



**Design Standards Manual for
Wireless Communication Facilities
Article 1.9**

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Document Terms

Antenna. Communications equipment that transmits or receives electromagnetic radio frequency signals and is used in providing wireless services.

Antenna Mounting Bracket. The hardware required to secure the antenna to the pole.

Antenna Mounting Post. A vertical post or pipe onto which the antenna-mounting bracket is mounted in order for the antenna to be attached to the pole.

Antenna Shroud. A three-sided cover that is mounted at the base of the antenna to conceal the appearance of the cables and wires from the hand-hole port on the pole to the bottom-fed antenna.

Canister. A cylindrical cover used to conceal the antenna(s), amplifier(s), radio(s), cables, and wires at the top of a pole.

Dog House. A plastic or metal cover that attaches to the base of a pole to conceal the transition point between the underground cables and wires to the vertical section of the pole.

Equipment Cabinet or Building. An enclosure that is mounted above base flood elevation or placed on a concrete slab that contains improvements, personal property, and/or facilities to operate its Antenna(s) for Permitted Uses including: radio receivers, transmitters, related facilities and/or cabinets, related cables and utility lines, a location-based power source (which may include a battery), an electrical meter, and any other equipment that may be necessary for the operation of wireless antenna.

Ground Mounted Equipment. Any equipment mounted to a separate post or to a foundation on the ground.

Handhole. A hole large enough only for the insertion of a hand and arm to access internal cables and wires located within a wireless support structure.

Light Emitting Diode (LED). A type of lighting fixture installed on light poles.

Light Fixture. The lighting unit or luminaire that provides lighting during the evening hours or hours of darkness.

Luminaire Mast Arm. The horizontal post that attaches a light fixture.

Microcell. A device that is connected to aerial facilities and used solely for transmitting, processing and receiving voice and data wireless telecommunications services, without any associated ground mounted equipment. The device is also referred to as an ASME (Aerial Strand Mounted Equipment).

Monopole. A single pole attached to a permanent foundation.

Omni Antenna. A style of antenna that projects radio frequencies in a 360-degree pattern.

Panel Antenna. A rectangular style of antenna that projects radio frequencies in a single directional pattern.

Pole Diameter. A measurement taken from the outer edges of a pole.

RAD Center. The center point of radiation emitted from an antenna. Measurements on facility plans are commonly calculated from this point.

Remote Radio Heads (RRH) / Remote Radio Units (RRU). Electronic devices that amplify radio signals to increase the distance of the outgoing radio signal from the antenna.

Sight Visibility Triangle (SVT). The traffic engineering standard that requires clear visibility by the driver of a vehicle to crossing traffic at a stop sign, driveway or intersection. To achieve clear visibility of the cross traffic, the land areas within the sight visibility triangle have specific maximum heights for landscaping, cabinets, and other potential visual obstructions.

Small Wireless Facility. A Wireless Communication Facility that meets both of the following qualifications:

1. All antennas are located inside an enclosure of not more than six (6) cubic feet in volume or, in the case of an antenna, that has exposed elements, the antenna and all of the antenna's exposed elements could fit within an imaginary enclosure of not more than six (6) cubic feet in volume.
2. All other wireless equipment associated with the facility is cumulatively not more than twenty-eight (28) cubic feet in volume, or fifty (50) cubic feet in volume if the equipment was ground mounted before the effective date of this section. The following types of associated ancillary equipment are not included in the calculation of equipment volume pursuant to this subdivision:
 - a. An electric meter;
 - b. Concealment elements;
 - c. A telecommunications demarcation box;
 - d. Grounding equipment;
 - e. A power transfer switch;
 - f. A cutoff switch; and
 - g. Vertical cable runs for the connection of power and other services.

Stealth and Concealment. The application of design standards to ensure wireless facilities blend in with the surrounding area to the maximum extent feasible, including but not limited to shrouds, decorative elements, faux elements, and ground equipment screening.

Stealth Building Element. A non-residential building element designed to conceal and/or camouflage wireless communications facilities, including but not limited to a wall mount, clock tower, cupola, or church steeple.

Stealth Structure. A structure designed to conceal and/or camouflage wireless communications facilities. A stealth structure may include, but is not limited to, a free-standing structure such as an artificial cactus, artificial tree, or a sculpture. A stealth structure does not include a flagpole, monopole with an attached flag, and a monopole with a minimal design feature.

Wireless Support Structure (WSS)

1. WSS means any of the following:
 - a. A freestanding structure, such as a monopole;
 - b. A tower, either guyed or self-supporting;
 - c. A sign or billboard; or
 - d. Any other existing or proposed structure designed to support or capable of supporting small wireless facilities.
2. WSS does not include a utility pole

Applicability

The standards contained in this manual shall apply to all Wireless Communication Facilities (WCFs) located on private or Town-owned property. A separate set of Council-adopted standards have been approved for facilities in the Town rights-of-way.

