



Wireless Antenna Installation and Clearance Requirements

04/27/2023

Rev 1

T&D Standard

LC12010-PUB

IMPORTANT: Do not use this document until you verify it is the version with the most recent date.

PURPOSE

Standard LC12010—*Wireless Antenna Installation and Clearance Requirements*—provides information on the typical installation and clearance requirements for wireless antennas and PGE conductors used on a joint-use wood pole.

The Utility Asset Management (UAM) group manages the installation requirements and locations, and contracts with the various wireless communication providers. Future potential antenna site locations are coordinated with the General Line Foreman before installation.

REFERENCES

IEEE National Electrical Safety Code (NESC)

APPLICATION

IMPORTANT: If an emergency repair is required on a pole that has wireless equipment, shut off all power to the radio components, and then bring both the pole and all attached wireless equipment to the appropriate line center. Notify the storeroom and the Network Operations Center of the repair using the emergency contact information located on the wireless equipment cabinet. The wireless carrier is responsible for removing all radio components before disposal of the pole.

Follow these installation guidelines when installing wireless antennas and PGE electrical conductors on a pole that is shared with wireless communication providers.

- The wireless communications provider is responsible for providing the wireless antennas and all associated equipment.
- PGE line crews or PGE-approved contractors are responsible for installing all antennas, equipment, conduits, and conduit brackets in the supply space. Installations of equipment in the communications space may be performed by the communications company, PGE, or PGE approved contractors.
- PGE is responsible for installing metering equipment, including current transformers, conduit, and meter bases.
- Conduits and 18-inch brackets should be mounted directly above equipment cabinets on the street side of the pole to accommodate up to three 4-inch conduits. If needed, these components can be rotated on the pole to ensure that existing communications cables are not trapped, and that proper climbing space is maintained. Replace an existing 8-foot primary distribution crossarm with a 10-foot crossarm to allow for additional conduit clearance.
- Preserve climbing space on the field side of the pole.

- Bond wireless communications equipment grounding to the PGE pole ground according to NESC requirements.
- The wireless communications provider is responsible for installing a label on the pole that shows the provider's company name and phone number.
NOTE: All work in the supply space will be performed by qualified personnel under the direction of PGE.
- If more than one wireless antenna is mounted, the antennas must be at least 3 feet from the pole. If only one wireless antenna is mounted, the distance may be reduced to 5 inches.
- To ensure adequate climbing space, a minimum of 5 inches is required between the face of the pole and the back of the grounded equipment cabinet or wire bundles (whichever is closer to the pole).
- Communication cables and equipment of different communication utilities must have not less than 4" of clearance anywhere in the span. An ambient temperature of 60 degrees F without wind is used to determine the 4" clearance. (NESC 235H).
- Communication cable messengers of different communication utilities must have not less than 12" of vertical spacing at the support structure. (NESC 235H).

IMPORTANT: When working near, or on, a transmitting antenna pole, follow all radio frequency (RF) safe work practices. Refer to Section 3600 of the PGE Safety Manual for information.

[Figure 1](#) shows a typical transmission pole with wireless antennas installed below the transmission lines. Clearances must be in accordance with NESC 238-F.

[Figure 2](#) shows a typical transmission pole with wireless antennas installed above the transmission lines. In this installation, the area between the transmission line and the antenna is not climbable.

[Figure 3](#) shows a typical distribution pole with wireless antennas installed above the primary lines.

NOTE: In [Figure 1](#), [Figure 2](#), and [Figure 3](#), the minimum distance between the conductor and the antenna represents the safety zone for the lineman.

[Figure 4](#) shows a typical distribution pole with wireless antennas installed below the primary lines, in the communications space.

[Figure 5](#) shows the clearance required between the equipment cabinet's bracket and the top of the cabinet to the lowest communication line on the pole.

[Figure 6](#) shows the wireless antenna site symbol used on Arc Facilities Manager Viewer (ArcFM).

