

## **Design Standards, Concepts, and Requirements for Wireless Facilities in the Rights-of-Way**

### **INTRODUCTION**

The purpose of this section is to provide guidance on the permitting, spacing, construction, installation and maintenance of Small Wireless Facilities (SWF), Utility Poles, Monopoles and Wireless Support Structures in Maricopa's right-of-way as defined by A.R.S. § 9-591, *et seq.*, and recognized in the "Small Wireless Facility Terms and Conditions" document.

The City's goal is to encourage and promote wireless communications coverage for all areas of the City while protecting the integrity of public assets, right-of-way, and easements and to minimize public inconvenience.

This section of the Engineering Design Standards is intended to comply with A.R.S. § 9-591, *et seq.* SWF, Wireless Facilities, Utility Poles, Monopoles and Wireless Support Structures that do not meet A.R.S. § 9-591, *et seq.* definitions will be evaluated on a case-by-case basis with different licensing, design components and fee schedules. For example, SWF larger than the following require a separate wireless license: 6 cubic feet of antennas or 28 cubic feet of ground-mounted wireless equipment.

Definitions pertaining to this section are in the "Small Wireless Facility Terms and Conditions" document. This section is a supplement to the Terms and Conditions document.

This section does not provide International Building Code guidance. Furthermore, it does not apply to City of Maricopa Traffic Barricading, Planning, or Building Safety requirements.

### **GENERAL INFORMATION**

The City administers application, planning, permitting, construction, and maintenance processes in accordance with the following documents:

- Chapter 16 of the Maricopa City Code
- Maricopa Association of Governments ("MAG") Uniform Standard Specifications and Details
- City of Maricopa Engineering Design Standards (this section)
- National Electric Code (NEC)
- National Electric Safety Code (NESC)
- ANSI/TIA 222-H
- OSHA regulations
- FCC Radio Frequency Exposure Guidelines (FCC OET Bulletin 65) and all other applicable radio frequency emissions laws and regulations in effect from time to time
- IEEE C95.1 2005 Standard
- Small Wireless Terms and Conditions
- Small Wireless Site License Application
- Small Wireless Site License
- Licensee shall comply with all applicable zoning, building permit, traffic control, ROW management requirements, Utility Permits, and other permits and regulatory requirements.
- Wireless communications service providers shall adhere to all applicable federal regulations, including but not limited to those issued by the Federal Communications Commission (FCC) and the National Environmental Protections Act (NEPA).

- Licensee shall comply with all applicable rules, guidelines and regulations issued by the Federal Aviation Administration (FAA), and any other agency of the State or Federal government with the authority to regulate monopole and antennas.

## DEFINITIONS

**All definitions in the Small Wireless Terms and Conditions are incorporated into this Section by this reference.**

“Antenna Mounting Bracket” means the hardware required to secure an antenna to a pole.

“Antenna Mounting Post” means the vertical post or pipe that an antenna mounting bracket is mounted to for the antenna to be attached to the pole.

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

“Canister Antenna” means the canister or cylinder style housing used to conceal antenna(s), amplifier(s), radio(s), cables, and wires at the top of a pole.

“Ground Mounted Equipment” means any communications equipment that is mounted to a foundation on the ground.

“Light Emitting Diode” or “LED” is a type of lighting fixture installed on City streetlight and traffic signal poles.

“Light Fixture” means the lighting unit or luminaire that provides lighting during evening hours and hours of darkness.

“Luminaire Mast Arm” means the horizontal post that attaches the light fixture to the streetlight pole or traffic signal pole.

“Outside Diameter” or “OD” means the points of measurement, using the outer edges of a pole, pipe or cylinder.

“Panel Antenna” means the style of antenna that is rectangular and with dimensions that are generally four (4) feet to eight (8) feet in height, by eight (8) inches to twelve (12) inches wide, and four (4) inches to nine (9) inches deep.

“Remote Radio Heads (RRH) / Remote Radio Units (RRU)” means the electronic devices that are used to amplify radio signals to increase performance (distance) of the outgoing radio signal from the antenna.

“Sight Visibility Triangles” means the traffic engineering and safety concept that requires clear view 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 in the sight visibility triangle has specific maximum heights for obstructions of the driver’s vision including landscaping, cabinets, and other potential view obstructions. Furthermore, the area of land adjacent to an intersection, driveway, or roadway has restrictive uses to preserve the view of oncoming or crossing vehicular and pedestrian traffic by drivers in vehicles attempting to merge with traffic or enter a roadway. Requirements can be found in the Engineering Design Standards Section 211.

“Stealth and Concealment Elements” means the use of shrouds, decorative elements, design concepts and faux elements so that a small wireless facility can be designed to blend in with the surrounding streetscape and minimize any visual impact.

“Verticality” means Utility Poles and Wireless Support Structures that exist in public rights-of-way.

## **FEES & CHARGES**

The City Schedule of Fees and Charges sets the price range for any activity or service governed by this Section. The Engineering Schedule of Fees and Charges can be found at <https://ci-maricopa-az.smartgovcommunity.com>

## **LOCATIONS**

Existing verticality will be available to the applicant on a first-in-permit-queue order as submitted using City’s SmartGov on-line permit application system. The requested submittals listed below must be complete without errors, including the construction plans. Applications, construction plans and submittals that are incomplete or contain errors and/or missing information will be deemed “incomplete” and may result in a “denial” if corrections are not resolved. City staff will not “save” or “tag” verticality for any proposed or future sites. The verticality will be approved for the first applicant that submits a completed application free from errors. The City may “save” or “tag” space on Maricopa owned traffic signals, ITS poles, and Wireless Support Structures for future City need.

