

**MEMORANDUM**

Agenda Item # 9 & 10

To: Metropolitan Planning Commission  
From: Jeff Archer, AICP, Principal Planner  
Date: July 20, 2017  
Subject: City of Knoxville and Knox County Wireless Communications Facilities Ordinances

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Recommendation:

MPC staff recommends that the City of Knoxville and Knox County Wireless Communications Facilities Ordinances be postponed until the September 14<sup>th</sup> MPC meeting. This will allow further public review of the two ordinances. Specifically, allowing staff to host a public workshop to present these ordinances to the public and be available to answer questions. The workshop is scheduled for August 31<sup>st</sup> at the Kansler Family YMCA, 616 Jessamine St at 6:30 PM.

**Sec. 20. Wireless Communication Facilities (WCF)****A. Purpose.**

The purpose of this section is to create a legal framework for the siting and appearance of wireless communication facilities through regulations that will:

1. Promote and protect the public health, safety and welfare, preserve the aesthetic character of the community, and to reasonably regulate the development and operation of wireless communication facilities within the City to the extent permitted pursuant to State and Federal law;
2. Encourage the collocation of antennas on existing towers and structures;
3. Protect residential zones, historic districts, scenic highways and parkways from excessive development of WCFs by ensuring that towers in or near these areas are only sited when alternative facility locations are not feasible;
4. Accommodate the growing demand for wireless communication services;
5. Enable WCF providers to furnish comprehensive and efficient wireless communications service to the community minimizing the adverse impacts of their facilities;
6. Encourage the use of the latest technology through advances in siting and design;
7. Establish clear standards for an orderly process for permit application review.

**B. Definitions.**

“Antenna” means one or more rods, panels, discs or similar devices used for wireless communication, which may include, but is not limited to, omni-directional antenna (whip), directional antenna (panel), and parabolic antenna (dish).

“Antenna Array” means a single or group of antenna elements and associated mounting hardware, transmission lines, or other appurtenances which share a common attachment device such as a mounting frame or mounting support structure for the sole purpose of transmitting or receiving electromagnetic waves.

“Base Station” means a perimeter boundary (often fenced) containing the tower and equipment shelters, and associated equipment that enables wireless communications between user equipment and a communications network.

“Collocation” means the mounting or installation of transmission equipment on an eligible support structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.

“Distributed Antenna System” or “DAS” means a network consisting of transceiver equipment at a central hub site to support multiple antenna locations throughout the desired coverage area.

“Equipment Shelter” means a building that contains ground related WCF equipment. The shelters are often located in base station areas.

“Small Cells” means compact wireless base stations containing their own transceiver equipment and function like cells in a mobile network but provide a smaller coverage area than traditional cell towers.

“Tower” means any structure built for the sole or primary purpose of supporting any FCC licensed or authorized antennas and their associated facilities, including structures that are constructed for wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul, and the associated site.

“Tower Height” means the vertical distance measured from the base of the tower structure at grade to the highest point of the structure, not including lightning rods or antennas.

“Transmission Equipment” means equipment that facilitates transmission for any authorized wireless communication service, including, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, and regular and backup power supply. The term includes equipment associated with wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

“Wireless Communication Facilities” or “WCF” means a staffed or unstaffed facility or location for the transmission and/or reception of radio frequency (RF) signals or other wireless communications or other signals for commercial communications purposes, typically consisting of one or more antennas or group of antennas, a tower or attachment support structure, transmission cables and other transmission equipment, and an equipment enclosure or cabinets.

“WCF Development Plan Review Process” means the public hearing process whereby either the Metropolitan Planning Commission reviews applications for consistency with the standards set forth within this ordinance.

### C. **Statement of Preferred Locations.**

There are preferred locations for WCF’s within these regulations. The regulations encourage an administrative approval process for collocation, small cell and Distributed Antenna Systems (DAS), and new towers located in the preferred ranking list, see subsections C.3.a through C.3.c. New towers sited in the least preferred location, shall require review by the Metropolitan Planning Commission (MPC), see subsection C.3.d.

