



Electric Service Requirements

Small cell antenna installations on SMUD Distribution poles and small cell point of connections

Engineering Specification T016
June 2020



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		REV. 2	DATE: 06-2020
CATEGORY <p style="text-align: center;">ELECTRIC SERVICE REQUIREMENTS</p>			
SUBJECT <p style="text-align: center;">SMALL CELL ANTENNA INSTALLATIONS ON SMUD DISTRIBUTION POLES AND SMALL CELL POINT OF CONNECTIONS</p>			

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1 PURPOSE

This specification provides minimum requirements of the Sacramento Municipal Utility District (SMUD) for the design, approval, and installation of second party communication small cell antennas on the SMUD’s distribution power poles or for electrical service to non-SMUD poles. For this Electric Service Requirement, Distribution power poles (also referred to as “SMUD Facilities”) are defined as: poles with energized distribution voltages (4 kV, 12 kV, or 21 kV), poles that only have energized secondary voltages (zero to 750 volts), span guy poles, and street light poles. Compliance with this specification is necessary to install any antenna on SMUD’s Facilities.

2 SCOPE

- This specification outlines the necessary actions, design, construction, and operational requirements and considerations for communications service providers to install a small cell antenna on SMUD’s Facilities. This document is not a design or construction specification, but provides minimum requirements and typical design details.
- This specification outlines requirements for electrical connections to non-SMUD facilities.
- Small Cell Antennas will not be allowed at the pole top positions on poles carrying 69 kV circuits. Please contact the Transmission Engineering group if attachments are desired on 115 kV and 230 kV poles/towers.
- Antenna installations on poles with pre-existing SMUD operated antennas will not be allowed by SMUD and are not covered in the scope of this specification.
- In Summary:

	Small Cell Antenna's will be allowed at:			
Pole with Following:	Pole Top	Between 69 kV and Distribution	Between Distribution and Secondary	Below Secondary
69 kV only	No	No	No	No
69 kV and Distribution	No	No	No	Yes
Distribution and Secondary only	Yes	--	No	Yes
Secondary only	Yes	--	--	Yes
SMUD Wood Streetlight Pole with Overhead Service only ⁽¹⁾	Yes	--	--	Yes

⁽¹⁾ Antenna's will be approved on SMUD owned and maintained wood Streetlight poles only if all R/W issues, ADA compliance, pole capacity issues, property owner coordination, local agency coordination, etc. are complete. All cost associated with attachments to SMUD wood streetlight only poles will be billed to the applicant.

3 REFERENCES – Latest Editions, Errata, Corrections, and Amendments

- 3.1 ANSI / Telecommunications / Electronic Industry Standards - Structural Standard for Antenna Supporting Structures and Antennas, ANSI/TIA/EIA-222-G.
- 3.2 California Code of Regulations, Title 8 – Industrial Relations, Subchapter 5 – Electrical Safety Orders.
- 3.3 California Electric Code (CEC).
- 3.4 General Order 95 (GO95).
- 3.5 NFPA (70) – NEC.
- 3.6 Northern California Joint Pole Manual Antenna Operation Procedures, Section 19.11
- 3.7 SMUD Electric Service Requirement T004 – Commercial and Industrial Service Requirements.
- 3.8 SMUD’s Tubular Steel Pole specification SS0204
- 3.9 US Department of Labor Occupational Safety and Health Administration, Regulations (Standard – 29 CFR) Electric power Generation, Transmission, and Distribution. – 1910.269, and Telecommunications – 1910.268
- 3.10 California Building Code – (CBC).
- 3.11 National Electric Safety Code - NESC

4 DEFINITIONS

4.1 APPLICANT

Applicant is an entity, typically a communications service provider, requesting to install an antenna on SMUD distribution poles, or a contractor acting on behalf of such an entity.

4.2 COMMUNICATION ZONE OR TELECOM SPACE

The lowest workable or usable space on any Pole at which the applicable minimum vertical clearance requirement is satisfied, located immediately below the Communications Worker Safety Zone. The Communication Space is used primarily for the placement of wires used to deliver communications services. For example -On a typical 45ft Joint Use Pole, the portion of a pole located from 18’ to 25’ above ground line (AGL). This zone is limited to the installation of Telecom facilities, except for electric utility equipment that passes through the zone.

4.3 DISTRIBUTION POLE OR SMUD FACILITY

Poles with energized distribution voltages (4 kV, 12 kV, or 21 kV), poles that only have energized secondary voltages (zero to 750 volts), span guy poles, and street light poles. These Distribution poles include attached

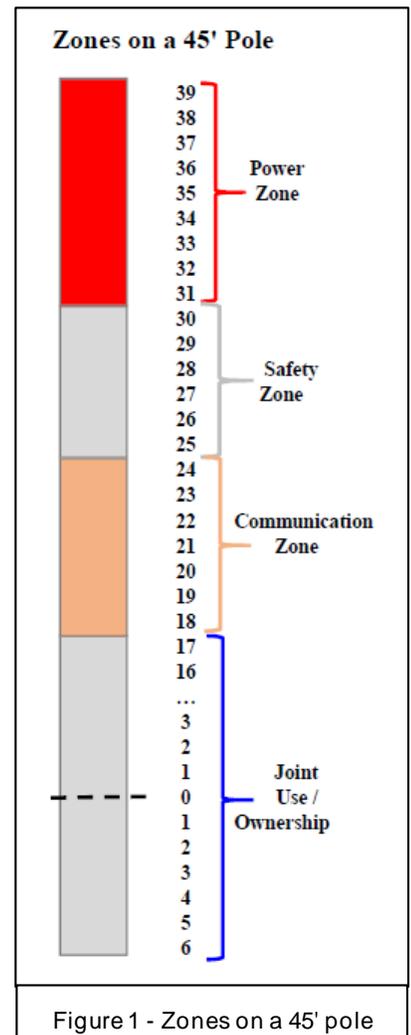


Figure 1 - Zones on a 45' pole

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circuits and devices, such as: secondary electrical circuits, electrical apparatus, risers, lights, communications circuits, and associated equipment. The related SMUD properties, facilities, Right-of-Ways, and/or easements combine to form SMUD Facilities.

4. 4 EQUIPMENT MODIFICATION / RECONFIGURATION TO AN EXISTING ANTENNA

Applicants must fill out a Make Ready Application form describing the applicant’s proposed modification to an existing pole. Make Ready Application form may be obtained from Joint.Pole@smud.org or from:

U.S.P.S.

SMUD Joint Pole Desk,
P.O. Box 15830, MS EA-105
Sacramento, CA 95852-0830

FED EX / UPS

SMUD Joint Pole Desk
9744 Kiefer Blvd. MS EA-105
Sacramento, CA 95827

Location

SMUD Joint Pole Desk
4401 Bradshaw Rd.
Sacramento, CA

4. 5 MAKE READY APPLICATION

A form completed by an Applicant to provide the necessary information for SMUD to consider permitting antenna(s) to be installed on a specific pole pursuant to a Pole Attachment Agreement, for antenna installations. This form must be submitted to SMUD’s Joint Pole Desk at any of the locations cited in section 4.4 above.

For attachments at the communication level, please follow the NCJPA Make Ready process. Please note if an antenna will be located on a SMUD or co-owned pole, Make Ready Application will be submitted with the Small Cell Site Application as cited in section 4.17 below.

4. 6 NORTHERN CALIFORNIA JOINT POLE ASSOCIATION (NCJPA OR JOINT POLE ASSOCIATION)

This is an association to provide pricing and coordination for all joint pole transactions between electric utilities and telecommunications service providers on the same pole.