SWF must meet or exceed current standards and regulations of the FCC, the FAA, and any other agency of the State or Federal government with the authority to regulate monopoles and antennas. If such standards and regulations are changed, the owners of the monopoles and antennas governed by this Section shall bring existing SWF and antennas into compliance with such revised standards and regulations within 3 months of the effective date of the revisions and or updates, unless a different compliance schedule is mandated by the controlling State or Federal agency. Failure to bring into compliance with such revised standards and regulations shall constitute grounds for the removal of SWF or antenna at the owner’s expense.

Preferred SWF locations include locations having the least amount of visual and neighborhood impacts. More so, the preferred locations include commercial and industrial areas, and less preferred locations include residential and school areas.

The City will furnish, upon request, the established address of the proposed verticality (street lights, traffic signals, etc.) if requesting to attach to a City asset. Contact the Engineering Division at 520.316.6839. The applicant is responsible for showing the correct address on each submittal document.

## **UTILITY PERMIT PROCESS – OVERVIEW**

1. Applicants will complete the “Small Wireless Site License Application” using Maricopa’s SmartGov on-line permit application system. SmartGov help can be found at <https://ci-maricopa-az.smartgovcommunity.com/Public/Home>.
2. All requested deployments of SWF will proceed according to the process described in this Section. The City will not process pre-approvals, and communications with City staff will not alter the terms or conditions of any written action taken with respect to an application.

3. The required "Small Wireless Site License Submittal" documents outlined below will be submitted with the "Site License Application," "Wireless Site License," and "Right of Way Application." If the documents submitted are not accurate or complete the "Right of Way Permit" and "Small Wireless License" will not be issued and will be denied.
4. Within twenty (20) calendar days after applicant submits the above documents using Maricopa's SmartGov on-line permit application system, the applicant will check SmartGov to determine if the application is complete, incomplete, denied, or approved. If by the eighteenth (18) calendar day SmartGov is not reporting a status, please contact the Systems Analyst at 520.316.6925 or dspermits@maricopa-az.gov. Some sites may require up to seventy-five (75) business days to review a completed application.
5. The City signed "Small Wireless Site License" and "Utility Permit" authorization or denial will be posted to the SmartGov on-line permit application system.
6. After permit issuance, the applicant and contractor will schedule a preconstruction meeting. Preconstruction meeting requirements can be found under the "Construction" section of this document.
7. Construction of the SWF must be completed within one hundred eighty (180) calendar days after permit issuance. Failure to construct within the time allotted will result in a cancellation of the permit. Time extensions will not be granted. In order to proceed with construction of the site, the applicant must apply for a new permit and pay the appropriate fee through SmartGov.

#### **PERMIT PROCESS – DENIAL OR INCOMPLETE APPLICATIONS**

1. In most cases, within twenty (20) calendar days after applicant submits the above documents the City will notify the applicant if the application is incomplete or denied.
2. If the City intends to deny an application, the applicant will receive a "Deficiency Report" with the specific code provisions, regulations or requirements on which the denial will be based. The "Notice of Denied Application" will be found in SmartGov under the specific case. The applicant will need to reapply and the denied application will be closed.
3. If the City intends to issue an incomplete application, the applicant will receive a "Deficiency Report" with the specific code provisions, regulations or requirements on which the incomplete application will be based. The "Notice of Incomplete Application" will be found in SmartGov under the specific case. An incomplete application, after the second submittal, on the third submittal, will be denied and the denied application will be closed. In order to proceed with the site, the applicant must apply for a new permit and pay the appropriate fee through SmartGov.
4. All conditions listed on the "Notice of Incomplete Application" must be corrected before resubmitting to the City. The applicant will provide a written record (or a correction list) stating what corrective actions were taken.
5. Resubmittals must be submitted through SmartGov. The resubmittal must contain the permit number, City provided site address, and a copy of the correction list.
6. An applicant may file a consolidated application for up to twenty-five SWF if every location in the consolidated application involves substantially the same type of SWF and substantially the same type of structure. The City will deny a consolidated application or bundling of

permits for incomplete applications or for those that do not qualify for consolidated treatment. Consolidated applications will not be accepted for sites that require structural review, new foundations, upgrades to existing facilities, or site-specific reviews.

## **VARIANCE PROCESS**

The City Engineer may administratively approve a variance to the Engineering Design Standards where special conditions would result in unnecessary hardship. The special conditions must relate to the land or structures in question and generally involve topography, shape, size, location, or surroundings. The variance process should not be used as a way to eliminate or reduce safety requirements. Furthermore, a variance cannot be granted unless evidence is presented that satisfies the conditions below.

The following variance questionnaire must be answered prior to the acceptance of an application:

1. Describe the unique conditions and circumstances (including size, shape, topography, locations or surroundings) which are peculiar to the land, structure or building which are not applicable to other lands, structures, or buildings in the same location.
2. Describe how the alleged hardships caused by the literal interpretation of the provisions of the Engineering Standards include more than personal inconvenience and financial hardship and that the alleged hardships were not created or self-imposed.
3. Indicate why granting the variance will not interfere with or injure the rights of other properties in the same location.
4. Will the proposed site and equipment conform to the definitions defined by A.R.S. § 9-591, et seq., and recognized in the "Small Wireless Facility Terms and Conditions" document?
5. Include the applicable submittal documents that support the variance request. Send variance request with permit submittal.

