

Customer Requirements for Strand-Mounted Antenna Assemblies on Wood Poles



1. Scope

This standard covers the requirements for strand-mounted antenna assemblies on Seattle City Light (SCL)-owned and co-owned wood poles.

This standard provides requirements for design, construction inspection, and ongoing maintenance of installed assemblies.

2. Application

This standard is intended for use by:

- Customers who design installations of strand-mounted antenna assemblies
- SCL engineers who review and approve strand-mounted antenna assembly designs
- SCL Electrical Reviewers who inspect and approve installations of strand-mounted antenna assemblies

For additional information, terms and definitions regarding customer requirements for utility pole attachment and related construction standards, see SCL 0093.04.

For any questions regarding the requirements specified in this standard, contact SCL Joint Use Engineering.

3. Requirements

3.1 General

Only one strand-mounted antenna assembly shall be allowed in each span.

The customer shall ensure the supporting poles are appropriately sized and have sufficient structural strength to accommodate the additional material load.

Installation shall not be located on poles identified as “bad order.” A “bad order” pole is any pole identified and labeled to be replaced within a year. See SCL 0117.23.

All new, upgraded, or replacement strand-mounted antenna assemblies capable of any radio frequency (RF) emission shall require application, review, and approval by SCL Joint Use Engineering.

Strand-mounted antenna assemblies shall not be installed directly below pole-mounted streetlight fixtures, as this may interfere with the intended illumination pattern.

Electric service for all strand-mounted antenna assemblies shall be fed from a pole-mounted power supply. See SCL 0094.01.

3.2 Non-Ionizing Electromagnetic Radiation (NIER) Report Submission

Prior to submitting a permit application, customers shall submit a Non-Ionizing Electromagnetic Radiation (NIER) report for each wireless site to the pole owner(s). All submitted reports will be reviewed, approved, and endorsed by a Radio Frequency (RF) Professional Engineer (PE) licensed in Washington State before the customer can proceed with the application process.

The purpose of the NIER report is to determine if the wireless site meets the Federal Communication Commission (FCC) standard for RF exposure for occupational and general population exposures. The NIER report shall specify:

- Distance (in feet) to FCC 100% Maximum Permissible Exposure (MPE) limits at the antenna level:
 - Vertical stand-off distance (general population)
 - Vertical stand-off distance (occupational)
 - Horizontal stand-off distance (general population)
 - Horizontal stand-off distance (occupational)
- Distance to FCC 100% MPE limits at ground level:
 - Horizontal stand-off distance (general population)
 - Horizontal stand-off distance (occupational)

3.3 Codes

Installation shall meet or exceed all applicable structural and clearance requirements and provisions of the latest revision of the National Electrical Safety Code (NESC), as well as SCL construction standards. In case of conflict, the most stringent requirements will prevail.

Strand-mounted antenna assembly power requirements shall meet the safety requirements of the NESC.

All electrical service and its equipment to provide power to strand-mounted antenna assemblies shall meet all applicable National Electrical Code (NEC), including passing inspection by the authority having jurisdiction (AHJ).

3.4 Grounding and Bonding

All conductive parts of the strand-mounted antenna assembly installation on the pole shall be bonded together and grounded to the pole ground. See NESC 092C3a and b.

All messengers shall be bonded together and grounded to the pole ground.

Ground wire shall be copper, #4 AWG minimum.

If no ground rod exists, one shall be installed. This installation shall meet or exceed the requirements of SCL 0451.01.

If multiple ground rods exist, all ground rods shall be bonded together using copper wire, #4 AWG minimum.

3.5 Equipment Mounting

Strand-mounted antenna assemblies shall be installed as aesthetically as is reasonably possible and with good workmanship principles so as to not interfere with climbing and maintenance of the pole by all parties.

Communication brackets may be used, with SCL Joint Use Engineering approval, to optimize pole attachments. See SCL 0093.06.

Antennas shall be installed and oriented in a manner that maintains RF energy below FCC occupational exposure limits.

If a communication enclosure is needed on the pole, it shall comply with SCL 0094.01.

A service disconnect switch shall be installed for all power supplies for the purpose of powering off all equipment.

The antenna assembly Equipment Power Off (EPO) switch shall be installed with the switch facing, and within reach from, the adjacent pole.