4. 7 NOTICE OF CONTACT (CONTACT PERMIT)

The Notice of Contact is a permit for pole attachment installations allowing identified antennas to be located at a specific location, in accordance with the terms and conditions of the NCJPA and/or Pole Attachment Agreement. This license is prepared in accordance with established fee structures by SMUD and executed by the Applicant and SMUD.

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4. 8 POINT OF CONNECTION:

The point where SMUD wiring interfaces with the customer wiring, and where the customer assumes the responsibility for further delivery and use of the electricity. Typical points of connection include but not limited to weatherheads, meter socket enclosures and fused disconnect (un-metered services).

4. 9 POLE ATTACHMENT AGREEMENT

This is an agreement, in principal, to allow a communications service provider to locate antennas on SMUD’s Facilities when all requirements are met. The Pole Attachment Agreement prescribes the terms and conditions on which SMUD may allow an Applicant to install antennas on SMUD’s Facilities, but does not provide a specific design nor constitute authorization to install. SMUD prepares the Pole Attachment Agreement for a fee when solicited by an Applicant and both the Applicant and SMUD execute the agreement.

4. 10 POLE TOP EXTENSION

A climbable extension attached to the top of a wood pole that will allow the antenna, the antenna’s support brackets, and the conduit containing the communication cables to the antenna to extend a minimum of six (6) feet above the highest level of energized conductor on the pole. SMUD’s preferred pole top extension is manufactured by SyGo, Inc., Series A-00-00-00 (Douglas Fir 7-foot extension) with associated step kit. An adaptor bracket C-05-00-00 may be needed for Class 4 or 5 poles.

4. 11 QUALIFIED COMMUNICATION LINE WORKER

An employee certified annually by the employer to demonstrate the skills required to work safely in the communication space per OSHA Regulations (Standards – 29 CFR) Telecommunications – 1910.268.

4. 12 QUALIFIED ELECTRIC LINE WORKER

An employee certified annually by the employer to demonstrate the skills required to work safely in the supply space per OSHA Regulations (Standards – 29 CFR) Electric Power Generation, Transmission, and Distribution – 1910.269.

4. 13 QUALIFIED SMUD LINE INSPECTOR

An employee, representing SMUD’s interests, qualified to assess the safety and quality of procedures and work performed on SMUD distribution poles. The inspector may observe and assess the work and work procedures, and obtain required clearances from SMUD’s Distribution System Operator (DSO) in order to permit Applicant to proceed with work at a SMUD distribution pole. The inspector is authorized on behalf of SMUD to start, stop, and shutdown work on its distribution poles.

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4.14 SMALL CELL

Low-powered cellular radio access nodes that operate in licensed and unlicensed spectrum that have a range of 10 meters to a few kilometers. They are “small” compared to a mobile macrocell, partly because they have a shorter range and partly because they typically handle fewer concurrent calls or sessions (aka DAS, femtocells, picocells, and microcells).

4.15 SMUD FACILITY IDENTIFICATION (SFI)

SFI is SMUD’s assigned identification for a facility/pole. It may consist of an Identification number on the pole (UD Number) and/or a street address.

4.16 STRAND ANTENNA

Antenna mounted on messenger wire attached between poles at the Telecom level. Except where not feasible, the Strand Antenna will be pointed away from the nearest pole. The Strand Antenna will not contain battery backup. One SMUD metered electric service point may power up to 24 Strand Antennas.

4.17 SUPPLY SPACE, SUPPLY ZONE, OR POWER ZONE

The portion of the pole located above the Safety Zone above the Communication Zone. Refer to Figure 1 on page 3.

4.17 Small Cell Site Application

An application package submitted by an Applicant to provide the necessary information for SMUD to consider permitting antenna(s) to be installed on a specific pole pursuant to a Pole Attachment Agreement, for antenna installations on SMUD’s distribution power poles or for electrical service to non-SMUD poles. A Small Cell Site Application is processed when it is submitted with all required documents and a \$1,000 non-refundable connection fee. Please note if an antenna will be located on a SMUD or co-owned pole, Make Ready Application as cited in section 4.5 above will be submitted with the Small Cell Site Application.

5 GENERAL REQUIREMENTS AND INFORMATION

5.1. All electric service connections SHALL adhere to the rules set forth in the latest edition of the National Electric Code (NEC), SMUD’s Electric Service Requirement T004, and this Electric Service Requirement. The installation must also have passed inspection by the City or County Authority Having Jurisdiction. Some items of particular attention are, but not limited to⁽¹⁾:

5.1.1. NEC 240.22 – No overcurrent device shall be connected in series with any conductor that is intentionally grounded [Neutral].

¹ NEC sections cited are from 2017 Code as examples and might change in future Code updates.

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- 5.1.2.** NEC 250.4(A)(2) – Normally non–current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth so as to limit the voltage to ground on these materials
- 5.1.3.** NEC 250.24(B) – For a grounded system, an unspliced main bonding jumper shall be used to connect the equipment grounding conductor(s) and the service-disconnect enclosure to the grounded conductor within the enclosure for each service disconnect in accordance with 250.28.
- 5.1.4.** NEC 250.24(D) - A grounding electrode conductor shall be used to connect the equipment grounding conductors, the service-equipment enclosures, and, where the system is grounded, the grounded service conductor to the grounding electrode(s) required by Part III of this article. This conductor shall be sized in accordance with 250.66.
- 5.1.5.** NEC Tables 250.66 and 250.122 – Minimum equipment grounding conductors must meet or exceed the sizes listed in NEC Tables 250.66 and 250.122 – whichever is larger.
- 5.2.** All antenna installations shall be consistent with General Order 95, "Rules for Overhead Electric Line Construction," of the California Public Utilities Commission, and all other applicable Federal, State, and local orders, codes, rules, and regulations.
- 5.3.** All materials used, and all work performed as part of the Applicant’s antenna installation or modification/reconfiguration must conform to the requirements of local inspection authorities, these specifications, and SMUD’s Rates, Rules, and Regulations.
- 5.4.** The Applicant shall carefully review all information supplied herein and herewith, all of which are incorporated as part of this Specification: including text, drawings, and drawing notes.
- 5.5.** Antenna attachments installed pursuant to this Specification shall be for Applicant’s provision of communication services to Applicant’s wireless customers in SMUD’s electric service area pursuant to a valid license issued by the Federal Communication Commission (FCC) permitting the Applicant to transmit and receive communications signals as a provider of Telecommunications Services.
- 5.6.** As per California General Order 95, Rule 94.6(C), surface mounted equipment (equipment mounted directly to the pole) shall occupy no more than 18” of vertical space. If greater than 18”, it needs to be mounted at least 4” away from the pole’s surface.