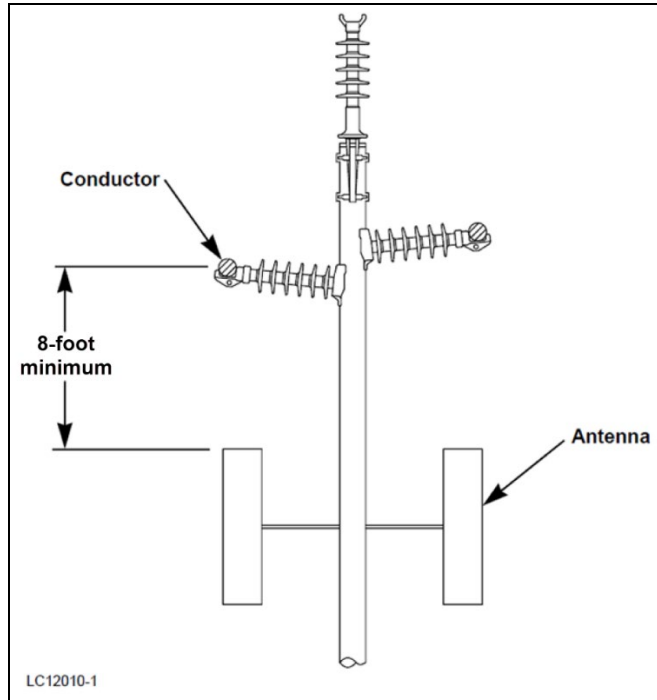


Figure 1: Transmission Pole with Antennas Installed Below the Transmission Line (NESC 235.6)

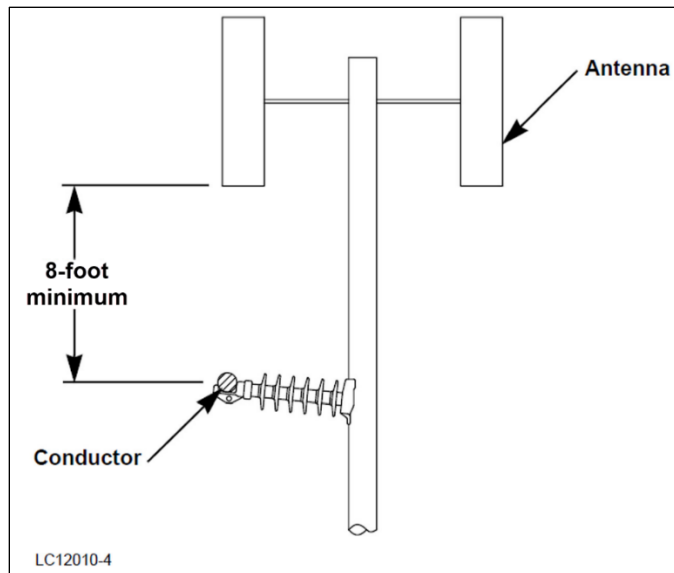


Figure 2: Transmission Pole with Antennas Installed Above the Transmission Line

NOTE: Clearances apply to transmission voltages of 230 kV and below only. Designer review is required for higher voltages.