1. Collocation of WCF on an existing tower and attachment to a building or structure should first be sought.
2. The City regulates the siting and design of small cell and Distributed Antenna Systems (DAS) within its right-of-way through a separate permit process and design guidelines set forth within the City’s Land Development Manual. These zoning regulations address location and design of small cell and DAS towers on lots, see subsection D.2.
3. New towers shall be an option of last resort. Where new tower construction is absolutely necessary, the following list provides preferred locations, ranked from most preferred (a) to least preferred (d).
  - a. Industrial Zones or Business Parks (I-1, I-2, I-3, I-4, BP-1);
  - b. Commercial or Office zones, form based districts, and downtown overlay (O-1, O-2, O-3, C-1, C-2, C-3, C-4, C-5, C-6, C-7, SC-1, SC-2, SC-3, PC-1, PC-2, SW 1-7, CU 1-5, and D-1);
  - c. Other zones (A-1, OS-1, OS-2); and

- d. Residential zones (R-1, R-1A, R-1E, EN-1, EN-2, R-2, R-3, R-4, RP-1, RP-2, RP-3, TND-1, TC-1); within two thousand feet (2,000') of a Scenic Highway or Tennessee Parkway; or Historic Districts (H-1, NC-1).

#### D. Development Standards.

1. Locating on an Existing Tower, Structure, and Building. New WCF facilities must, to the maximum extent feasible, collocate on existing towers, structures or buildings to avoid construction of new towers, unless precluded by structural limitations, inability to obtain authorization by the owner, or where the existing facility will not meet the service coverage objectives of the applicant.
  - a. Existing Tower
    - 1) An existing tower may be extended a maximum of ten percent (10%) higher.
    - 2) Expansion of a base station to accommodate accessory equipment is permitted provided the base station is designed in accordance with the standards in Sections D.3.f.2 and D.3.h.2.
  - b. Existing structures (excluding existing towers) or buildings may accommodate new WCF's, provided antennas and supporting structures are not higher than thirty feet (30') above the highest point of the existing structure or building.
    - 1) New WCF's should be camouflaged, disguised, or concealed whenever possible to make them compatible and blend into the setting and host structure or building.
    - 2) Roof-mounted transmission equipment and antennas should be set back from all roof edges to the maximum extent feasible, if b.1 above is not achievable.
2. New Small Cell and DAS Tower Development Standards.

For the purposes of this ordinance, references to small cell shall also include DAS. All development standards for small cell towers are contained within this subsection and are not subject to subsection 3. New Tower Development Standards.

  - a. Tower Height. Towers shall not exceed forty (40') in height when existing or proposed buildings and structures on the lot are less than forty feet (40') high. In cases where there are taller buildings and structures on the lot, new small cell towers may match the existing height, up to sixty feet (60').
  - b. Collocation. Collocations for two separate wireless service providers on the same support structure is encouraged whenever feasible and safe.
  - c. Antennas. The maximum dimensions for panel style antennas shall be thirty inches (30") high and twelve inches (12") wide. The maximum dimensions for canister style antennas shall be forty eight inches (48") high and sixteen inches (16") in diameter.
  - d. Accessory Equipment. Shall be contained within a landscaped median, located in a ground vault or mounted on the pole at least eight feet (8') above the ground.
  - e. Stealth. WCF's shall be designed to fit into the surrounding area by utilizing existing poles and structures. For example, locating antennas on a parking lot light poles, signs (subject to the restriction of Article VIII), banner poles, or flagpoles.
  - f. Setback. Antennas that are located on parking lot light poles or other existing structures are not subject to a minimum setback.
3. New Tower Development Standards.
  - a. Tower Type. All new towers shall be either a "Type 1" or "Type 2" monopole design.