## **SUBMITTAL REQUIREMENTS**

- Site plan. A plan drawn to scale, that identify all antennas by type (e.g. canister, ground, etc.) and all related equipment no less than seventy feet from the SWF site. Site plans shall include:
  - the location of proposed equipment and other structures in relation to existing structures within 100 feet of the pole.
  - dimensions of existing and proposed structures
  - dimensions of existing and proposed ROW (street, curb, gutter, sidewalk)
  - sight distance visibility triangles
  - existing landscaping
- Elevation. Elevations shall include all structures or locations on which facilities are proposed to be located.
- Construction drawings (plans) shall conform to the documents listed in the "General Information" section of this document.
- Three (3) photographs of the proposed site showing different viewpoints (Google Earth or similar snapshots do not meet this requirement since the imagery is outdated.):
  - one (1) at 90 degrees, and
  - the other two at 45 degrees on either side of the proposed location.
  - Photographs shall identify the location of all proposed structures (mark the location with white paint, use an orange cone traffic cone, etc.).
  - Include perspective from the nearest single-family lot.
- A copy of the applicant's agreement or proof of participation as a member of the Arizona Location Service, as set forth in A.R.S. § 40-360.21, e.t. seq.

- Title report for the adjacent private property for proposed monopole locations.
- Color Photo rendering of current and proposed equipment.
- Structural analysis sealed by an Arizona professional registrant.
- Applicant shall provide a copy Construction notice to the adjacent landowner of the project. The notification shall consist of the following:
  - project location,
  - project address,
  - project description,
  - photo rendering,
  - site plan,
  - equipment dimensions (height comparison),
  - applicant's contact information, and
  - a construction schedule
- Equipment and antenna specifications and details.
- Soil analysis to determine if the soil will adequately support the structure and meet electrical grounding requirements.
- Description and copy of other permits required as applicable (Federal Aviation Administration, etc.)
- Name and number of the maintenance company, key point of contact, addresses and phone numbers if maintenance of the equipment is to be contracted out or done by someone other than the applicant.
- Describe the anticipated useful life of the proposed facilities and provide a plan for the removal of the equipment and for the restoration of the site should the equipment be no longer needed.
- To the extent allowed by law, radiofrequency (RF) radiation performance submittals shall include reports and graphics as required by Section 7 of the Terms and Conditions and these Design Standards.
- RF exposure assessments for SWFs attached to utility poles or any other structures not owned by the Licensee, shall graphically illustrate in three dimensions the worst-case exposure levels that exceed FCC limits for service personnel accessing the area near the SWF exposure zones. If the graphic illustration exceeds the FCC exposure limit in any area accessible to workers who would work on maintenance or repair to the adjacent traffic signals, lights, or utility wiring on the utility pole, a narrative must be supplied containing all the information required to provide an RF Safety plan to protect workers from RF exposure above the FCC limits. The applicant shall provide graphics to illustrate RF radiation levels.
- Radio frequency (RF) compliance analysis (radio emission regulatory package) and/or radio frequency safety report to evaluate the electromagnetic energy generated by the antenna and the procedures for working around the site. The analysis will evaluate compliance with FCC guidelines for human exposure to radiofrequency (RF) electromagnetic fields. The intent is to comply with the FCC requirement for "Occupational/Controlled" limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure." The report should be easy to understand by electrical lineman, and traffic signal and streetlight technicians. The clearance distance from the active SWF site should be clearly stated in the report, along with the OSHA requirements and lock out, tag out procedures.
- A written report verifying that, at its maximum load including cumulative effects of multiple facilities, the SWF meets or exceeds the Federal Communication Commission's radio frequency safety standards.
- Radio frequency emissions and interference studies shall be submitted for licensed or unlicensed frequencies if SWF fall within the "SWF locations and Interference Sensitivity

Zones (ITZ)". The ITZ can be found on the City of Maricopa website by searching "Interference Sensitivity Zones."

- Radio frequency report setting forth the maximum RF power level going into the antenna, the frequency range of the antenna, and the rated azimuth angle for any directional antennae.
- Documentation of, or a signed statement by an authorized representative of the applicant, that applicant is in compliance with all conditions imposed in conjunction with such licenses or approvals, a description of the number, type, power rating, frequency range, and dimensions of antennas, equipment cabinets, and related wireless communications facilities proposed to be installed, and engineering calculations demonstrating that the proposed facility will comply with all applicable FCC requirements and standards.

## **DESIGN GUIDELINES**

The following Design Guidelines, along with the standard design specifications, constitute the City's objective design standards and stealth and concealment regulations promulgated pursuant to ARS § 9-593(K). As such, any deviation from these design guidelines may be a basis for the City to deny an application submitted pursuant to ARS § 591, *et seq.*

All wireless facilities subject to this Section shall be designed and installed in a way that

- (1) minimizes the visual impact of the facilities to the public;
- (2) matches the visual context and character of the rights-of-way and the surrounding neighborhood and development; and
- (3) meets the highest standards of visual and functional quality.

## **ANTENNAS AND RRH/RRU**

All antennas shall be installed in a manner that minimizes the visual impact to the public. All work shall be performed in a professional and workmanlike manner.

Antenna Mounting Posts and Brackets:

- All panel antennas shall be mounted directly to the pole or mounting post so that the distance from the "face" of the streetlight pole to the back of the antenna does not exceed nine (9) inches.
- All 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.