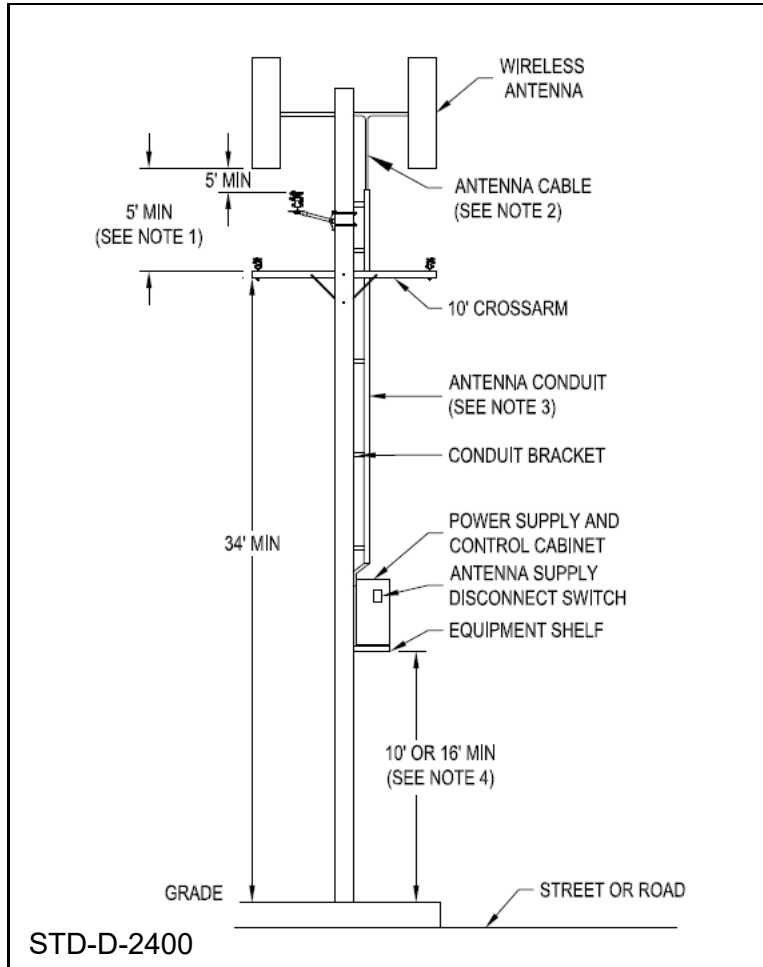


Figure 3: Distribution Pole with Antennas (STD-D-2400)

NOTES FOR FIGURE 3

1. A minimum 5-foot clearance is required between the bottom of the antenna and secondary power. The term “antenna” includes all components associated with the antenna structure, including mounting brackets, wiring, and wiring harnesses.
2. The antenna's ground wire must be insulated and in conduit.
3. A minimum 3-foot clearance is required between the top of the primary insulators and the opening of the antenna conduit.
4. The bottom of the equipment shelf on a distribution pole must be at least 10 feet above pedestrian sidewalks or restricted-traffic roads, and at least 16 feet over roads, streets, and alleys.