- 1) "Type 1 Monopole" is sometimes referred to as a slick stick or unipole. It is a type of monopole design where all antenna and related equipment are housed inside the pole structure rather than attached to the exterior of the pole in an effort to conceal the visual impact of the antennas.
  - 2) "Type 2 Monopole" is a single, ground-mounted, self-supporting pole-type structure, tapering from base to top and supporting a fixture designed to hold one or more external antennas.
- b. Height. The maximum height of new towers is regulated by the zoning districts in Table 1.
  - c. Separation. All towers shall have a minimum separation of one thousand five hundred feet (1,500'). This separation standard shall not apply to sites where applicants are proposing a new tower to replace an existing tower. The old tower shall be removed within 60 days of the new tower becoming operational.
  - d. Collocation. A new WCF tower proposed for construction must accommodate a minimum of two (2) antenna arrays if the tower is less than one hundred twenty five feet (125') in height, and at least three (3) antenna arrays if the tower is one hundred twenty five feet (125') in height or greater. The base station area shall contain adequate space for ground equipment associated with the proposed number of antenna arrays.
  - e. Driveway Access. Shall be paved meeting applicable City standards (Land Development Manual). The driveway shall follow the existing topography as much as possible and limit views of the base station from the public street.
  - f. Landscaping and Screening.
    - 1) Tower. Should be sited to avoid skylining the tower by locating the tower below the ridgeline and using natural vegetation to help screen the tower.
    - 2) Base Station.
      - a) Landscaping. All landscaping shall be installed and maintained in accordance with this subsection.
        - (1) The outside perimeter of the base station shall be planted with at least a twelve foot (12') wide planting area that contains six foot (6') high (at the time of planting) columnar or pyramidal evergreens that will form a solid screen at maturity. A break in the planting area not to exceed twelve foot (12') in width shall be allowed for access.
        - (2) Existing vegetation shall be used when feasible to camouflage the base station.
      - b) Screening.
        - (1) All base stations shall be fenced.
        - (2) In residential zones, scenic highway, and historic areas base stations may include wood or masonry fencing. Fencing shall be designed to blend in with existing surroundings, using architecturally compatible construction and colors.
  - g. Equipment Shelter.
    - 1) An equipment shelter used in connection with a WCF shall be limited to four hundred (400) square feet of gross floor area per provider and twelve feet (12') in height.
    - 2) In residential zones, all equipment shelters should be designed to blend in with existing surroundings, using architecturally compatible construction and colors.
  - h. Setbacks.
    - 1) Towers.

- a) All towers shall be set back from the property line of all properties zoned A-1, R-1, R-1A, R-1E, R-2, R-3, RP-1, RP-2, RP-3, R-4, TC-1, or TND-1 (not including right-of-way), all properties with an H-1 or an NC-1 overlay, and any residentially zoned property within the Town of Farragut or Knox County, a minimum distance equal to one hundred ten percent (110%) of the height of the tower.
  - b) In all other cases towers shall meet the building setback requirements of the base zoning district, but not less than twenty five feet (25').
- 2) Base Station. Perimeter fencing shall meet the setback requirements of the base zoning district, but not less than twenty five (25').
- i. Lighting. For new wireless communication support towers, only such lighting as is necessary to satisfy FAA requirements is permitted. Dual (low intensity) lighting shall be encouraged. All FAA-required lighting shall use lights that are designed to minimize downward illumination. Security lighting for the equipment shelters or cabinets and other on-the-ground ancillary equipment is permitted as long as full cutoff fixtures are used.
  - j. Visual Impact. All WCFs in residential zones, within two thousand feet (2,000') of a Scenic Highway or Tennessee Parkway, and Historic Districts shall be sited and designed to minimize adverse visual impacts on surrounding properties and the traveling public to the greatest extent reasonably possible, consistent with the proper functioning of the WCF.
  - k. Stealth Design/Technology. Stealth design is encouraged in zoning districts. Stealth and concealment techniques must be appropriate given the proposed location, design, visual environment, and nearby uses, structures, and natural features (including, but not limited to clock towers, flag poles, or faux-tree). Stealth design shall be designed and constructed to substantially conform to surrounding building designs or natural settings, so as to be visually unobtrusive. Stealth design that relies on screening wireless communications facilities in order to reduce visual impact must screen all substantial portions of the facility from view. Stealth and concealment techniques do not include incorporating faux-tree designs of a kind that are not native to East Tennessee and out of scale with natural vegetation.

**E. Summary of Development Standards.**

Table 1 summarizes the development standards found in Section D, the following also apply to information found within this table:

1. Collocation is encouraged in all zoning districts;
2. Any tower within an Industrial, Office, or Commercial district that is within two hundred fifty feet (250') of a residentially zoned property shall be a Type 1 Monopole and shall not exceed one hundred twenty five feet (125') in height;
3. The criteria for new towers within two thousand feet (2,000') of a Scenic Highway or Tennessee Parkway shall be the same as Residential Districts; and
4. Within overlay districts, the stated tower criteria shall take precedence over the base zoning district.