Panel Antennas:

- All panel antennas for a SWF shall fit within an imaginary enclosure of not more than six (6) cubic feet in volume in accordance with A.R.S. §9-591(19)(a). (NOTE: This volume does not include antenna cable shrouds when required.)
- All panel antennas with exposed cables from the bottom of the antenna shall have a shroud installed on the antenna or antenna mounting posts to conceal all cables.
- The type of shroud may be ninety (90) degree angle (parallel to the bottom of the antenna) depending on the location of the site. The shroud shall extend from the bottom of the antenna to two (2) inches below the bottom of the nearest hand-hole.

Canister Antennas:

- All canister antennas shall fit within an imaginary enclosure of not more than six (6) cubic feet in volume. (Note: This volume does not include the canister as it is a concealed device and not the antenna.)
- The canister shall be no larger than eighteen (18) inches in diameter (OD).
- All canister antennas shall be in a canister that is mounted to a base plate at the top of the vertical section of the replacement pole.
  - If on decorative pole shall be located below the arm.
  - If on galvanized standard pole, can be located above the arm.
- All 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.
- Canister antennas are required within and adjacent to residential or multifamily properties, including arterial and collector roads that are adjacent to the community.
- Canister antennas will not be tapered.

#### Remote Radio Heads (RRH) / Remote Radio Units (RRU):

- On a case-by-case basis, the City in its sole discretion and – upon reviewing the landscape in the immediate surrounding area, the location of the pole, and stealth options, may allow a site to have an RRH/RRU installed on the pole.

#### General Requirements:

- All SWF antennas, mounting hardware, and cabling shall be covered and painted to match the color and texture of the verticality on which it is mounted.
- The bottom of the hand-hole shall not exceed six inches below the bottom of the antenna.
- Decorative and special designed verticality will be reviewed on a case-by-case basis. City reserves the right to deny SWF attachments if the attachments do not meet City's design standards for stealth and concealment.
- Antennas shall be 50 feet minimum horizontal clearance from public spaces if antenna is at the same elevation as the public space. The guideline is to comply with the FCC estimated "worst case" horizontal distances.
- Install pole numbers on each replacement pole to match the number on the existing streetlight pole being replaced.
- All cables for the wireless equipment and antennas – except where such cables or wires attach to the ports in the antenna – shall be located inside a conduit inside the caisson and pole. There shall not be any externally visible conduit or entry point of the cables.
- All electrical wires for the streetlight luminaire, traffic signal heads, and any City device shall be new and connected to the existing power source for these facilities.

#### Painting Antennas and Mounting Equipment:

- 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 City.

#### Structural Requirement:

The design for the antennas and associated equipment placed in ROW shall be sealed by a registered Arizona structural engineer.

### **GROUND EQUIPMENT (CABINETS, METERS, AND MISC. EQUIPMENT)**

- Equipment and equipment enclosures are required to be screened by a screen wall, painted and landscaped. Landscaping shall be with drought tolerant plants at a rate of 5 ten-gallon size shrubs for every 10 lineal feet.

- All landscaping shall be irrigated for a minimum period of one year. Landscaping shall be maintained throughout the life of the facility.
- Screening and equipment enclosures shall blend with or enhance the surrounding context in terms of scale, form, texture, materials, and color. Equipment shall be concealed as much as possible by blending into the natural and/or physical environment. All screening shall be at the discretion of the City.
- Screening shall consist of building materials, color, accents, and textures as the primary building or buildings adjacent to the site. If no buildings exist on site, ensure that the proposed structure is designed to blend into the environment. Architectural integration is required for equipment enclosures and screening walls.
- Equipment other than antenna shall be low-profile and pad-mounted, unless otherwise approved by the City.
- Equipment location shall be unobtrusive. Alternative placement is required for equipment proposed in front of windows, doors, etc. Equipment shall be placed as close as possible to existing structures and property lines.
- Equipment shall be installed in a location that does not impair or interfere with the Sight Visibility Triangle requirements as dictated in Section 211 of the City of Maricopa Engineering Design Standards; show sight triangle on plans, including calculations.
- Equipment shall be 50 feet minimum clearance from existing right-of-way structures, (i.e. business and monument signs) to prevent view obstructions.
- Unless otherwise specified by City, a wireless equipment cabinet with air-conditioning (not a fan only) shall be enclosed by screening and setback a minimum of fifteen (15) feet from livable space and residential property lines. A variance may be given if the equipment does not produce sound. A noise analysis may be required to demonstrate that the equipment will not produce sound. The applicant may consider underground vaults depending on site conditions.
- Design techniques should be used to reduce the opportunities for graffiti.
- The electric company meters shall be screened or contained within a “Myers-type” or “Milbank-type” pedestal cabinet that is painted to match the ground equipment, in conformance with electric company standards.
- Additional or new communications or electric poles are not authorized.

## **UTILITY POLE DESIGN – STREETLIGHTS**

Applicant acknowledges that the primary purpose of the structures to which the wireless facilities are to be attached remains as street light poles and applicant shall not interfere with the primary purpose of the structures.

### **General Requirements:**

- New street light, wires, luminaries, and associated streetlight fixtures, when required, shall conform to City of Maricopa lighting standards, as defined in Chapter 16 of the Maricopa City Code.
- Street light construction and pole replacement shall match build type of existing streetlight poles.
- Electrical wires for the streetlight luminaire and any other City device on the pole shall be new and connected to the existing power source.
- Applicant shall purchase and store one extra street light pole in anticipation of emergency or routine replacement of poles utilized by Licensee. All replacement poles shall be approved by the City prior to installation.
- Abandoned streetlights shall be salvaged and delivered to the City. Call out delivery arrangements on plans.