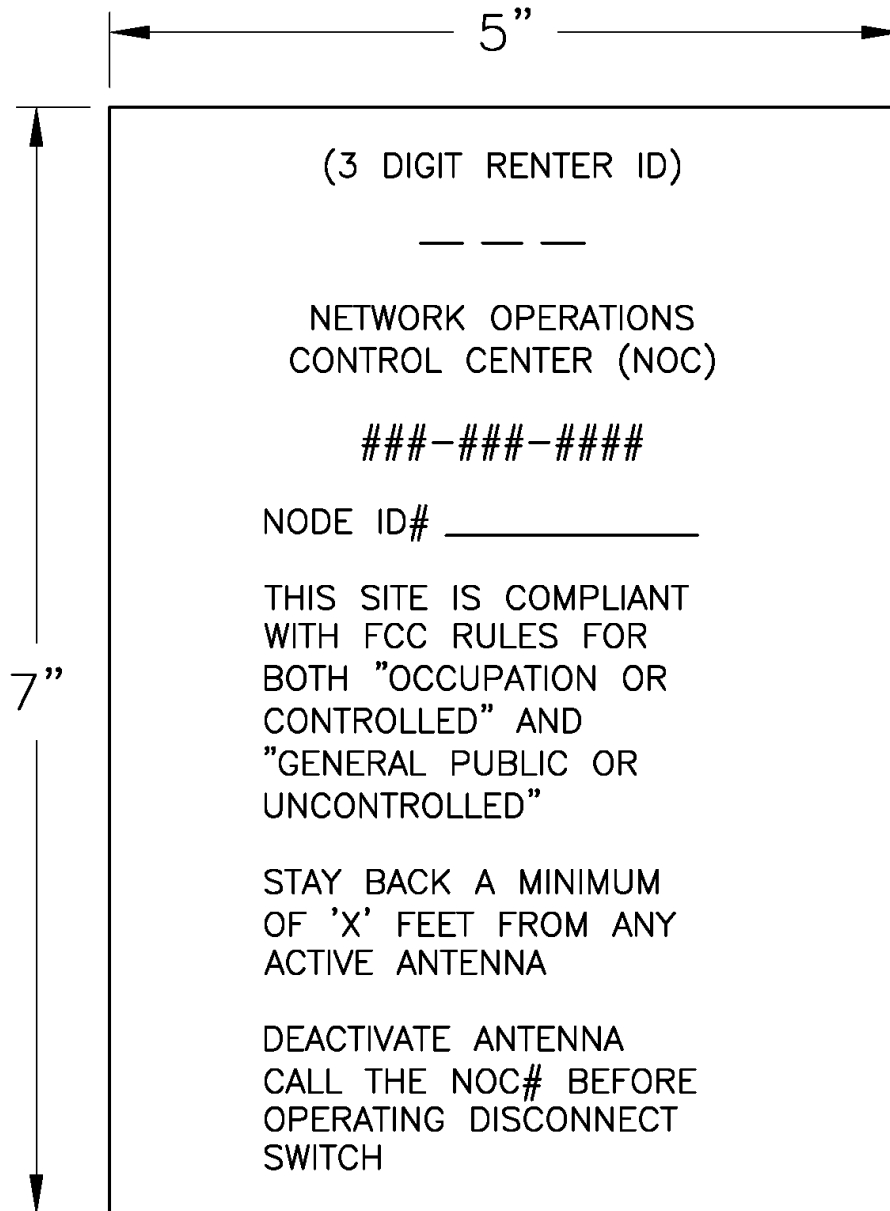
3.6 Identification, Caution, and Notice Tags

The following tags shall be installed at each wireless site as follows:

- **An Antenna Owner Identification (ID) tag** shall be installed on either the communication enclosure or on a flat surface mounted to the pole if no communication enclosure exists. The tag shall be clearly visible from the ground and shall contain a unique company equipment ID number and site name per SCL 0093.12. Information shall include working clearance and a 24-hour contact phone number for deactivation notification. See figures 3.6a and 3.7.
- **An RF Notice tag** shall be strand-mounted on both sides of the strand-mounted antenna, outside of the general population stand-off distance, nominal 6 ft from the antenna on the span side and 1 ft from the antenna on the pole side. See figures 3.6b and 3.7.
- **An RF Caution tag** shall be installed on either the communication enclosure or on a flat surface mounted to the pole if no communication enclosure exists and be clearly visible from the ground. The tag shall be clearly marked and visible from the ground. See figures 3.6c and 3.7.

Figure 3.7 shows RF Caution and Antennal Owner ID tags placed one above the other; however, each tag can be placed anywhere on the communication enclosure as long as the lowest point of either tag is a minimum 15 ft above ground. In cases where a pole-mounted communication enclosure does not exist, tags shall be installed on the pole at a minimum 15 ft above ground.