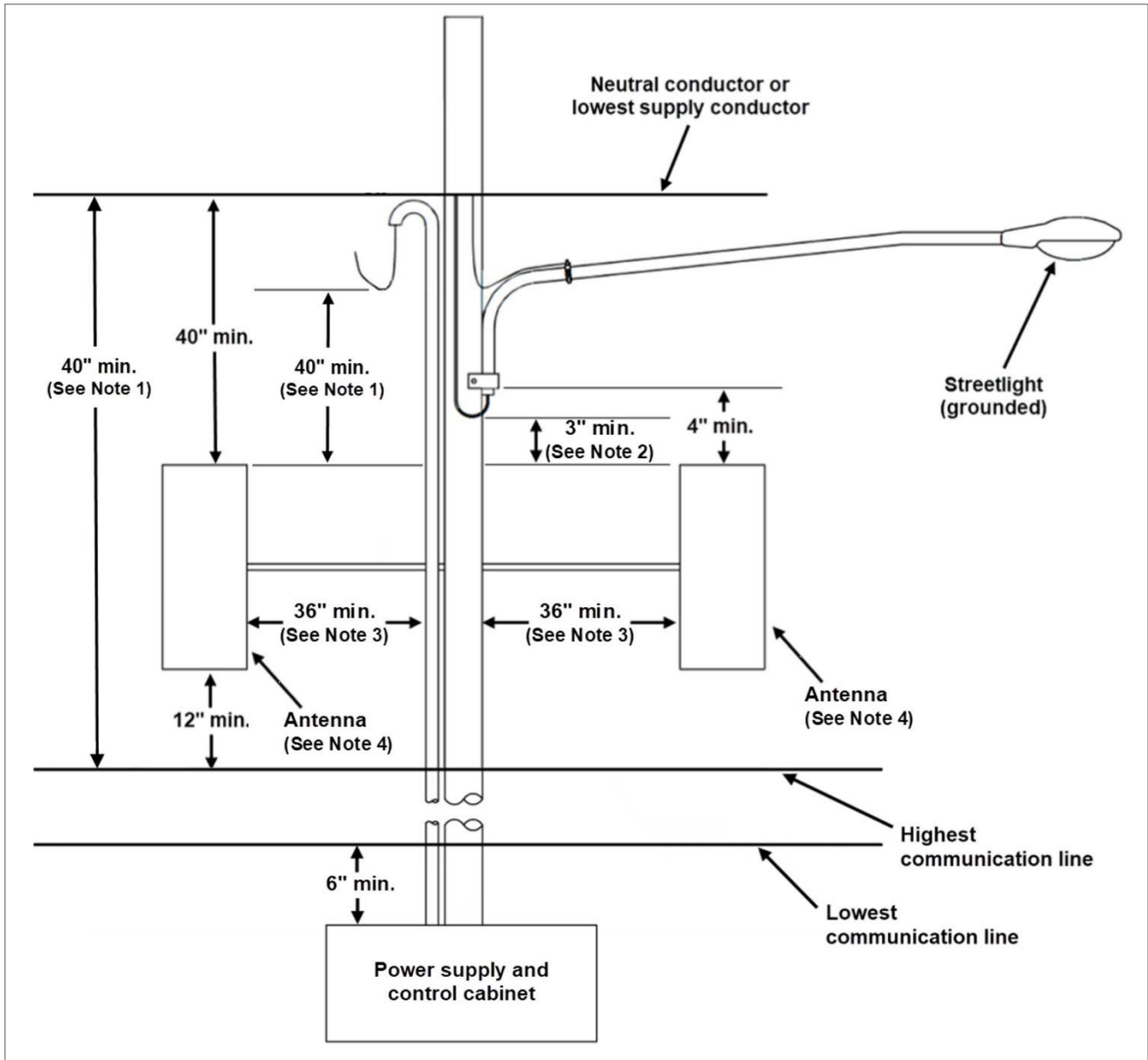


Figure 4: Minimum Clearances on a Pole with Antennas

NOTES FOR FIGURE 4

1. If a secondary drip loop exists and is the lowest supply conductor, there must be at least a 40-inch clearance between the bottom of the loop and the top of an antenna (or the highest communication line, if no antenna exists).
2. The distance between the top of the antenna and the bottom of the drip loop is 3 inches only if the power conductor is covered with a non-metallic sleeve. If the conductor is **not** covered, a minimum 40-inch clearance is required.
3. If only one antenna mount is attached the pole, this distance can be reduced to 5 inches.

- 4. The term “antenna” includes all components associated with the antenna structure, including mounting brackets, wiring, and wiring harnesses.