- Taper or step-taper design of the existing streetlight pole, to the extent possible and approved by the City. The taper or step-taper will be called out on the plans.
- All equipment, except for the antenna, shall be pad mounted and not attached to the pole.

#### Luminaire Mast Arms:

- All luminaire mast arms shall have the same length, rise, and style as the original luminaire arm, unless otherwise determined by the City based upon the location of the replacement pole.
- The replacement luminaire mast arm shall be at the same height above the ground as the existing luminaire mast arm.

#### Light Fixtures:

- All replacement poles shall have a City approved light-emitting diode (LED) fixture installed, unless otherwise directed by the City.
- All replacement light fixtures shall have a new City approved photo-cell or low profile shorting cap where appropriate.

#### Pole Foundation:

- All pole foundations shall conform to the City's adopted standards and specifications on streetlight design and shall be modified for wireless communications equipment and cables.
- The City, in its sole discretion, may allow the pole foundation design to be "worst case" for all soil conditions.
- A separate, one and half (1 ½) inch diameter schedule 40 P.V.C. conduit shall be installed in the pole foundation for the City's luminaire wire and any additional City wires or cables.
- The City's conduit shall extend a minimum of (2) inches and a maximum of (4) inches above foundation. All forty-five (45) and ninety (90) degree bends shall have a radius of no less than (18) inches and shall be factory bends only.
- All pole foundations shall be at sidewalk grade, unless otherwise noted.
- Shrouds for the streetlight pole mounting bolts may be required for the replacement pole.

#### Painting of Replacement Pole (New Pole):

- The pole design, materials and construction shall conform to AASHTO standards for structural supports for highway signs, luminaries, and traffic signals, based on a wind speed of 80 miles per hour. The pole and all parts shall be hot dipped galvanized steel per M.A.G. 771.
- For powder coated bronze/silver poles, the wireless provider shall replace with same powder coated color and/or color combination.

### **UTILITY POLE DESIGN – TRAFFIC SIGNALS**

Applicant acknowledges that the primary purpose of traffic signal pole shall remain as a pole structure supporting a traffic signal and related streetlight fixtures used to provide traffic control and lighting in the City ROW. The attachment of wireless equipment to a new or replacement traffic signal pole that interferes with this primary purpose will not be approved.

The preferred SWF location is on streetlights, not traffic signals or ITS monopoles. Traffic signal use will be considered if there are no streetlights within 300 feet of a traffic signal.

Traffic signal construction and pole replacement shall match existing traffic signal.

#### General Requirements:

- An SWF shall be designed to blend in with the surrounding streetscape and minimize any visual impact.
- A replacement pole shall match the City of Maricopa standard traffic signal pole, as closely as possible, subject to more specific criteria below.
- For each individual pole type or style used to support the wireless equipment, one spare replacement pole shall be provided by applicant to City in advance so the pole can be replaced promptly in case of a knockdown.

#### Signal Mast Arms:

- The traffic signal mast arms shall be the same length as the original signal, unless otherwise determined by the City.
- All signal mast arms shall match the arc (if applicable) and style of the original signal arm.

#### Luminaire Mast Arms:

- All luminaire mast arms shall be the same length as the original luminaire arm unless otherwise determined by the City.
- All luminaire mast arms shall match the arc (if applicable) and style of the original luminaire arm.

#### Signal Heads:

- All existing signal heads shall be replaced, at no cost to City, with new light-emitting diode (LED) signal heads.
- All signal heads shall be procured from a City approved signal heads supplier or manufacturer.

#### Light Fixtures:

- All replacement poles shall have the City standard LED light fixture installed.
- All replacement light fixture shall have a new photo-cell or sensor installed to City standard.

#### Other City Elements on Signal Mast Arm or Pole:

- All existing emergency signal detection units, video detection cameras, CCTV cameras, Pedestrian push buttons, pedestrian signals, and any other pedestrian or traffic devices shall be replaced with new units by licensee and installed at no cost to the City. Salvaged equipment may be used at the City's discretion if the equipment meets current City Standards, is in like-new condition, and is specifically called out on the UTL permit. All equipment shall be procured from a list of City approved suppliers.

#### Signs and Other Misc.:

- All street name plates or signs, illuminated signs, directional signs and any other existing City approved signs shall be replaced with new signs at no cost to the City. All signs and attachments shall be procured from a list of City approved suppliers.

#### Traffic Signal Pole Foundation:

- All pole foundations shall conform to City standards and specifications for traffic signal pole design and shall be modified for wireless communications equipment, hand holes, and cables.
- The wireless provider shall install a three (3) inch diameter (OD) conduit in the pole foundation for the City's cables and wires for the signal heads, luminaire and devices on the signal mast arm and luminaire mast arm.
- The City's conduit shall have a minimum of four (4) inches and maximum projection of six (6) inches above the top of the pole foundation.

- In addition to the conduits for the City's use inside the pole, the wireless provider shall install one of the two options for its cables and wires:
  - a) One, four (4) inch diameter conduit in the pole foundation; or
  - b) Two, two (2) inch diameter conduits in the pole foundation. The length of the conduit shall extend from the pole foundation to six (6) inches above the signal head mast arm.

#### Painting of Pole, Antennas and Mounting Equipment:

- For powder-coated traffic signal poles, the wireless provider shall replace with same powder-coated color and/or color combination.