Figure 3.6a. Example of Antenna Owner Identification (ID) Tag



Notes:

1. 5 in x 7 in aluminum (yellow with black lettering)
2. Located on side of communication enclosure or on pole
3. Made of weather- and corrosion-resistant material

Figure 3.6b. Example of RF Notice Tag

GROMMET HOLE
 FOR STRAND-
 MOUNTING
 ø0.3125"
 (TYPICAL 2 PLACES)

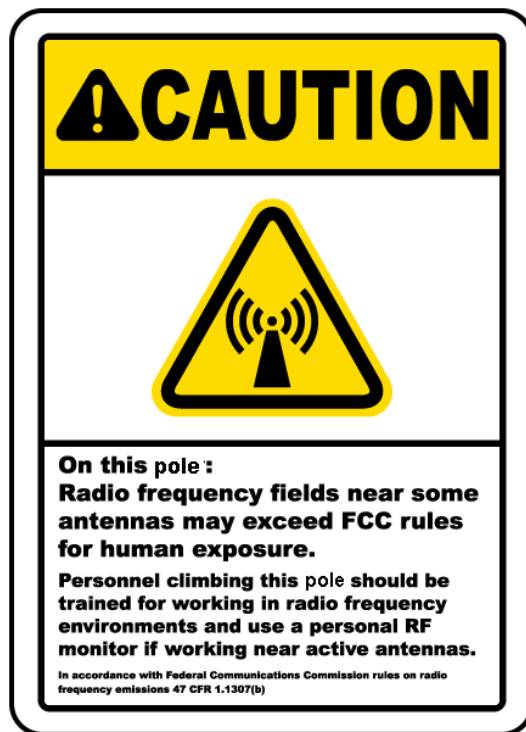
ANTENNA OWNER
 & OWNER
 PHONE NUMBER



Notes:

1. 4 in x 2 in aluminum or plastic (black and white lettering and blue fill where shown)
2. Located on the strand with the associated strand-mounted antenna
3. Made of weather- and corrosion-resistant material

Figure 3.6c. Example of RF Caution Tag



Notes:

1. 5" x 7" aluminum (black lettering with yellow fill as shown)
2. Located on side of communication enclosure or on pole
3. Made of weather- and corrosion-resistant material

3.7 Clearances

Strand-mounted antenna assemblies shall have a maximum length of 3 ft.

There shall be a nominal 3 ft of clearance between the closest component of the strand-mounted equipment and the pole face.

Anywhere in the span, vertical clearances shall be:

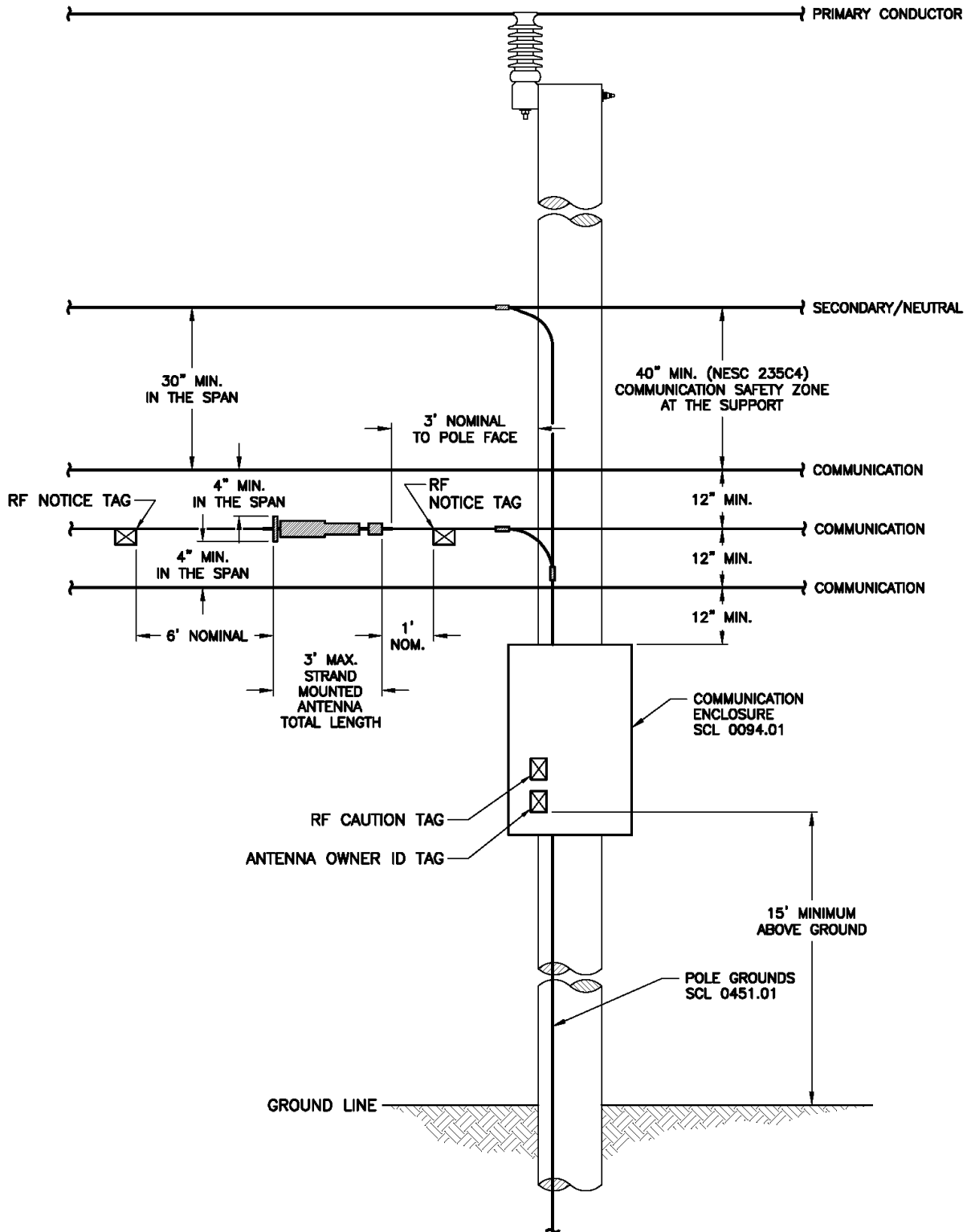
- A minimum of 30 inches from the secondary service or system neutral
- A minimum of 10 ft from the primary conductor (4 kV–26 kV)
- A minimum of 4 inches from any other communication cable, messenger, and strand-mounted equipment. If this clearance cannot be obtained, a written letter of agreement between the parties shall be delivered to the pole owner(s) prior to installation. See NESC 235H.

At the support, vertical clearance shall be:

- A minimum of 12 inches between communication pole attachments, including the communication enclosure.
- A minimum of 40 inches between the secondary service or system neutral to the highest communication pole attachment.

See Figure 3.7.

Figure 3.7. Strand-Mounted Equipment Clearances and Tag Locations



3.8 Inspection

SCL reserves the right to inspect all installations at any time and notify customers of unsafe work conditions or construction that is not compliant with SCL standards or NESC requirements.

Once construction is completed, an SCL Electrical Reviewer will conduct a final inspection.

3.9 Maintenance

Customers shall perform all routine maintenance outside of the supply space, which is defined as the area above the communication worker safety zone.

Maintenance work shall not cause any interruption of SCL's utility or other services. If the work requires encroaching into the supply space, contact SCL for assistance.

4. References

National Electrical Safety Code (NESC), C2-2017 Edition; Institute of Electrical and Electronics Engineers (IEEE) Inc., New York, NY

SCL Construction Standard 0093.04; "Requirements for Utility Pole Attachments"

SCL Construction Standard 0093.06; "Communications Bracket Installation"

SCL Construction Standard 0093.12; "Pole Attachments, Identification and Tagging"

SCL Construction Standard 0094.01; "Communication Enclosures on SCL Wood Poles"

SCL Work Practice 0117.23; "Wood Pole Condition and Treatment Tag Interpretation"

SCL Construction Standard 0451.01; "Grounding Electrodes for Distribution Poles"

5. Sources

Chao, Yaochiem; SCL Joint Use Supervisor and subject matter expert for 0095.30 (yaochiem.chao@seattle.gov)

City of Seattle Standard Specifications for Road, Bridge and Municipal Construction; 2017 edition

Crume, Steve; SCL Joint Use Manager and subject matter expert for 0095.30 (stephen.crume@seattle.gov)

Haberman, Douglas; SCL Joint Use Strategic Advisor and subject matter expert for 0095.30 (douglas.haberman@seattle.gov)

Kenny, Mariah; SCL Joint Use Engineer and subject matter expert for 0095.30 (mariah.kenny@seattle.gov)

Neuansourinh, Ponet; SCL Standard Engineer, originator and subject matter expert for 0095.30 (ponet.neuansourinh@seattle.gov)

NFPA 70, National Electrical Code (NEC); 2014