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- 5.7. Should it become necessary to abandon a bolt hole (due to the removal or relocation of equipment on the pole), the abandoned bolt hole shall be filled with a hard-wood plug of appropriate diameter to ensure a tight fit. The plug shall be a minimum of 2.5 inches in length and treated with either copper naphthenate or pentachlorophenol.
- 5.8. Existing secondary conductors may be raised a maximum of five feet (5') above the height of adjacent poles given the following conditions (*in no case will the secondary conductors be raised to encroach upon the 6 foot safety clearance zone between primary and secondary conductors*):
- 5.8.1. If no mid-span service taps are present on the affected secondary spans, the secondary conductor height can be raised a maximum of five feet (5') above the height of the secondary conductors on the adjacent pole(s).
- 5.8.2. If mid-span service taps are present on the affected secondary spans, and the mid-span taps are accessible to trucks, then the secondary conductor height can be adjusted a maximum of five feet (5') above the height of the secondary conductors on the adjacent pole(s).
- 5.8.3. If mid-span services are present on the affected secondary spans, and the mid-span taps are not truck accessible, then the secondary conductor heights cannot be adjusted.
- 5.9. No communication conductors will be allowed above a SMUD owned or maintained streetlight. SMUD owned or maintained streetlights will be located within the SMUD owned (secondary) portion of the pole.
- 5.10. A RF Safety Study will be required for ALL installations on SMUD Facilities and for non-SMUD owned poles that either require an overhead point of connection or have equipment attached which SMUD personnel maintains.
- 5.11. **As conditions warrant, SMUD will give notice to antenna owner(s) to have an antenna turned off for SMUD prearranged work. However, SMUD may disconnect service to antenna installations or otherwise deactivate an antenna (as per GO95, Appendix H, Exhibits B and C), without notice in emergency conditions, when performing operational activities that require SMUD personnel to work above ground level in the vicinity of the antenna. It will be up to the Applicant to re-energize the Antenna. Applicant shall provide an appropriate visible fused disconnect means (switch) that shall be clearly identified and accessible to SMUD personnel. Applicant shall arrange to have a SMUD lock installed on the switch to prevent public access but ensure SMUD accessibility; in no case shall Applicant apply a lock or otherwise prevent SMUD access to the switch. The location of the switch shall be shown on the application.**

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5.12. Where an antenna will be installed on a jointly owned pole at the communication level, the Applicant shall comply with all then existing requirements of the Northern California Joint Pole Association Operations/Routine Handbook, including section 19.11 (or its successor) and all subsections.

Failure to comply with the above requirements could cause unnecessary delays for the Applicant and/or cancellation of agreements allowing the installation or requiring the removal of antenna facilities.

6 POLE ATTACHMENT AGREEMENT

A POLE ATTACHMENT AGREEMENT specific to Small Cell Antenna installations must be formally executed by both SMUD and the Applicant before SMUD will address any specific request for attachment. A Pole Attachment Agreement may be initiated by contacting SMUD's Distribution Line Design Department at 916-732-5700.

7 REQUEST TO INSTALL OR MODIFY ANTENNA(S)

- 7. 1** All proposals and submittals pertaining to antenna installations on SMUD Facilities shall be submitted to SMUD at the locations cited in section 4.4 above, where they shall be reviewed for completeness. For installation by NCJPA Members within their owned space, please apply through Northern California Joint Pole Association Process. Per the Routine Handbook, if a Member wishes to purchase/attach onto a pole that is either solely or jointly owned by another Member(s), the requesting Member will fill out a *Preliminary Authorization for Joint Pole Transaction (Form 2)* and forward it to all owners of record.
- 7. 2** SMUD will not consider any proposal or submittal for installation or modification of antennas unless SMUD and the Applicant have formally executed a Pole Attachment Agreement (See Section 6, above).
- 7. 3** Maintenance of antennas or equipment installed on SMUD distribution poles within the electric utility supply space may only proceed after receiving approval from SMUD of the planned work and schedule.
- 7. 4** For antennas within SMUD's Supply Space, all work (e.g., installations, maintenance, and removals of antennas and equipment), shall only take place in the presence of a SMUD inspector.
- 7. 5** Utility conductors shall be de-energized before any installation, maintenance, or removal commences on communication equipment within the electric utility space. Requests for line de-energization must be made several weeks in advance, or in an emergency as far in advance as is practicable, by calling 1-

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888-742-7683 prior to the desired maintenance work. Request to de-energize a line can be dependent upon weather or system configurations.

7.6 SMALL CELL SITE APPLICATION

- 7.6.1** The Applicant shall request SMUD to consider a potential pole for antenna installations on SMUD’s distribution power poles or for electrical service to non-SMUD poles by submitting a Small Cell Site Application to SMUD.
- 7.6.2** The Small Cell Application can be completed online at SMUD’s project application website (<https://usage.smud.org/ProjectApplication>).
- 7.6.3** The Small Cell Site Application must be complete in its entirety including a \$1,000 non-refundable connection fee before SMUD will consider the request.
- 7.6.4** Once SMUD has verified that a complete Small Cell Site Application has been received, all information will be forwarded to the appropriate staff to process the request. SMUD may reject a proposed Facility because of conflicts with SMUD projects or plans; conflicts with pole operating agreements; conflicts with stipulations of the Right-of-Way, easement, or property; community agreements or concerns; Facility availability; operating or reliability concerns; exceptions to SMUD construction, maintenance, or operating practices; engineering, construction, or operational constraints; electric service supply problems; and other considerations specific to a site.
- 7.6.5** SMUD Staff will notify the Applicant if the Small Cell Site Application is initially accepted or rejected. If the Small Cell Site Application is rejected, SMUD will identify the reason(s) for the rejection. In some cases, the Applicant may negotiate acceptable mitigation to SMUD’s concerns, and the application may then receive approval
- 7.6.6** If SMUD approves the Small Cell Application/construction drawings, the Applicant will need to take the approved drawings to the city and apply for an encroachment permit.
- 7.6.7** During construction, deviation from the approved design will be cause to halt construction. The Applicant should inform SMUD’s inspector immediately of design/construction deviations from that which was approved. When applicable, SMUD staff will work with the Applicant to review and approve changes. SMUD may withdraw approval for an attachment in the event of a deviation cannot be reconciled.

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7.6.8 After construction is completed, the city will need to perform an inspection of the wireless carrier’s electrical work. The inspection tag will be sent to our C-10 desk by the local Authority Having Jurisdiction. Once we receive the inspection tag, we'll schedule a crew to power the connection.

7.6.9 A submitted Small Cell Site Application does not reserve space on SMUD’s distribution power poles. If Applicant is actively working to update/ revise plans (if needed) then SMUD will inform other interested Applicants SMUD is currently process an application for said pole. If Applicant is not actively working to update/revise plans and more than a year elapses, the application can be cancelled and other interested Applicants can move forward with submitting Small Cell Site Application for said pole.

7.7 WORK PLANNING, SCHEDULING, AND CONSTRUCTION

7.7.1 *The work outlined in section 7.7.1 only pertains to pole top installations.* Work scheduling and construction of antenna installations/modifications will be performed under the review of a Qualified SMUD Representative. Before scheduling any work, the Applicant and/or its contractor must request a pre-construction meeting with a SMUD Representative. The Applicant will review the agreements and approved design, and supply a work plan to the SMUD Representative including additional information as follows:

- The identification of the pole at which the work is to be performed.
- The reason for the work and type of work to be performed.
- The Applicant’s primary contact including: name, company, phone number, and e-mail address.
- A proposed schedule showing the requested start dates, breaks, and end dates for installation of the site’s infrastructure, i.e., grounding, antennas, supporting structures, etc.
- Names of the Qualified Electrical Line workers, and/or Qualified Communication Workers proposed to perform the work (with qualifications noted) – please refer to Section 8 for additional requirements.
- Name of Applicant’s field foreman/forewoman directing work.
- A complete set of SMUD approved design drawings and documents showing the proposed work with statement and seal per paragraph 9.1.1.
- Agreed upon conditions of service, construction, or maintenance that is specific to the site.