### **WIRELESS SUPPORT STRUCTURES – ITS MONOPOLES**

Applicant acknowledges that the primary purpose of the City-owned ITS monopoles to which the antennas may be attached remains as a monopole that provides communication services on behalf of the City and applicant shall not interfere with such primary purpose of the City-owned structures.

- ITS monopole collocations shall conform to Maricopa Detail MAR-704.
- ITS monopoles are only authorized if other verticality does not exist within 1,000 feet.
- If Maricopa Zoning Code (Chapter 16) conflicts with this section, the more stringent requirement will apply.
- Antenna, antenna support structures, and related equipment shall be located, designed and screened to blend with the existing natural or built surroundings and existing supporting structures. All facilities shall be designed and located to minimize their visibility to the greatest extent feasible.
- All wireless communications facilities and related equipment shall comply with the required building setbacks for the zoning in which the facility is located. However, in no instance shall the facility (including antennae and equipment) be located closer than 5 feet to any property line.
- Monopole shall be a non-glossy color and/or exterior finish to minimize visual impacts from surrounding properties. Example: galvanized steel for freestanding, non-stealth facilities; fiberglass artificial bark cladding for stealth tree-like facilities.
- Equipment shall not be artificially lighted unless required by the FAA or other applicable government authority. All objects affecting navigable airspace must comply with Federal Aviation Regulation Section 77 and must be in conformance with the current restrictions for land within one mile of a runway.
- Monopole shall be compatible in scale and integrated architecturally with the design of surrounding buildings and natural setting.

### **WIRELESS SUPPORT STRUCTURES – MONOPOLE (CARRIER OWNED)**

- Monopole in ROW shall conform to Maricopa Zoning Code (Chapter 16).
- If Maricopa Zoning Code (Chapter 16) conflicts with this section, the more stringent requirement will apply, if applicable per A.R.S. § 9-591, et seq.
- Antenna, antenna support structures, and related equipment shall be located, designed and screened to blend with the existing natural or built surroundings and existing supporting structures. All facilities shall be designed and located to minimize their visibility to the greatest extent feasible.
- Monopole shall conform to Maricopa Detail MAR-705.
- Monopole proposed for locations readily visible from the public right-of-way shall incorporate appropriate techniques to disguise the facility and/or blend into the surrounding environment, to the extent feasible.

- Monopoles are only authorized if other verticality does not exist within 1,000 feet.
- Monopoles shall be located at least 1,000 feet from residential zoning.
- A Monopole shall be located at least 1,000 feet from another monopole.
- In Non-Residential Districts, all monopoles must be at least 1,000 feet from another freestanding antenna structure, unless appropriate camouflage or stealth techniques have been used to minimize the visual impact of the facility.
- All wireless communications facilities and related equipment shall comply with the required building setbacks for the zoning district in which the facility is located. However, in no instance shall the facility (including antennae and equipment) be located closer than 5 feet to any property line.
- Stealth or camouflaged facilities shall not have antenna mounts that extend beyond the outside edge of the materials used to provide the stealth or camouflage design.
- Monopole shall be a non-glossy color and/or exterior finish to minimize visual impacts from surrounding properties. Example: galvanized steel for freestanding, non-stealth facilities; fiberglass artificial bark cladding for stealth tree-like facilities.
- Equipment shall not be artificially lighted unless required by the FAA or other applicable government authority. All objects affecting navigable airspace must comply with Federal Aviation Regulation Section 77 and must be in conformance with the current restrictions for land within one mile of a runway.
- Monopole shall be compatible in scale and integrated architecturally with the design of surrounding buildings and natural setting.

## **SITE AND CONSTRUCTION DRAWINGS PLAN REQUIREMENTS**

The purpose of these “Site and Construction Drawing Plan Requirements” is to outline what is required to be shown and illustrated on site and construction drawings (plans). The Construction drawings must be submitted at the same time as the other submittal requirements listed.

There shall be no notations added by the applicant on the construction drawings, submittals, permits, or applications. The City rejects any notations by the applicant that involve or relate to the purpose, nature, or legal effect of the permit or application.

## **SITE PLAN AND CONSTRUCTION REQUIREMENTS**

### **GENERAL REQUIREMENTS**

- Project name and correct address shown on application, permit, plans, etc.
- MAG, City of Maricopa standards/details, and the approved product list materials are called out on construction plans.
- “Typical drawings” in most cases not acceptable; only site-specific drawings for each site are acceptable.
- Confirm City of Maricopa corporate limits by using the GIS Annexation map layer.
- Trench and bore alignments shall be designed behind curb, out from under pavement. The first preference is behind the sidewalk in a public utility easement. The second preference is under sidewalk. The third preference is on the opposite side of the street, behind sidewalk in a public utility easement. The fourth preference is under curb and gutter. The fifth preference is within a median. The last option is under pavement.
- Conform to the Pavement Restoration Process as approved by the City Engineer.
- Show and dimension all concealment and screening elements.

## COVER SHEET

- Vicinity map with section, township, range and parcel numbers.
- Sheet index.
- Engineering company identification and Engineer's seal.
- Statement setting forth the maximum RF power level going into the antenna, the frequency range of the antenna, and the rated azimuth angle for any directional antennae.