1 General Standards for All Wireless Communication Facilities

1.1 Location Standards

1. Separation Standards from Underground Utility Infrastructure

- a. All structures shall maintain the following minimum separation distances (measured horizontally from furthest exterior edge of each) from existing underground utility infrastructure:
 - (1) Six (6) linear feet from water lines;
 - (2) Six (6) linear feet from sewer lines;
 - (3) One (1) linear foot from Telecommunications equipment;
 - (4) One (1) linear foot from Cable Television lines; and
 - (5) Six (6) linear feet from all other utility infrastructure.
- b. The Town, in its sole discretion, may grant a variance, upon approval by the Town Engineer, from these horizontal separation standards, dependent on factors specific to the site.
- c. In the case where there is an issue with horizontal separation from other underground utilities, the authorized installer may elect to work with the impacted utility provider to have lines, pipes or property moved so that minimum separation can be achieved. All relocation of Town-owned or privately-owned utilities shall be at the sole expense of the authorized installer.

2. Separation Standards from an Light Pole

- a. All structures shall be located a minimum five (5) feet from the original pole. The Town, in its sole discretion, may increase the minimum separation standard to ensure construction can occur safely.

3. Separation Standards from Sidewalks or Curbs

- a. All structures shall be separated from an existing sidewalk by a minimum of one (1) foot or from the back of curb by a minimum of four (4) feet. The Town, in its sole discretion, may increase the minimum separation standard to ensure the safe use of the adjacent area.

4. *Sight Visibility Triangles (SVT)*

- a. All structures shall be installed in a location that does not interfere with Town SVT safety requirements.

5. *Interference with Town Operated Networks*

- a. The selection of a proposed location for a WCF shall consider the potential interference with any Town operated networks.
- b. The Town may require a technical report to determine the potential for interference with Town networks, and if deemed necessary, may require a re-design or re-location of the proposed structure in order to remove the interference.

1.2 Standards for Equipment Mounted to a Wireless Support Structure (WSS)

1. *Antenna mounting standards*

- a. For Small Wireless Facilities, all antennas shall be mounted to the pole so that the distance from the “face” of the wireless support structure, measured to the back of the antenna does not exceed nine (9) inches. For all other WCFs the antennas shall be placed as close to the pole as feasible.
- b. Mounting posts shall be trimmed so that the posts do not extend higher than the top of the antenna or protrude lower than the antenna, unless necessary to install a shroud.
- c. All pole mounted equipment shall be a minimum of twelve (12) feet above the existing grade of the foundation.

2. *Antennas (for Small Wireless Facilities only)*

- a. All antennas for a Small Wireless Facility shall fit within an imaginary enclosure of not more than six (6) cubic feet in volume. (NOTE: This volume does not include antenna cable shrouds when required.)
- b. All antennas with exposed cables from the bottom of the antenna shall have a shroud installed on the antenna or antenna mounting posts to conceal the cables.

- (1) The Town may require the shroud to be installed at a forty-five (45) degree angle (away from the bottom of the antenna; toward the pole) or a ninety (90) degree angle (parallel to the bottom of the antenna).
- (2) The shroud shall extend from the bottom of the antenna to two (2) inches below the bottom of the nearest hand-hole.

3. *Canisters*

- a. Canisters are considered a concealment element and are not associated with the function of the antenna, therefore when designed to cover an antenna array, the canister will not count towards the maximum cubic feet allowed.
- b. When antennas are placed in a canister, the canister shall be no larger than eighteen (18) inches in diameter, measured from the outside edges.
- c. Antennas located within a canister shall have the canister mounted to a base plate at the top of the vertical section of the pole.
- d. Cables protruding from the canister shall be concealed within the canister or by a shroud at the point where the canister is mounted to the base plate.

4. *Remote Radio Heads (RRH) / Remote Radio Units (RRU)*

- a. Remote Radio Heads/Units are not considered to be part of the antenna.
- b. All RRH/RRU units shall be placed behind antennas or within a canister and fully concealed.
- c. Where permitted, the RRH/RRU shall be calculated as part of “All other wireless equipment associated with this facility.” For Small Wireless Facilities, the maximum size permitted is twenty-eight (28) cubic feet.

1.3 Standards for Ground-Mounted Equipment

1. *General Location Requirements*

- a. All ground-mounted equipment, including but not limited to equipment cabinets or power pedestals, shall maintain at least three (3) feet of ingress/egress around the equipment.
- b. Sight Visibility Triangles (SVT). All ground-mounted equipment shall be installed in a location that does not impair or interfere with SVT safety requirements. To ensure proper sight distance, all Town of Gilbert Public Works and Engineering Standards shall be met.