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After reviewing the complete work plan submittal, the SMUD Representative will notify the Applicant if the proposed work plan is approved or not approved. The work plan will be approved if

- the submitted information is sufficient,
- the work can be safely performed,
- the work has no unacceptable adverse effects on SMUD’s electric system operations, and
- clearances can be obtained.

If not approved, discussions between SMUD and the Applicant may take place to resolve any issues, including schedule changes.

The SMUD Inspector will oversee the Applicant’s installation work and coordinate schedules and clearances with SMUD’s Operations Departments. Regardless of work schedules and plans, SMUD may delay work due to factors such as severe weather conditions or power system emergencies.

**** **Please Note** – electrical loads on the system may prohibit some electrical lines from being de-energized until the electrical loads decrease. Therefore, the granting of electrical clearances required to perform the installation or maintenance of antennas through the electric circuit(s) maybe delayed on key facilities for upwards of three months. ****

The SMUD Inspector is authorized to order the Applicant to stop work and/or correct any work practices or construction which: endanger the safety of the work force, the public, or SMUD crews; that impact the reliability of the pole and/or power supply system; or is inconsistent with the approved design.

- 7.7.2** Only Qualified Communication Line Workers are permitted to install, maintain, and work on antennas and associated equipment installed on distribution poles located below the electric supply lines and in the telecommunication space, as defined per GO95.
- 7.7.3** Only Qualified Electric Line Workers are permitted to install, maintain, and work on antennas and associated equipment installed on distribution poles located in SMUD’s supply space, as defined per GO95.
- 7.7.4** SMUD’s rights hereunder to inspect, stop, or otherwise review, comment on, test, accept or approve, any work or facilities shall not impose any duty, obligation, or liability on SMUD with respect to the work or facility, nor shall they impose any duty to inspect, review, or approve the methods by which the work is performed. Nor shall any such action, or failure to take such action, by SMUD prejudice any claim, right or

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privilege that SMUD may have arising out of defective or nonconforming work or facilities, or the use thereof, or relieve Applicant of its responsibility for the work and facilities, or its obligations hereunder or under any Pole Attachment Agreement or NCJPA.

7.7.5 Following design approval and construction, SMUD will prepare a Notice of Contact (Contact Permit).

7.8 METERING REQUIREMENTS

7.8.1 *Per pole location, only one non-metered connection point per pole for a total aggregate of 2200 watts or less (based on maximum nameplate AC wattage of ALL equipment) will be allowed.*

7.8.2 Per pole location, if the total aggregate AC watts are greater than 2200 (based on maximum nameplate rating of ALL equipment at the point of connection), the Applicant will be responsible for installing a meter pedestal (refer to EUSERC drawings 308 and 309) so that the equipment will be metered.

7.8.3 Regardless of whether it is attached in the electric supply or communication level, only **one** non-metered attachment(s) will be permitted per pole.

7.8.4 Applicant shall label/identify their conductors in the SMUD service point. The labels/identification will be permanent in nature, able to survive burial in soil and submersion in water for extended periods of time. Pull boxes will not be allowed in the underground service run.

7.9 POLE REPLACEMENT POLICY

When the installation of an antenna on a SMUD distribution pole requires replacement of the pole with a pole more appropriate for the installation of the communication antenna, SMUD will perform the replacement at full cost to the applicant, except as otherwise may be provided under the Pole Attachment Agreement.

8 CONTRACT CREW REQUIREMENTS

All Contract crews that will be performing work at or above SMUD's secondary conductor level as defined by GO95 will have to meet SMUD's requirements. A detailed list of these requirements and special conditions can be obtained from the Supply Chain Department at SMUD. Some key requirements include:

8.1 All workers must be Qualified Electrical Line Workers certified to work on high-voltage systems (4 kV to 21 kV) and have passed a 4-year apprenticeship-training course.

8.2 All workers must wear appropriate Personal Protective Equipment.

8.3 Contractor and workers shall follow all Federal, State, and Local safety regulations.

8.4 Contractor shall have an Injury and Illness Prevention Program.

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- 8.5 Contractor shall pay prevailing wages.
- 8.6 Contractor shall have a Sight Safety Plan for all installation sites.
- 8.7 Contractor shall have a Contractor B or Specialty C-10 license.

9 DESIGN REQUIREMENTS

9.1 GENERAL REQUIREMENTS

9.1.1 Professional Engineers Responsibility

The Applicant's design documents, drawings, and pertinent calculations shall be approved, signed, dated, and sealed by registered professional engineer(s) in their respective field of expertise for the Electrical, Civil, or Structural designs. The engineer(s) shall incorporate applicable Codes, Standards, and accepted sound engineering practices in the design.

Designs shown in drawings and all calculations shall conform to the requirements of the latest editions of the California General Order 95 (GO95), the California Electric Code, the National Electric Code (NEC), and the National Electric Safety Code IEEE C2 (NESC). All design documents shall be annotated with the following affirmation of the Professional Engineer responsible for the design "I Name of PE affirm that the design presented in this document meets the requirements of GO95 (*year of edition*), the California Electric Code (*year of edition*), the NEC (*year of edition*), and the National Electric Safety Code (NESC) (*Year of edition*)".

9.1.2 Pole loading calculations will be calculated for antenna and equipment installations that will be installed on distribution poles.

Pole structural calculations need to be performed on all poles that will have antennas and associated equipment attached to the pole. The calculations will be done under the supervision of a Professional Engineer licensed in either Civil or Structural Engineering in the State of California. The calculations will be performed:

- On the existing pole, the existing pole with pole top extension, or the proposed pole if the existing pole is to be changed out,
- On all existing electric supply equipment and conductors,
- On all existing telecom equipment and cables, and
- On all proposed and future antennas and equipment.

Note: Pole top antenna loading calculations shall include a Line worker's weight on the pole top extension (if used) and shall include Pole Overturning Calculations per GO95 Rule 94.11.

9.1.3 Pole overturning calculation (For pole top antennas only)

Pole overturning calculations shall use the latest CBC soil profile values (Table 1806.2) and design criteria (1807.3.2) to check if pole embedment is adequate. Do not use O-Calc for this check. If a soil type other than the most conservative value in the CBC table is used, provide strong justification based on good engineering judgement.

9.1.4 Strength Remaining and Safety Factor Requirement

Pole strength remaining and Safety Factor for pole loading calculation shall meet GO95 and SMUD minimum requirements listed below. Applicant is responsible to provide pole testing data and % remaining strength if safety factor is below 4.

Safety Factor		% Remaining Strength	Result
SF < 4	and	< 95%	Fail – Replace Pole
SF ≥ 4	and	≥ 77%	Pass – Pole OK
3 ≤ SF < 4	and	> 95%	Pass – Pole OK

9.2 Applicant must provide the following information about the antenna(s) in their application:

- 9.2.1** Physical dimensions of all equipment and mounting hardware (arms, braces, etc.).
- 9.2.2** Weight of all equipment and center of gravity location.
- 9.2.3** Method of attachment, including hardware and specifications, i.e., bolt size, bolt grade, manufacturer cut-sheets of ALL equipment, etc.
- 9.2.4** The Applicant must self-certify the maximum AC wattage consumption of ALL equipment at the point of connection.
- 9.2.5** Any existing SMUD equipment on the pole (SMUD wireless device, Analog Mixed Signal RF collecting or routing device, DA RF routing device, auto transfer switch, air switch, capacitor bank, transformer, or recloser).
- 9.2.6** The height above ground of the antenna(s).
- 9.2.7** The number of antenna(s) that will be placed on a pole.
- 9.2.8** The AC power consumption of ALL equipment when the transmitter(s) is (are) operating at 100 % duty cycle/fully utilized.
- 9.2.9** Additional information may be required (or a field test may need to be performed) if there is a danger of the Applicant’s equipment interfering with SMUD’s equipment on the same pole or on adjacent poles.