<b>Table 1: New Wireless Communications Tower Criteria</b>				
<b>Zoning Districts</b>	<b>Permitted Tower Type/ Antenna Locations</b>	<b>Maximum Tower Height</b>	<b>Stealth Design</b>	<b>Review Process (see Section F)</b>
Industrial Districts (I-1, I-2, I-3, I-4, BP-1)	<ul style="list-style-type: none"> <li>• Small Cell</li> <li>• Monopole Type 1</li> <li>• Monopole Type 2</li> </ul>	200'	Encouraged	Administrative
Office/Commercial Districts (O-1, O-2, O-3, C-1, C-2, C-3, C-4, C-5, C-6, C-7, SC- 1, SC-2, SC-3, PC-1, PC-2)	<ul style="list-style-type: none"> <li>• Small Cell</li> <li>• Monopole Type 1</li> <li>• Monopole Type 2</li> </ul>	150'	Encouraged	Administrative
Form Districts (South Waterfront District and Cumberland Avenue Corridor District)	<ul style="list-style-type: none"> <li>• Small Cell</li> <li>• Monopole Type 1</li> </ul>	125'	Encouraged	Administrative
Other Districts (A-1, OS-1, OS-2)	<ul style="list-style-type: none"> <li>• Small Cell</li> <li>• Monopole Type 1</li> </ul>	125'	Encouraged	Administrative
Residential Districts (R-1, R-1A, R-1E, EN-1, EN-2, R-2, R-3, R-4, RP-1, RP-2, RP-3, TND-1, TC-1)	<ul style="list-style-type: none"> <li>• Small Cell</li> <li>• Monopole Type 1</li> </ul>	125'	Encouraged	Public Hearing
Overlays (H-1, NC-1, TO-1, D-1)	<ul style="list-style-type: none"> <li>• Small Cell</li> <li>• Monopole Type 1</li> </ul>	125'	Encouraged	Public Hearing
F1	Not Permitted			

**F. Application Review.**

1. Administrative Review.
  - a. Collocation on existing towers shall be reviewed by the chief building official or their designee.
  - b. Collocation on existing structures (excluding existing towers) or buildings shall be reviewed by MPC staff.
  - c. New towers (including small cell) shall be reviewed by MPC staff.
2. Public Hearing. Shall be reviewed by the Metropolitan Planning Commission (MPC). MPC may request feedback from TTCDA when a WCF is located within the Technology Overlay (TO) district or from the Historic Zoning Commission when a WCF is located within Historic (H-1) and Neighborhood Conservation (NC-1) districts.

**G. Application Submittal Requirements.**

In addition to the application information required by Knoxville's Municipal Code Chapter 6– Buildings and Building Regulations, applications under this ordinance shall include the following application materials.

1. General Requirements.
  - a. For public hearing review, a pre-application meeting with MPC staff is required.
  - b. Letter of Commitment. The applicant shall provide a written letter of commitment from at least one cellular provider to locate on an existing or proposed facility.
  - c. Site plans. Complete and accurate plans and drawings to scale, prepared, signed and sealed by a Tennessee-licensed engineer, land surveyor and/or architect, including:
    - 1) Plan views and elevations showing tower, base station, fencing, landscaping, associated ground equipment, driveway design, lease area, and access and utility easements. All items shall include required dimensions;
    - 2) Identification of distances to the lot lines for adjoining properties and right-of-way from proposed tower and base station.
  - d. Statement of Purpose/RF Justification. A clear and complete written Statement of Purpose shall minimally include:
    - 1) A description of the technical objective to be achieved, whether it be to close a gap or address a deficiency in coverage, capacity, frequency and/or change in technology;
    - 2) A scaled map that identifies the proposed site location and the targeted service area. The map will be used to determine potential collocation and preferred siting opportunities.
  - e. If existing vegetation is to remain to help screen the proposed facility, a written landscape preservation agreement between the landowner and lessee may be required.
  - f. All other information and/or materials that the MPC may require.
2. Additional Requirements for Locating on an Existing Tower, Structure, and Building. Collocation consent. A written statement, signed by a person with the legal authority to bind the applicant and the project owner, which indicates whether the applicant is willing to allow other transmission equipment owned by others to collocate with the proposed WCF whenever technically and economically feasible and aesthetically desirable.