2. *Screening Requirements*

- a. All ground-mounted equipment shall be contained within low-profile cabinets.
- b. Cabinets shall be fully screened from view by a decorative solid enclosure equal to or exceeding the height of the equipment cabinet.
- c. Enclosure access gates shall be opaque, compatible with the enclosure material, and where feasible shall be facing away from the street or primary public view.
- c. The type of screening materials and design shall be architecturally compatible with buildings and fencing in the immediate vicinity. The use of barbed wire, razor wire, chain link, woven wire or other similar material is prohibited.
- d. The Town, in its sole discretion, may waive the screening requirement if it determined that the equipment is located out of the public view. If the Town determines that screening is not required, the Town may specify the paint color of the ground-mounted equipment or require alternative screening solutions such as landscaping.
- e. Any disturbed landscaping or irrigation systems shall be returned to its original state with materials approved by the Town.

3. *Decals and Labels*

- a. Decals, logos and other identification information from the equipment manufacturer shall be removed unless required for warranty purposes or by local, state or federal law.
- b. An “Emergency Contact” decal may be permitted on the ground equipment.
- c. The ground-mounted equipment shall not have any flashing lights, sirens or regular noise other than a cooling fan that may run intermittently.

4. *Equipment adjacent to Residential*

- a. Unless otherwise specified by the Town, a ground-mounted equipment cabinet that contains an air-conditioning unit (not a fan only), shall be enclosed by a solid fence and setback a minimum of fifteen (15) feet from lots with a Residential General Plan designation.

5. *Electric Meters*

- a. Electric meters shall be placed in a location that ensures adequate ingress and egress clearances are maintained from private property lines and driveways.
- b. All electric meters shall be installed in a location that does not impair or interfere with the SVT safety requirements of the Town.
- c. The electric meters shall be contained within a “Myers-type” or “Milbank-type” pedestal cabinet that is painted to match the ground-mounted equipment or as specified by the Town.
- d. In the case where screening is not required, the Town may specify the paint color of the electric meter cabinet.

1.4 Removal Standards

1. *Removal of Original Equipment*

- a. The removal of the original equipment (if applicable) shall be coordinated with the equipment owner to determine what components shall be saved or discarded.

2. *Removal of Existing Foundations*

- a. The concrete pole foundation for an original light pole or other structure shall be removed by the authorized equipment installer as instructed by the Town:
 - (1) Partial Removal - The original pole foundation shall be removed and lowered to a level that is twelve (12) inches below existing grade. The remaining foundation shall then be covered with four (4) inches of one-half (1/2”) inch to three (3/4”) quarter inch decomposed granite material. The remaining eight (8) inches shall be native soil.
 - (2) Complete Removal - If it is determined that a complete foundation removal is required, all materials (concrete, rebar, metals, bolts, etc.) shall be removed. The Town Engineer may determine, on a case-by-case basis, the type of backfill material and compaction required.

1.5 Miscellaneous Provisions

1. *Calculating the Base Height of an Existing Pole.*
 - a. The base height, from which the calculation for the “increase in pole height” is referenced to determine overall pole height, shall be calculated as follows:
 - b. *Light Pole*
 - (1) A light pole with a separate luminaire mast arm mounted to the vertical pole shall use the top of the vertical pole as the base height.
 - (2) A light pole, with the luminaire mast arm integrated (e.g. telescopic style pole) into the top vertical section of the pole, shall use the point on the pole where the mast arm is connected plus twenty-four (24) inches as the base height.
2. *Cables, Wires and Jumpers*
 - a. All cables, wires and jumpers shall be located inside a conduit that runs within the caisson and structure, with the exception of where such cables or wires attach to the antenna ports.
3. *Hand holes*
 - a. All hand hole locations shall be identified on the facility plans with the application submittal.
 - b. All hand holes shall be concealed to the maximum extent feasible.
 - c. Hand holes shall be located in a way that ensures the maximum concealment of wires and cables.
4. *Identification and Information Decals*
 - a. For Wireless Communication Facilities, a 4” x 6” Radio Frequency safety decal shall be mounted no less than twenty-four (24) inches from the bottom of the antenna.
 - b. A discreet site identification or number shall be permitted on the structures. The size, color and location of all proposed decals shall be approved by the Town.
 - c. Unless required by local, state or federal law, no advertisements or identifying logos shall be placed on any structure.

5. *Alternative Cable/Wire Concealment Options*

- a. An exterior cable chase and/or dog house may be permitted in areas where the visual impact would not be significant to the surrounding properties.
- b. Where permitted, the materials and paint color of the cable chase and dog house shall be compatible with the proposed structure and shall be reviewed and approved by the Town.

2 Standards for Wireless Communication Facilities on Existing Vertical Elements

2.1 General Standards

1. All WCFs shall be designed to minimize the visual impact to the surrounding area to the maximum extent feasible.
2. All plans shall be signed and sealed by a Professional Engineer registered with the State of Arizona.