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9.2.10 If upon subsequent inspections of the Applicant’s equipment on SMUD’s distribution pole, it is found that additional equipment has been added without an appropriate request for installation, *the equipment at that pole will be de-energized* until such time that the Applicant can re-apply for the site and re-submit a pole loading calculation sheet for the site as set forth in Section 9.1., this document. The unauthorized equipment may be required to be removed before any further discussion of equipment addition(s) is undertaken. The costs for all SMUD labor hours to resolve this issue will be recovered, in addition to possible fees or penalties.

9.3 Pole Identification

SMUD’s Facility Identification shall be clearly shown on every drawing and document.

9.4 Guidelines for Selecting a Distribution Pole for Antenna Installation

Items to consider during the selection of a distribution pole location for installing an antenna include:

- 9.4.1** SMUD will allow only one pole top antenna structure per pole.
- 9.4.2** SMUD will allow attachments to SMUD solely owned street light poles on a case-by-case basis.
- 9.4.3** If a SMUD antenna already exists on the pole, SMUD will not allow an Applicant’s antenna on the pole.
- 9.4.4** Minimum pole heights must be maintained to accomplish antenna function while minimizing visual impact. New pole height shall not exceed the previous pole’s height plus the 6’ extension required for the antenna.
- 9.4.5** When possible, select a pole supporting only secondary voltage and communications conductors.
- 9.4.6** Regarding poles where a small cell antenna is desired to be placed above primary voltage conductors (4 kV, 12 kV, or 21 kV), only poles with tangent construction will be allowed. Further, those tangent poles:
 - 9.4.6.1** May NOT have SMUD switchable devices on them (including, but not limited to, transformers, capacitor banks, reclosers, switches, risers, and in-line cutouts),
 - 9.4.6.2** May NOT have “Line & Buck” construction (where a second level of primary conductors is/are dead-ended below the primary tangent conductors), and

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9.4.6.3 May NOT have “Line Cross” construction (where a second level of primary conductors cross underneath the primary tangent conductors).

9.4.7 Installation on poles where the existing, or future, SMUD primary voltage exceeds 21 kV will not be accepted.

9.4.8 Ease of access to the proposed antenna location is highly desirable to allow for the maintenance and repair of equipment. Locations along streets or alleys are best. Back yards should be avoided if at all possible, as well as locations adjacent to fences, landscaping, or other obstructions.

9.4.9 If a pole top extension is used to install the antenna above SMUD’s primary conductor, the pole and extension must remain climbable – unless the extension is installed on a pole in an area that is accessible to a 26,000 pound SMUD service vehicle in all weather conditions. Telecom company shall provide the pole top extension mentioned in section 4.8 above, or a non-metallic extension that meets or exceeds the strength requirements of the extension mentioned in section 4.9.

9.5 DESIGN REVIEW BY SMUD

9.5.1 Submittals

Transmittal letters shall accompany all design document and drawing submittals, and shall include the following information:

- Company name, date mailed, and responsible contact person together with contact’s phone, e-mail, and postal mailing address.
- SMUD’s Facility Identification.
- Purpose of document transmittal, e.g., for approval, to record as built documents, etc.
- A COMPLETE Make Ready Application must be submitted before the pole will be reserved for Applicant’s installation.
- A completed Point of Connection Application must be submitted along with the connection fee (paid prior to determining point of connection).
- Listing of Documents transmitted containing the following information for each document:
 - ID number for Drawing or Document,
 - Title for Drawing or Document, and
 - Revision for Drawing or Document.

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9.5.2 Design Criteria

The design drawings, calculations, and specifications shall include at least the following information, where applicable:

- The source fused-disconnect voltage and ampacity will be determined on a case-by-case basis upon submittal of equipment nameplate load information cut sheet. Provisions shall be made to install a SMUD padlock on the switch to prevent public access but ensure SMUD accessibility. In no case shall the Applicant apply a lock to prevent SMUD access.
- Structural calculations of the pole on which the antenna is to be installed.
- Structural calculations of the antenna's attachment point to the pole.
- Structure layout showing antenna, antenna cable installation, switch to turn off all equipment, and all related equipment on the pole. Show these additions and modifications as an integral part of the existing structural layout and detail drawings.
- Elevation equipment layout.
- Description of vertical cable and cableway passing through the supply space, including the maximum possible operating voltage to ground.
- Site plan and topography.
- Meter and accessory panel layout and installation details.
- Power service one-line and schematic drawings.
- Grounding plan and details.
- Service design details.
- Lists of all RF transmit frequencies.
- Lists of all applicable FCC licenses.
- A fully dimensioned plan and elevation views of the RF radiation patterns at the proposed site showing the FCC MPE guideline limits for Specific Absorption Rate (SAR). A single three-dimensional view, with dimensions, would be acceptable.

9.5.3 Electronic Submittals

Drawings and other submittals should be provided in electronic format. This will facilitate a timely review by SMUD. Transmittal by e-mail will expedite the processing between the Applicant and SMUD as well as within SMUD. All drawings shall be in Adobe® (.pdf) formats.

Documents shall be in Word® (.docx), Excel® (.xlsx), or Adobe® (.pdf) formats. Digital photographs should be (.jpg) format. The drawings, documents, and photographs may be zip compressed for e-mail transmittal. Site-specific field conditions may warrant supplemental CAD file submittal.

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9.5.4 Approval Process

9.5.4.1 SMUD’s technical staff will review submittals. The applicant will be notified by e-mail of required changes for submittals that are not approved.

9.5.4.2 Submittals meeting SMUD’s requirements will be signed as approved. SMUD approvals shall be considered valid for a period of one year.

9.5.4.3 The Applicant may revise design submittals that are not approved. The Applicant shall incorporate all SMUD requirements in all documents of the revised submittal package. The Applicant shall resubmit the whole revised package as described above.

9.6 STRUCTURAL DESIGN for Steel Poles (if required) – please refer to SMUD’s Tubular Steel Pole specification SS0204 and SMUD Distribution Line Design Criteria DD7201

9.7 CLEARANCES

9.7.1 Physical Clearances

Antenna, antenna cables, cableways, and all associated hardware shall be installed to maintain clear and safe clearances, climbing space, and working space. The installation shall enable SMUD crews to easily remove, install, and maintain the aerial wires, cables, and insulators and other apparatus installed on distribution poles. The requirements for all joint pole partners or leased attachment must also be accommodated.

9.7.1.1 Working Space

SMUD crews may be required to perform work to change, maintain, and modify supply wires and cables, insulators and other equipment located on distribution poles. Lift buckets may also be used to access equipment located on metal poles. The Applicant shall not place any antenna, or associated equipment such as antenna cable ladder(s), cableway(s), or any other antenna-associated hardware so as to encumber this access. Drawings shall show sufficient detail so that SMUD is able to confirm that this requirement is met. GO95 climbing and working space shall be maintained.

9.7.1.2 WHIP Antenna Danger

Whip antenna wire tips shall be made easily visible and the tips covered.

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9.7.1.3 Antenna RF Radiation Danger and Service Disconnect

Radiation from the antenna must at all times be within the limits established by the FCC and by US OSHA (regulations 1910.97 paragraph (a) (2) (ii)). The Applicant shall install an appropriate RF caution sign {refer to US OSHA regulations 1910.97 paragraph (a) (3) (iii)} at the base of the pole where these limits can be exceeded. See paragraph 8.8.3 for RF Caution sign specification.