## PLAN, PROFILE & DETAIL SHEETS

- Applicable City of Maricopa General Notes.
- On all sheets that have maps or plans, North shall be oriented to the top of the sheet or to the right. Show a North arrow and bar scale on each sheet. Project stationing shall increase from left to right on the sheet.
- Keynote all construction notes. Group construction keynote referencing to a specific symbol (square symbols designate demolition and removals; diamond symbols designate relocations and circular shapes for construction items). Number notes uniquely such that one number represents a specific note that only occurs on the applicable plan sheets. Each construction note should be circumscribed by the appropriate symbol.
- Legend of symbols used for existing and design elements. Use standard MAG symbols.
- All projects submitted for review and/or further processing shall be complete and consist of plans, specifications, structural calculations, geotechnical report, and other documentation as required for the project.
- The engineer responsible for the design must seal all plans and documents submitted for review. The registrant's signature is required on the plans and documents.
- Existing and proposed rights-of-way and easements are dimensioned. Right-of-way lines labeled "RW" or "ROW" and public utility easements labeled "PUE". Clearly differentiate between City of Maricopa and others' rights-of-way.
- Show centerline stationing and offset on plan and profile. Stationing numbers should be chosen to prevent "negative" stationing. On curved sections the stationing should be along the centerline of the curve and not the tangent lines.
- Single plan and profile sheet, scale: 1 inch = 20 feet and not to exceed 500 feet per sheet; separate profiles for each curb and gutter and crown line at 1 inch = 2 feet vertical scale and 1 inch = 20 feet horizontal, using 3-inch separation between profiles.
- In the area of match lines, portions of the same street are not to be repeated on separate sheets. Match lines shall show stationing and adjacent sheet number.
- Intersections shall not be cut by match lines and shall be complete from beginning of curb return (BCR) to end of curb return (ECR) on same sheet. When intersecting streets are to be improved beyond ECR, additional plan and profile sheets should be used to detail the intersecting street. The intersections at the beginning and end of the project shall be fully shown.
- The location and size of all existing and proposed facilities, including but not limited to the lip of the street gutter, the edge of the street pavement, sanitary sewer lines, water lines, irrigation facilities, other utilities (including communications, gas, fiber, power, etc. publicly or privately owned), landscaping, structures, monument signs, business signs, sidewalks, street lights, and traffic signals. All existing utilities shall be shown at their proper location and elevation.
- It is recommended that the applicant uses Arizona811 resources, "Damage prevention and safety begin in the project-design phase. Knowing the location of underground facilities enables designers to plan projects more efficiently — and helps prevent dangerous and costly utility strikes when work on the project begins." Use the Project Designer E-Stake information. The information lists facility owners occupying the ROW. This will provide a

reference point of ROW facility owners, to obtain As-builts or record drawings showing the location of their facilities within the ROW. Contact AZ811 at 602-659-7500.

- Show diameter and variety of trees and shrubs.
- Proposed cable route and length proposed by applicant for power source, and voice and data communication lines between the equipment cabinet and the antenna.
- On existing roadways and intersecting streets, the plans shall show dimensions from monument line to rights-of-way and to existing back-of-curb. Clearly dimension and label existing medians, sidewalks, curb ramps, etc.
- Pavement cuts and potholes shall be shown and dimensioned on plans.
- Pavement and concrete restoration shall be dimensioned and labeled.
- All existing utilities that will be crossed shall be shown at their proper location and elevation.
- All facilities placed within public rights-of-way shall bear an identification plaque bearing the company name, address and emergency phone number of the facility owner. The plaque shall be stamped or engraved with letters 1/8" minimum in height. The identification plaque shall be aluminum, stainless steel or other non-corrosive metal. The plaque shall be permanently attached with stainless steel screws or rivets. The plaque shall be visibly placed on the top or as near as practicable to the top (and bottom if mounted on a pole) of the facility (cabinet, junction box, etc.)
- Hand-hole locations shall be called out on the plans.
- Plans shall clearly show the actual areas for location of Equipment Cabinet(s) with dimensioned clearances from existing infrastructure.
- Cables placed a minimum of thirty-six (36) inches below existing grade within schedule 40 PVC conduits or better.
- All equipment shall be installed in a location that does not impair or interfere with the sight visibility triangle requirements as dictated in these Standards; show sight triangle on plans, including calculations.

## TOPOGRAPHY AND NOTATION

- Show existing site conditions and topography to at least 10 feet beyond rights-of-way line or any easements. Use standard City symbols where applicable.
- Show all subdivision names, block numbers, lot numbers, property splits, lot dimensions, and property addresses. Show all names of major businesses, schools, fire stations and other public facilities.
- Show all existing alleys and easements with proper designations and dimensioning.
- Show all utility poles. Differentiate between power poles with street lights and those without. Additionally, show all traffic signal poles and their appurtenances.

## RADIO FREQUENCY

- The application shall include sufficient information for an approved radio frequency specialist or electrical engineer specializing in Electromagnetic Field (EMF) or Radio Frequency Radiation (RFR) studies (hereinafter, "an approved specialist") retained by the City to provide peer review of the information submitted.
- SWF shall have an on-site manual with indicator light "kill switch" to de-energize all RF-related circuitry and components at the site. For collocation facilities, a single "kill switch" shall be installed that will de-energize all carriers at the facility in the event of an emergency.
- Within ninety (90) days after FCC issuance of an operational permit for the SWF the applicant shall submit a written report providing existing measurements and worst-case predictions of RF power density levels for:

- Existing SWF: Report the maximum RF power density levels (spatially averaged per FCC Guidelines) measured in the areas identified as readily accessible to the public or workers;
  - Existing SWF plus cumulative: Maximum estimate of RF power density levels (spatially averaged per FCC Guidelines) measured in the SWF RF environment to be inclusive of any other significant contributors to the RF environment (i.e. co-located SWF). Definition of “Significant Contributors” to be any contributor > 5% of the FCC Public limit at any measurement locations;
  - Certification signed by a competent person stating that RF radiation measurements are performed with properly calibrated test equipment and meet FCC guidelines.
- If at any time during the term of the Site License the City has reasonable evidence that the applicant is not in compliance with FCC Guidelines, and the City provides written notice of such, the applicant so notified shall provide to the City, within thirty (30) days after such notice, an analysis and determination of its compliance with FCC guidelines showing the data collected and the status pursuant to FCC Guidelines. If on review, the City finds that the SWF does not meet FCC Guidelines, the applicant shall immediately turn off the SWF and shall have sixty (60) days from the City’s findings of noncompliance to bring the SWF into compliance.

