the antenna owner to provide a disconnect switch that is readily accessible to PG&E. This switch must de−energize all sources of power to the antenna, both AC and any battery backup.

(ii) Require the antenna owner to establish a protocol, agreed to by PG&E, for powering down the antenna site.

(iii) Will be operated by mutual agreement except during emergencies.

Note: Minimum Approach Distances (MADs) must be indicated on the antenna signage.

(b) Antennas that meet the FCC’s General Population (G.P) Uncontrolled Limits
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(i) Do not require a disconnect switch for these low power antennas.
(ii) Require the wireless company to submit documentation indicating the maximum RF output of the antenna meets the FCC requirements for General Population/Uncontrolled RF exposure.

15. Notification of Conditions to Third Party Utility: If an existing antenna installation is found that does not meet the design and construction requirements detailed in 1 thru 7 above, a 3rd party notification (Form -3447) should be created. Typical problems involve antennas, risers or other equipment installed in the climbing space, inadequate clearances or signage, and antennas installed in the Safety Clearance Zone on joint poles. These conditions present a hazard for workers and must be corrected within the timelines described in Utility Standard TD−2014S Notification of Conditions to Third-Party Utility.

Also see the, Design and Construction Checklist for Third Party Antennas, for requirements and typical deficiencies.

16. Design and Construction Requirements for Antennas and Other Equipment on Streetlight Poles

A. Antennas and other equipment on PG&E−owned streetlight poles
   (1) PG&E will not sell ownership interest in a streetlight−only pole. Third party attachments, antennas or other equipment (see note below) may be permitted under a license agreement. Requests from a NCJPA Member to become a joint pole owner (for street light only poles), via Form 2, should be rejected. Refer all requests to PG&E’s NRD Department.
   (2) Licensing for third party antennas, gun shot detectors, government owned cameras, and other equipment will be managed by PG&E’s NRD Department. Consult with NRD and Electric Distribution Standards for the applicable design, construction and other requirements.
   (3) Where applicable, unmetered attachments to streetlights must also meet the requirements outlined in Form 79−1078 − Agreement for unmetered electric service to devices connected to Pacific Gas and Electric Company’s streetlight facilities.
   (4) Antennas are not allowed on poles with decorative, semi−decorative, or “Special facility” streetlights that the customer has chosen from our appliance product mix or outside of the normal product mix. Exceptions may be allowed when the streetlight customer of record states, in writing, that they have no objection to the installation. Refer any requests to PG&E’s New Revenue Development (NRD) Department.

17. Antennas on customer owned streetlight poles.

A. Antenna projects involving customer owned streetlight poles will be managed by PG&E’s. Streetlight Program Manager. Streetlight poles installed under the following rate schedules are not owned by PG&E therefore any requests for attachment should be directed to the pole owner.
   (1) LS−1C, Customer owns pole and foundation
   (2) LS−2A, B, and C
   (3) OL−1

B. Where the requesting party wants to attach to a PG&E owned streetlight mast arm on a customer owned pole, a letter of approval must be acquired by the requesting party from the PG&E customer receiving lighting service.

C. A separate energy connection for the antenna must be made under the governing tariff in absence of any special CPUC approved agreement. The 79−1048 agreement (and Rate Schedule LS−2) allows antennas on city owned streetlight poles to utilize the streetlight photo control receptacle as the energy source where the installation meets the loading limitation and all other requirements of the agreement.
## Installation Details for Service to Pole-Mounted Communication Equipment

### Table 1  Bill of Material to Be Furnished by the Communication Company

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Conduit, Rigid, PVC, Schedule 80 ¹ (size as required)</td>
</tr>
<tr>
<td>2</td>
<td>Pipe Straps, Galvanized</td>
</tr>
<tr>
<td>3</td>
<td>Conduit Fittings (as required)</td>
</tr>
<tr>
<td>4</td>
<td>Wire, 600 V, Size as Required</td>
</tr>
<tr>
<td>5</td>
<td>Service Weather Head, PVC</td>
</tr>
<tr>
<td>6</td>
<td>Meter Panel or SmartPole Meter Enclosure (TD−027911B−002), as required</td>
</tr>
<tr>
<td>7</td>
<td>Steps, Pole (if pole is unstepped)</td>
</tr>
</tbody>
</table>

¹ Use Schedule 80 for 1-1/2” or smaller, or Schedule 40 for 2”.