9.7.1.4 Antenna Electric Touch Potential Danger

If any exposed antenna part is operated at a potential that might cause a muscular reaction when touched, the Applicant shall install a warning sign reading "DANGEROUS ANTENNA VOLTAGE." This sign shall be installed at the base of the pole where the danger exists. See paragraph 8.8.2 for Hazardous Antenna Voltage specification.

9.7.1.5 The Emergency Power Off (EPO) switch for Strand Antennas shall be between 18" and 3' of the poles surface, enabling a Linemen to reach out and turn off the antenna while climbing past the antenna's location.

9.7.1.6 The antenna must be at least 6' away from the nearest pole's surface. Should this conflict with the measurements in 9.7.1.5 above, the 6' antenna distance will prevail.

9.7.1.7 Clearances from Power Conductors

- **Antennas Placed Below Supply Conductors**

Any equipment installed below the supply conductors shall follow the clearance requirements per G.O. 95 Rule 94.4(A), which must be 6 feet (72 inches) from the supply conductors. Refer to GO95 Rule 94 and to Drawing 9.6 this document.

- **Antennas Placed Above Supply Conductors**

Minimum distance from the line conductor to the antenna, or its connecting cables, shall meet the requirements of GO95 Table 2, case 21 and the appropriate column and with GO95, Rule 94.

9.7.2 SIGNAGE

The Applicant shall provide all signs in accordance with the requirements of ANSI standards Z535-1, 2, 3, 4, and 5. Signs shall be installed in locations that do not obstruct climbing. Sign locations shall be shown in drawing submittals.

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9.7.3 Antenna Workers Notice Sign

Fasten an ANTENNA WORKERS NOTICE sign to the pole. The sign shall read and be constructed per section 10.1, with the specific location specified.

9.7.4 Hazardous Antenna Voltage Sign

When required by paragraph 9.7.1.4, fasten a HAZARDOUS ANTENNA VOLTAGE sign to the pole. The sign shall read and be constructed per section 10.2.

9.7.5 RF Caution Sign

When required by paragraph 9.7.1.3, fasten a RF CAUTION sign on the pole. The sign shall read and be constructed per section 10.3.

9.8 Electric Service

The electric service for the antenna installation shall be as set forth in SMUD's Rules and Regulations. SMUD shall not be liable for damage to Applicant's equipment or communications issues that may result from fault current, ground potential rise, or other physical or electrical events that may occur in proximity to its power delivery facilities.

10 WARNING SIGNS & DRAWINGS

10.1 ANTENNA WORKERS NOTICE SIGN

10.2 HAZARDOUS ANTENNA VOLTAGE SIGN

10.3 RF CAUTION SIGN

10.4 ANTENNA/TRANSMITTER OWNERSHIP DECAL

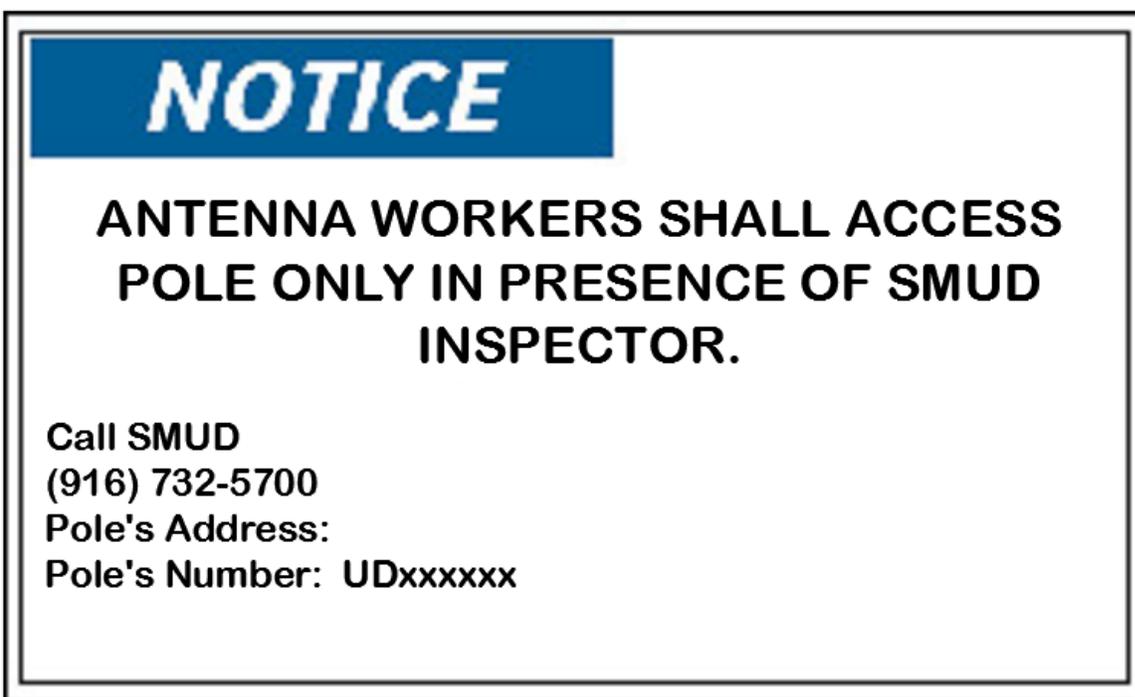
10.5 DISTRIBUTION STEEL POLE TYPICAL ANTENNA REQUIREMENTS

10.6 DISTRIBUTION WOOD POLE TYPICAL ANTENNA REQUIREMENTS

10.7 REQUIREMENTS FOR PASSING CABLES THROUGH SUPPLY CONDUCTORS

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10.1 ANTENNA WORKERS NOTICE SIGN