## **CONSTRUCTION REQUIREMENTS**

Construction work in the ROW will conform to the documents listed in the “General Information” section of this document, including material testing as outlined in the City of Maricopa Construction and Material Specifications and Details.

## **GENERAL PRECONSTRUCTION MEETING AGENDA ITEMS**

- Preconstruction meetings are required for each site.
- Attendees will include City inspector, bore monitor, traffic barricading coordinator, and/or ITD/transportation staff, if applicable, and City utility locator for larger projects.
- In general, preconstruction meetings will review the following:
  - Confirm existence of permit, plans, and specifications.
  - Confirm pavement restrictions.
  - Coordinate with City’s CIP work, where applicable.
  - Obtain construction schedule.
  - Obtain emergency contact information.
  - Confirm citizens have been notified of construction impacts by letter. Sample shall be provided to the inspector at the preconstruction meeting and placed in master permit file.
  - Confirm equipment location is inconspicuous.
  - Construction limits shall be identified by white paint before preconstruction meeting.
  - Discuss inspection requirements.
  - Confirm project notification sign meets City requirements, if applicable.
  - Confirm utility bores meet City requirements.
  - Identify pavement replacement limits.
  - Coordinate work with Public Relations as needed.
  - Material testing frequencies.

## **GENERAL CONSTRUCTION REQUIREMENTS**

- All construction and maintenance activities in the ROW shall be subject to inspections.
- All improvements, construction and maintenance activities on the ROW shall be in accordance with the terms and conditions of the ROW permit and in compliance with ROW improvement standards.

- Trench widths conform to table MAG 601.2.2. Open trenches do not exceed 300 feet in the aggregate in any one location per MAG 601.2.10. The width of the trench identified in the table shall be made as wide as necessary for shoring, bracing, and for proper installation.
- All disturbed landscape and irrigation systems shall be replaced or repaired in-kind.
- Where construction is being done on private property, the applicant will obtain written permission for the project from the property owner.
- The Public Works Inspector may provide a generic inspection checklist per applicant request.

## **STREETLIGHT CONSTRUCTION**

The City of Maricopa requires at least one IMSA Level 1 Roadway Lighting or Traffic Signal Technician on site during all phases of any street light work. It will be the responsibility of the contractor to provide verification of current certification. If a job is inspected and a certified technician is not on site, the job will be shut down. This same requirement also applies to lighting within parking lots constructed owned or maintained by the City of Maricopa.

Inspections shall be requested by the contractor in accordance with the following list:

- Before starting project (pre-job inspection).
- Before filling pull box holes with aggregate.
- Before backfilling trench and covering conduit.
- When the pole foundations are dug, anchor bolts, ground wire and ground plate are ready and in place, prior to pouring concrete.
- Before pulling wire.
- Before installing fixtures, and photocell.
- Before making splices.
- When project is completed. If necessary, a list of discrepancies will be submitted to the contractor for corrective action.

Failure to have these items inspected and approved before proceeding will result in rejection of the work done, and removal of all such work will be required.

Before disconnecting any existing street lights, the new light system shall be working or temporary lighting installed. Existing street lights to be removed and new street lights shall not operate at the same time.

## **TRAFFIC SIGNAL CONSTRUCTION**

The installation work of the replacement traffic signal pole, including mast arms, signal heads and devices, must be performed by a AZ licensed Traffic Signal Contractor with a minimum of five (5) years of experience installing traffic signals.

City of Maricopa requires at least two International Municipal Signal Association Certified Traffic Signal Technicians on site during all phases of any traffic signal work. One technician must be a level II. It will be the responsibility of the contractor to provide verification of certification. If a job site is inspected and certified technicians are not on site, a stop work order will be issued. Temporary and contract employees do not satisfy this requirement.

## **OPERATION AND MAINTENANCE STANDARDS**

- To ensure the structural integrity of SWF, the owner of the equipment shall ensure that it is maintained in compliance with standards contained in applicable State or local building

codes and the applicable standards for SWF published by the Electronic Industries Association, as amended from time to time.

- All equipment, including lighting, fences, shields, cabinets, and poles, shall be maintained in good repair, free from trash, debris, litter, graffiti and other forms of vandalism, and any damage from any cause shall be repaired as soon as reasonably possible to minimize occurrences of dangerous conditions or visual blight.
- Graffiti shall be removed from any facility or equipment as soon as practicable, and in no instance more than thirty (30) calendar days from the time of notification by the City.
- Each facility shall be operated in a manner that will minimize noise impacts to surrounding residents and persons using nearby parks, trails, and similar recreation areas. All air conditioning units and any other equipment that may emit noise that would be audible from beyond the equipment shall be enclosed or equipped with noise attenuation devices to the extent necessary to ensure compliance with applicable noise limitations.