### Table 2  Bill of Material to Be Furnished and Installed by PG&E

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
<th>Document</th>
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<tbody>
<tr>
<td>8</td>
<td>Connector, Compression or Wedge (as required)</td>
<td>–</td>
<td>041010</td>
</tr>
<tr>
<td>9</td>
<td>Conduit, Rigid, PVC, 2”</td>
<td>360234</td>
<td>021924</td>
</tr>
<tr>
<td>10</td>
<td>Meter, Watthour (as required)</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
Installation Details for Service to Pole-Mounted Communication Equipment

Note

1. Unmetered load may be 2-wire, 120 V or 3-wire, 120/240 V.

2. If a SmartPole Meter is installed a 2-wire, 120 V service is required. See TD–027911B–002 SmartPole Meter for Service to Pole–Mounted Communication Equipment.

Figure 1
Unmetered Service Connection to Communication Equipment

Figure 2
Installation With Aerial Cable Secondary

Figure 3
Installation With Extended Rack Secondary

Figure 4
Installation With Crossarm Secondary
Notes

1. For poles close to curbs avoid exposure to equipment and personnel. It is best to place the meter on a side of the pole away from traffic. If this cannot be done, the following conditions must be met:

   A. The meter must be no closer than 4 feet to a curb to provide safe access and reading.
   B. If the meter panel extends to the side past the pole, it cannot be closer than 1 foot to a curb.

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**Figure 5**

Pole-Metered Service Connection to Communication Equipment
Notes

For poles next to roads that have rolled curbs, ramps, or without any curb, avoid exposure to equipment and personnel by placing the meter panel on the back of the pole in the 12 O’clock position. If this cannot be done, one of the following conditions must be met:

1. If the pole is 36” or more away from the edge of the road the meter panel can be placed in a quadrant away from the flow of traffic. For example, in the 10:30 position as shown below. The meter panel must not:
   A. Extend out past the parallel plane of the pole to the roadway.
   B. Be closer than 8 feet (96 inches) away from adjacent roads or non–residential driveways.
   C. Be closer than 4 feet (48 inches) away from residential driveways or sidewalk ramps.

2. Use an approved method of protection (i.e., barrier posts) to prevent contact from vehicles. Prior approval from the Authority Having Jurisdiction (City/County/State) and PG&E may be required.

3. Use a different pole.
Notes
1. Consideration should be given on reserving additional space (> 6 Ft.) for proposed or future installation of PG&E wires and equipment.

Centerline of Pole

0 - 50 kV Conductors

2 Ft. Minimum (Rule 94.4E)

Antennas

RF Signage

Communication Equipment

7 Ft. Minimum
8 Ft. Maximum

Figure 6
Antenna – Below Supply Lines

Figure 7
Antenna – Below Communication Lines
Installation Details for Service to Pole-Mounted Communication Equipment

Note: If Antennas are mounted more than 8" from the surface of the pole, climbing space must be maintained to the top of the pole.

Figure 8
Pole Top Antenna – Single Communication Conduit Run
Installation Details for Service to Pole-Mounted Communication Equipment

Note: If Antennas are mounted more than 8" from the surface of the pole, climbing space must be maintained to the top of the pole.

Figure 9
Pole Top Antenna – Multiple Communication Conduits on Standoff Brackets

See Note
Installation Details for Service to Pole-Mounted Communication Equipment

Note
Any equipment or combination of equipment that exceeds 18" in height must be stood off a minimum of 4" from the surface of the pole to facilitate climbing.

Figure 10
Pole Top Antenna – Streetlight Only Poles
Revision Notes
Revision 11 has the following changes:

1. Updated Section “Purpose and Scope” on Page 1.
2. Added new notes 1, 2, 5, and 7.
3. Added and updated “References” on Page 2.
4. Updated Note 15.
5. Updated Detail Section B–B on Page 9.