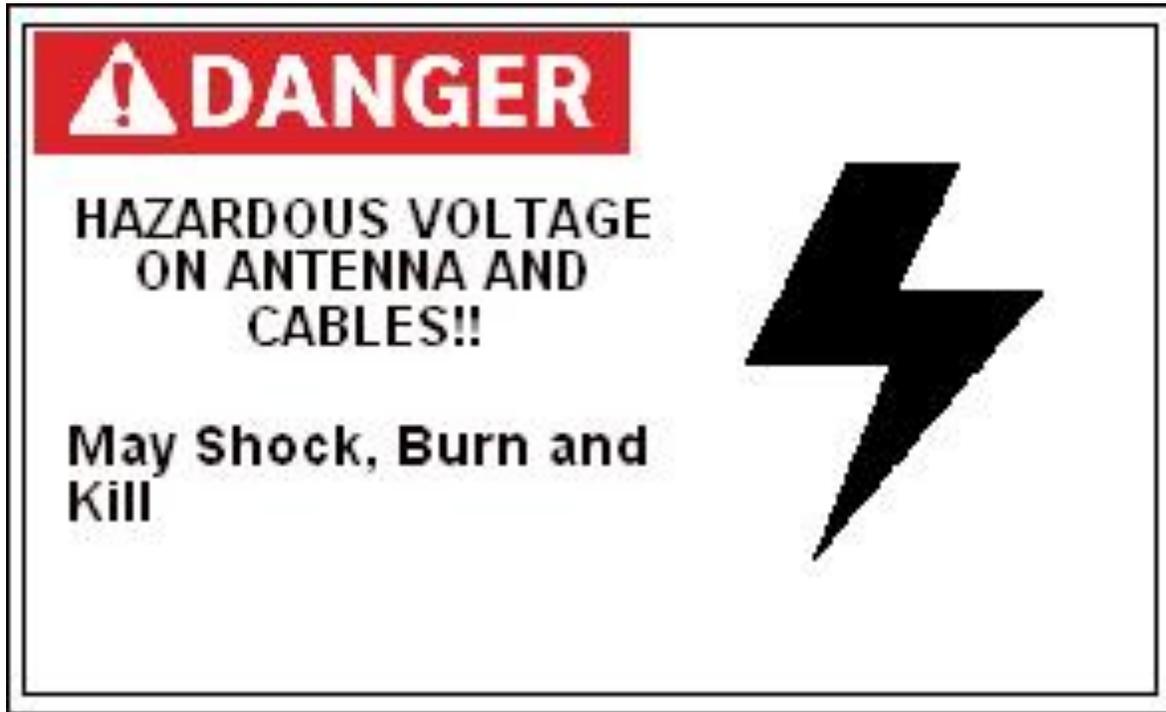


Sign to be used for installations on Poles that have Telecommunication equipment passing through Primary Electric Conductors.

The Applicant shall complete LOCATION letter placeholder by using the numbers to replace these placeholders from the job package. Make sign from 18 gage steel with Porcelain Enamel finish, Blue "Notice" header with all other copy and symbols black on white background, size 8.5" x 14", 4 holes with 1/2" i.d. brass grommets, located 1/2" in from each corner, (Standard Sign Blank).

Electromark part No. SMD048-W-ZD-AN2 or approved equal.

10.2 HAZARDOUS ANTENNA VOLTAGE SIGN



Make sign from 18-gauge steel with Porcelain Enamel finish, Red "Danger" header with all other copy and symbols black on white background, size 8.5" x 14", 4 holes with 1/2" i. d. brass grommets, located 1/2" in from each corner, (Standard Sign Blank).

Electromark part No. SMD049-W-ZD-AN2 or approved equal.

10.3 RF CAUTION SIGN



Sign 12"X18" aluminum panel with rounded corners and holes located near each of the four corners for convenience in mounting. Manufacture the sign with a special UV resisting coat applied to the surface to increase longevity in outdoor environments.

TESSCO part No. 43875 or approved equal.

10.4 ANTENNA/TRANSMITTER OWNERSHIP DECAL

<p style="text-align: center;">ANTENNA EQUIPMENT OWNED AND OPERATED BY:</p> <p style="text-align: center;">Call (XXX) XXX-XXXX IF THERE ARE PROBLEMS OR IF DE-ENERGIZATION IS REQUIRED. Pole's Address: Pole's Number: UDxxxxxx</p>
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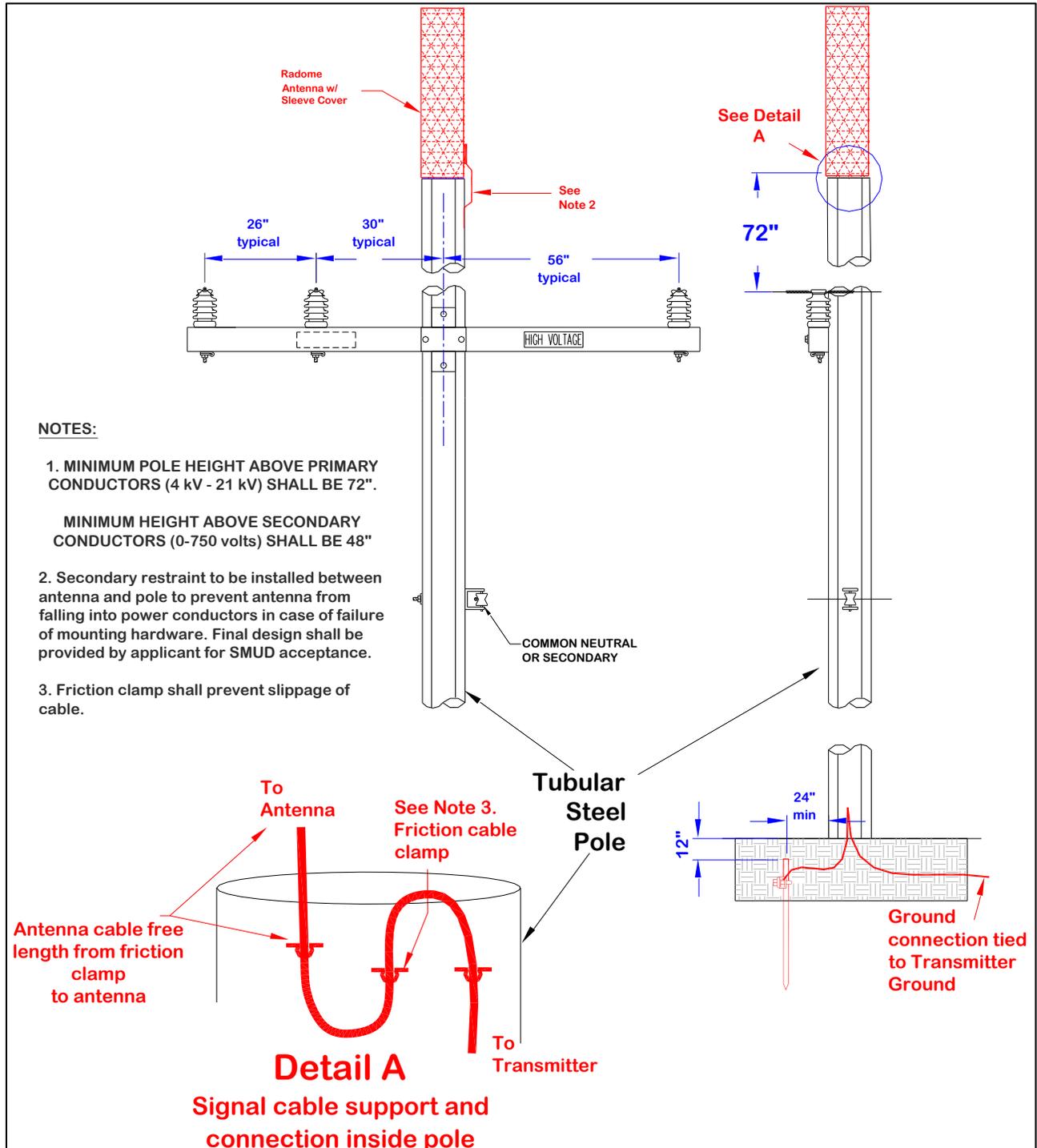
Sign to be used for identification of Small Cell Equipment on Poles.

The Applicant shall apply a decal approximately 3" x 5" (or larger) in size that lists the ownership, the telephone number to contact if the transmitter needs to be de-energized, the address, and pole's UD number.