2.2 Detailed Standards

1. *Height*
 - a. The maximum height allowed is based on the applicable zoning district as provided in Article 4.7 of the Land Development Code, Table 4.703.E.
 - b. The overall height is measured from grade to top of the highest point of the structure, including all antennas and equipment.
2. *Pole Diameter*
 - a. The overall pole diameter of a replacement pole shall increase no more than 100% for poles with original diameters up to 8 inches and no more than 80% for poles with original diameters larger than 8 inches.
3. *Luminaire Mast Arms (for light poles)*
 - a. All luminaire mast arms shall be the same length as the original luminaire arm, unless the Town requires the mast arm to be different (longer or shorter) based upon the location of the replacement pole.

- b. Unless otherwise approved, all luminaire mast arms shall match the arc (if applicable) and style of the original luminaire arm.
- c. The replacement luminaire mast arm shall be at the same height above the ground as the existing luminaire.

4. *Luminaire Fixtures*

- a. All replacement poles shall utilize the same light fixture as existing, unless otherwise directed by the Town.

5. *Pole Foundation*

- a. All pole foundations shall conform to the Town adopted specifications and shall be modified by a Professional Engineer registered in the State of Arizona to support all proposed pole mounted equipment.
- b. The Town may accept a foundation that has been designed to meet the “worst case” scenario for soil conditions across all of the proposed sites.
- c. The Town may approve alternative “spread” foundations on a case-by-case basis if there are on-site limitations relating to the depth of utilities.
- d. The height of the pole foundation shall be a minimum of two (2) inches above grade if located in a hardscape area or a minimum of six (6) inches above finished grade if located in a turf area. If the pole foundation encroaches into any portion of a sidewalk, then the pole foundation shall be installed flush with the sidewalk.
- e. The Town may require shrouds for the light pole mounting bolts, depending on the location of the pole.

6. *Painting of Replacement Pole*

- a. If the replacement pole is an unpainted galvanized pole, the pole shall not be painted or have a finish unless otherwise specified by the Town.
- b. If the replacement pole is painted, the new pole shall match the existing color and finish unless otherwise specified by the Town.

7. *Painting Antennas and Mounting Equipment*

- a. All antenna mounting brackets and hardware, antenna mounting posts, cables, shrouds and other equipment mounted on a new or replacement unpainted

galvanized pole shall be painted Sherwin Williams “Web Grey” (SW7075) color or equivalent, unless otherwise specified by the Town.

- b. All antenna mounting brackets and hardware, antenna mounting posts, cables, shrouds and all other equipment mounted on a painted new or replacement pole shall be painted to match unless otherwise specified by the Town.

3 Standards for Small Wireless Facilities on New Support Structures

All new wireless support structures shall incorporate the highest level of stealth and concealment of the antennas and wireless equipment in order to minimize the visual impact of the site to the surrounding properties.

3.1 General Standards

1. A new wireless support structure shall be designed to be architecturally integrated and compatible with the use of the surrounding area.
2. A WCF shall be designed to blend in with the surrounding area with minimal to any visual impact.
3. All plans shall be signed and sealed by a Professional Engineer registered with the State of Arizona.

3.2 Detailed Standards

1. *Height*
 - a. The maximum height allowed is based on the applicable zoning district as provided in Article 4.7 of the Land Development Code, Table 4.703.E.
 - b. The overall height is measured from grade to top of the highest point of the structure, including all antennas and equipment.
2. *Stealth and Concealment Elements*
 - a. As part of the stealth and concealment elements of the wireless support structure, the Town may require the authorized installer to install decorative signs or artistic elements on the structure.
 - b. The wireless provider is responsible for the performance of and any costs incurred for regular upkeep, maintenance and replacement (if necessary) of these stealth and concealment elements.

3. *Pole Foundation*

- a. The pole foundation for a new wireless support structure shall conform to civil and structural engineering standards as required by the Town.
- b. The height of the pole foundation shall be two (2) inches above finished grade. However, if the pole foundation is adjacent to or within a sidewalk or ramp, the height of the pole foundation shall be flush with the surface of the immediate area.
- c. Shrouds for the pole mounting bolts may be required.

4. *Painting of Wireless Support Structure, Antennas and Mounting Equipment*

- a. The Town shall identify the paint colors, location of paint, and any decorative treatments that may be required on the new wireless support structure.
- b. The Town shall identify the paint colors for the antennas, antenna mounting brackets and posts, antenna shrouds, and cables.
- c. The Town may require a new wireless support structure to be painted using a powder-coat process.

Contact Information

For questions regarding these Design Standards, please contact the Development Services Department at (480) 503-6700 and ask to speak with a Staff member in the Planning Division.