3. Additional Requirements for New Small Cell. Each applicant shall submit a summary that explains how it arrived at the structure and design being proposed.
4. Additional Requirements for New Tower.
  - a. Collocation and alternative sites analysis.
    - 1) Collocation Requirement for all New Towers. All applications for a new tower shall demonstrate that existing towers within one mile and other structures and buildings within a half mile are not feasible for collocation, consistent with subsection D.1.
      - a) For all new towers the applicant shall provide a description of why each tower within one mile of the proposed WCF is not feasible for collocation.
      - b) For existing structures and buildings the applicant shall provide a description of why they are not feasible for collocation.
    - 2) Alternative Site Analysis. All towers in a residential zone, within two thousand feet (2,000') of a Scenic Highway or Tennessee Parkway, historic district or within 250 feet of a residential zone.
      - a) The tower location preferences located in subsection C.3 must be addressed in a clear and complete written alternative site analysis that shows at least five (5) higher ranked preferred locations, alternative sites considered to the extent that such higher ranked alternative sites are located within one mile of the proposed site. A factually detailed and meaningful comparative analysis between each alternative candidate and the proposed site that explains the substantive reasons why the applicant rejected the alternative candidate. An applicant may reject an alternative tower site for one or more of the following reasons:
        - (1) Inability to obtain authorization by the owner;
        - (2) Failure to meet the service coverage objectives of the applicant;
        - (3) Failure to meet other engineering requirements for such things as location, height and size;
        - (4) Zoning constraints, such as the inability to meet setbacks;
        - (5) Physical or environmental constraints, such as unstable soils or wetlands; and/or
        - (6) Being a more intrusive location despite the higher priority in this chapter.
  - b. Visual analysis. For public hearing reviews, the applicant shall provide color photo simulations of the proposed tower. The photo simulations shall include before and after images of the site, taken from at least four different perspectives and a map identifying the locations that the photos were taken.
  - c. Design justification. A clear and complete written analysis that explains how the proposed design complies with the applicable design standards under this chapter to the maximum extent feasible. A complete design justification must identify all applicable design standards under this chapter and provide a factually detailed reason why the proposed design either complies or cannot feasibly comply.

**H. Exceptions to Standards.**

A WCF may exceed the maximum height, provided the applicant can demonstrate that technically neither coverage nor capacity at the maximum height stated in Table 1 can be provided. If the maximum height is exceeded a public hearing review process shall be used, regardless of zoning district.

**I. Final Inspection.**

Certificate of Completion will only be granted upon satisfactory evidence that the WCF was installed in compliance with the approved plans.

**J. Maintenance.**

1. The WCF site, including all landscaping, fencing and related transmission equipment must be maintained in accordance with all approved plans.
2. All graffiti on WCFs must be removed at the sole expense of the permittee after notification by the City to the owner/operator.

**K. Tower Replacement**

A legally existing WCF may be replaced on the same site provided they are in compliance with this section. The old tower shall be removed within 60 days of the new tower becoming operational.

**L. Removal of abandoned towers.**

The following regulations shall apply to ensure the removal of abandoned towers:

1. The owner of any telecommunications tower shall provide written notification to the chief building official within thirty (30) days of the occurrence of either or both of the following:
  - a. The tower has changed ownership.
  - b. Use of all telecommunications antennas on the tower has ceased.
2. All towers permitted under the requirements of these regulations that are not operated for telecommunications purposes for a continuous twelve (12) month period shall be considered abandoned, and the owner of such tower shall remove same within ninety (90) days of receiving notice from the chief building official. Failure to do so shall be deemed a violation of these regulations. The owner of the tower may appeal the decision of the chief building official to the City of Knoxville Board of Zoning Appeals. At such hearing the owner shall be required to show just cause why the tower should not be considered abandoned and subject to removal.
3. At the time a request for a building permit is made, the applicant shall provide proof of the establishment of a financially secured and legally enforceable method of removing a telecommunications tower when it ceases to be used for a period of twelve (12) months. This may be in the form of a bond, a letter of credit or some other financial arrangement approved by the City Finance Director for financial adequacy and the City Law Director for legal enforceability. Such bond or other approved financial surety shall be maintained by the owner of the tower so long as the tower exists.

**M. Independent Review.**

MPC may retain the services of an independent, qualified radio frequency technical expert of its choice to provide technical evaluation of permit applications for WCFs, including administrative and public hearing review. The technical expert review may include, but is not limited to (a) the accuracy and completeness of the items submitted with the application; (b) the applicability of analysis and techniques and methodologies proposed by the applicant; (c) the validity of conclusions reached by the applicant; and (d) whether the proposed WCF complies with the applicable approval criteria set forth in this chapter.

**N. Exempt Facilities.**

The following facilities are exempt from Article V, Section 20:

1. FCC licensed amateur (ham) radio facilities;
2. Satellite earth stations, dishes and/or antennas used for private television reception not exceeding three feet (3') in diameter;
3. A government-owned WCF installed upon the declaration of a state of emergency by the federal, state or local government, or a written determination of public necessity by the City; except that such facility must comply with all federal and state requirements;
4. A temporary, commercial WCF installed for providing coverage of a special event such as news coverage or sporting event, subject to approval by the City; and
5. A temporary tower may be used for a period of ninety (90) days to allow repair of a damaged permanent WCF, subject to approval by the City. Such temporary tower shall comply with applicable setbacks and height requirements.