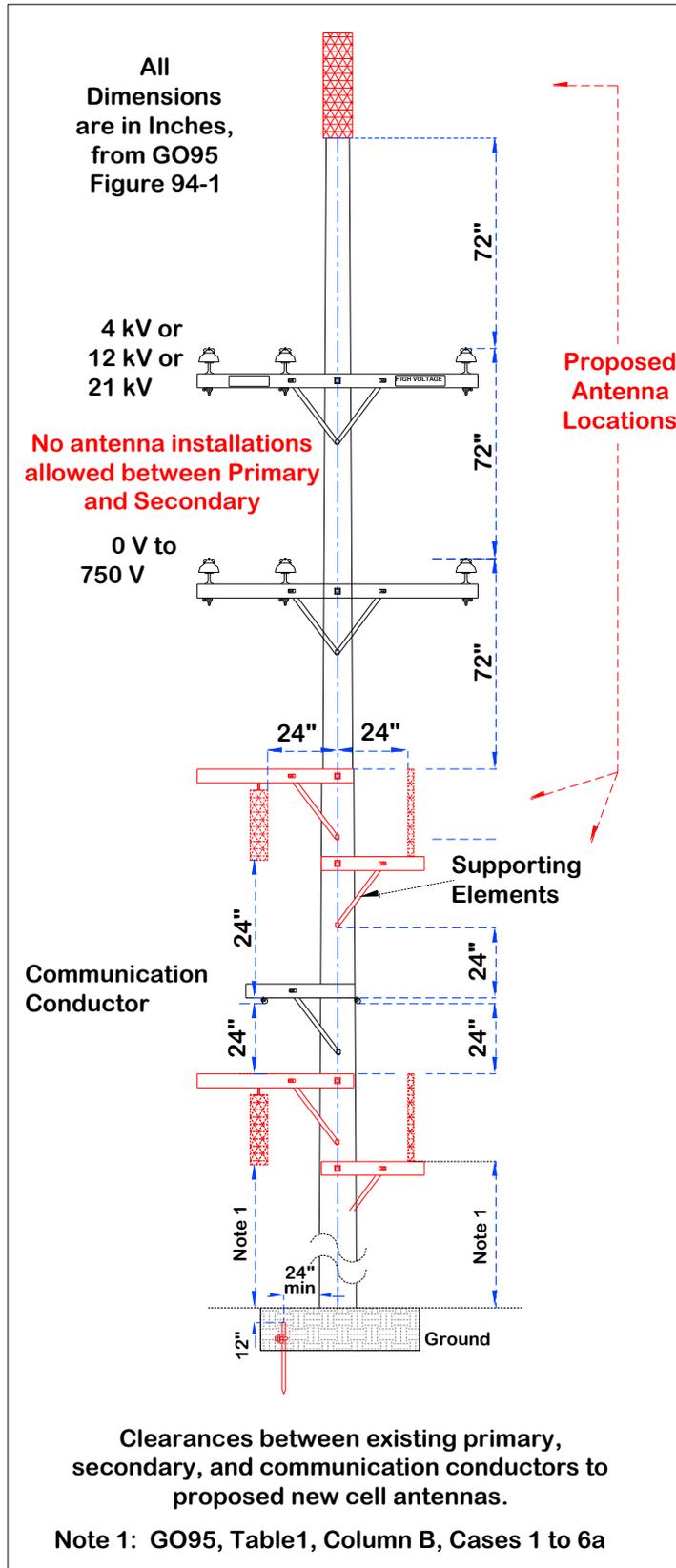
This decal must be located and legible to a person standing on the ground adjacent to the pole.

Manufacture the sign with a special UV resisting coat applied to the surface to increase longevity in outdoor environments.

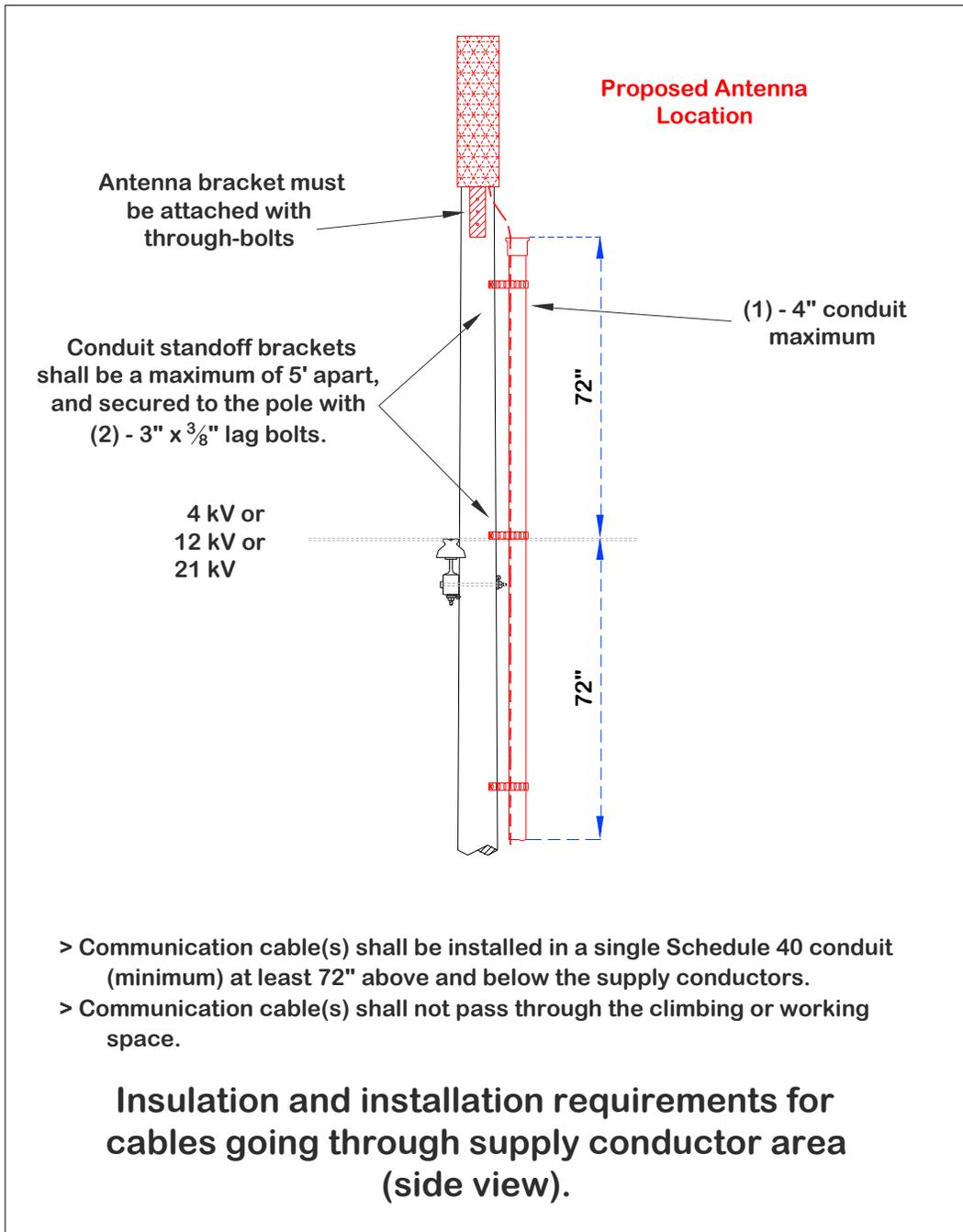
10.5 DISTRIBUTION STEEL POLE TYPICAL ANTENNA REQUIREMENTS



10.6 DISTRIBUTION WOOD POLE TYPICAL ANTENNA REQUIREMENTS



10.7 REQUIREMENTS FOR PASSING CABLES THROUGH SUPPLY CONDUCTORS



This drawing is to show the clearance requirements of the conduit openings with respect to the primary conductors. Actual construction and conduit attachments in the field may vary depending upon the location and the equipment being installed.

If the Telecom Company does not consider that the Schedule 40 conduit will provide adequate insulation value for their cables, they can take appropriate measures to add insulation to their cables as they deem necessary.