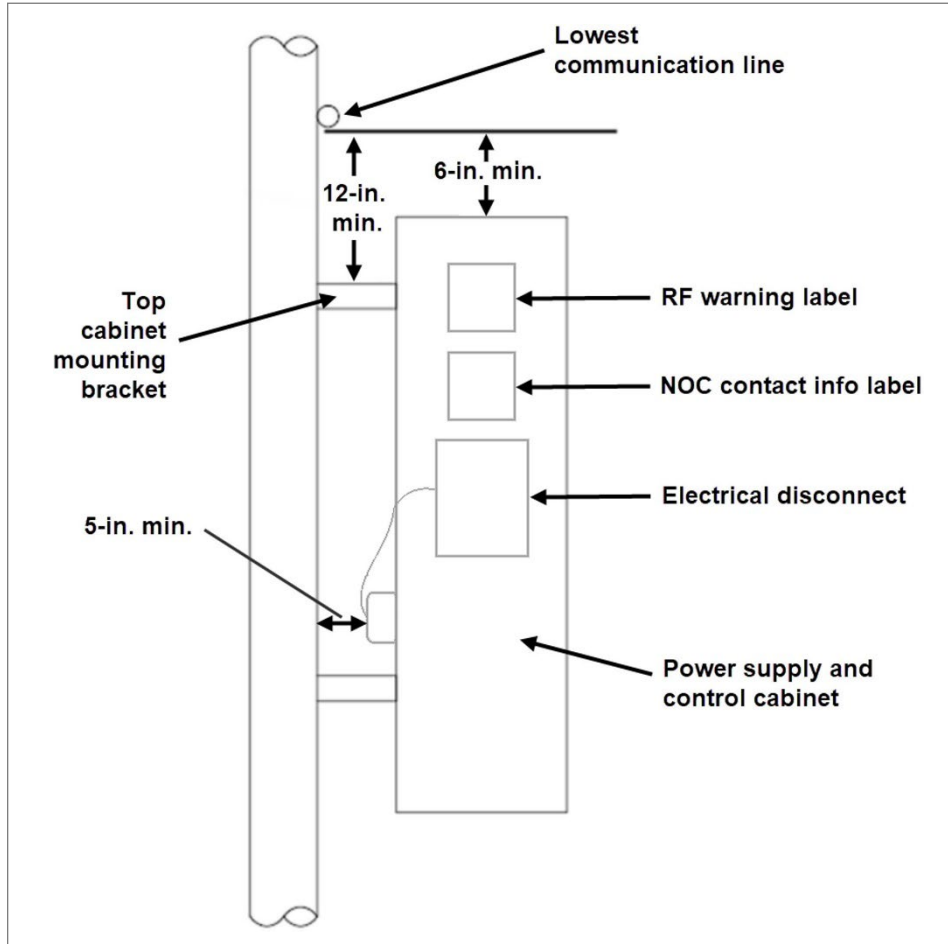


Figure 5: Clearances Between Equipment Cabinet and Lowest Communication Line

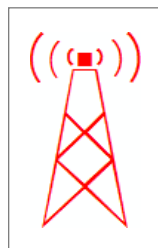


Figure 6: Wireless Antenna Site Symbol

AC, DC, AND RF DISCONNECTS

Each wireless site in the PGE service territory must have a means to remove all RF hazards. This includes removing the hazards associated with electrical backup systems including battery backup, external generators, or anything else that could be a source of electrical energy used to generate RF radiation.

NOTE: Some wireless sites built before 2010 may not have a readily accessible means to remove RF hazards. When a wireless communication provider applies for an upgrade to an existing site, PGE requires them to either install or provide access to a switch that interrupts power to the radio unit that generates the RF signal.

Use these methods to remove RF hazards:

- Remove electrical power to radios.
- Break the connection between the radio and antenna(s).

Before shutting down a wireless site, you are required to alert the Network Operations Center (NOC) about the shutdown. NOC contact information is posted on a sign on the wireless equipment cabinet (see [Figure 12](#)).

The first two of the figures below show a DC disconnect:

- [Figure 7](#) shows the location of a disconnect on pad-mounted equipment.
- [Figure 8](#) shows a close-up of the disconnect.
- [Figure 9](#) shows a dc switch inside a disconnect panel.

The last two figures show an ac disconnect switch:

- [Figure 10](#) shows the location of an ac disconnect switch on pole-mounted equipment.
- [Figure 11](#) shows a close-up of the switch.

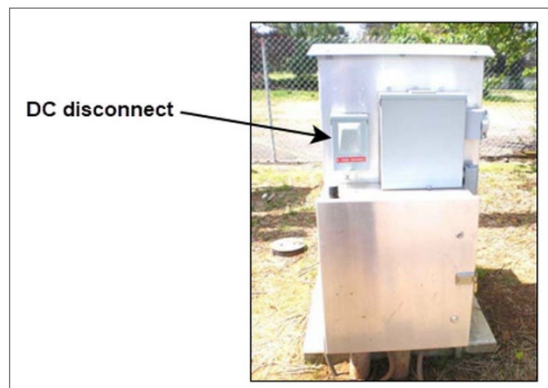


Figure 7: DC Disconnect on Pad-Mounted Equipment



Figure 8: Close-Up of DC Disconnect



Figure 9: DC Switch Inside a Disconnect Panel

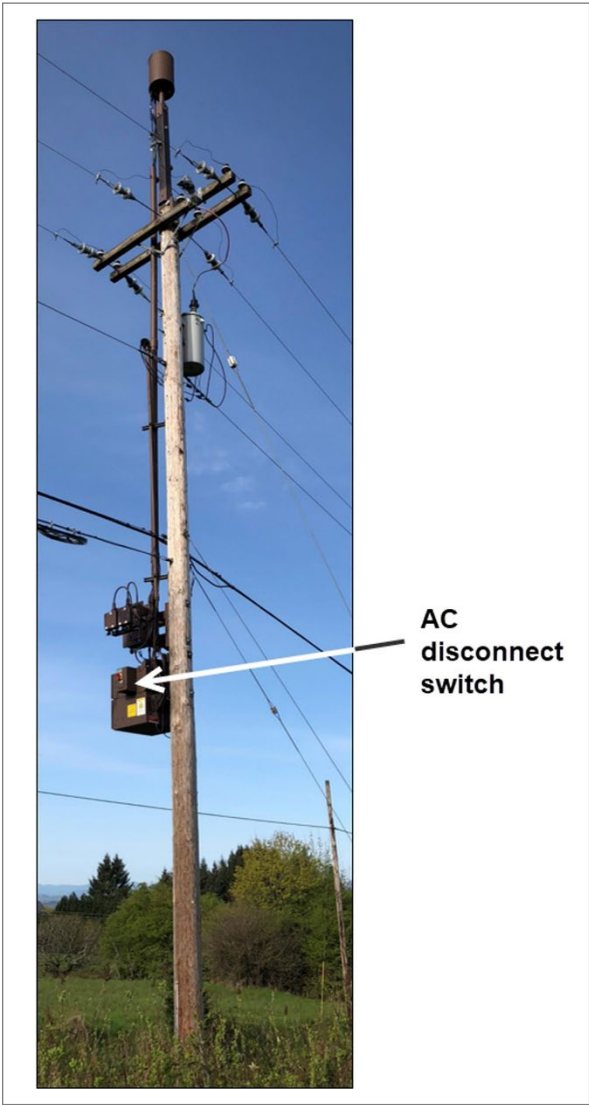


Figure 10: AC Disconnect Switch on Pole-Mounted Equipment



Figure 11: Close-Up of AC Disconnect Switch

REQUIRED NETWORK OPERATIONS CENTER AND RF SAFETY SIGNS

Network Operations Center information and RF safety signs must be placed on the wireless equipment cabinet on the same side as the disconnect switch (as shown in [Figure 12](#)).

If the NOC information cannot be read from ground level without an optical aid, then an additional NOC sign must be mounted 8 feet above ground level. Consult with the PGE Wireless Project Manager to determine the best location for the sign and the appropriate materials and methods for use when attaching it.



Figure 12: NOC Information and RF Safety Signs on Wireless Equipment Cabinet

REVISION HISTORY

Periodic review of this program document is required at an interval not to exceed three (3) years.

Revision	Date	Section	Change
0	03/15/2011	ALL	Standard Issued for implementation
1	04/27/2023	ALL	Revised Standard to reflect updated NESC reference requirements. NESC has moved 235I2 to 238F in 2023 edition. Figure 1 and Figure 2 were updated to show the required 8-foot minimum clearance; not new 2023 requirement. Figure 3 updated to show new PGE framing.