

1. Agenda

Documents: [AGENDA DECEMBER 04.PDF](#)

2. Packet

Documents: [PACKET DECEMBER 04.PDF](#)



NOTICE OF THE REGULAR MEETING OF THE PLANNING AND ZONING COMMISSION

**December 4, 2012
6:00 P.M.**

Pursuant to ARS 38-431-02, notice is hereby given to the members of the Chino Valley Planning and Zoning Commission and the general public that the Chino Valley Planning and Zoning Commission will hold a regular meeting open to the public on Tuesday, December 4, 2012, at 6:00 p.m. in the Chino Valley South Campus building, located at 202 N. State Route 89, Chino Valley, Arizona 86323.

The Agenda for the meeting is as follows:

- 1. CALL TO ORDER**
- 2. ROLL CALL**
- 3. PLEDGE OF ALLEGIANCE**
- 4. APPROVAL OF MINUTES**
 - 4A.** November 6, 2012.
- 5. STAFF REPORT**
- 6. DISCUSSION ITEM**
 - 6A.** This hearing will be conducted as a workshop to discuss and review possible revisions to Section 4.25, Wireless Communication Tower, of the Unified Development Ordinance (UDO).
- 7. PUBLIC COMMENTS**
- 8. ADJOURN**

A copy of the agenda and background material provided to the Commissioners is available for public inspection at the Marion Lassa/Chino Valley Library, 1020 W. Palomino Road, Chino Valley, Arizona.

Further details may be obtained by contacting Development Services Department at 1982 Voss, Chino Valley, Arizona (928) 636-4427. The Town endeavors to make all public meetings accessible to persons with disabilities. With 72 hours advance notice, special assistance can also be provided for sight and/or hearing impaired persons at public meetings. Please call 636-2646 (voice), 636-1787 (TDD) or use the AZ Statewide Relay Service at 1-800-367-8939 (TDD) to request an accommodation to participate in this meeting.



NOTICE OF THE REGULAR MEETING OF THE PLANNING AND ZONING COMMISSION

**December 4, 2012
6:00 P.M.**

Pursuant to ARS 38-431-02, notice is hereby given to the members of the Chino Valley Planning and Zoning Commission and the general public that the Chino Valley Planning and Zoning Commission will hold a regular meeting open to the public on Tuesday, December 4, 2012, at 6:00 p.m. in the Chino Valley South Campus building, located at 202 N. State Route 89, Chino Valley, Arizona 86323.

The Agenda for the meeting is as follows:

- 1. CALL TO ORDER**
- 2. ROLL CALL**
- 3. PLEDGE OF ALLEGIANCE**
- 4. APPROVAL OF MINUTES**
 - 4A.** November 6, 2012.
- 5. STAFF REPORT**
- 6. DISCUSSION ITEM**
 - 6A.** This hearing will be conducted as a workshop to discuss and review possible revisions to Section 4.25, Wireless Communication Tower, of the Unified Development Ordinance (UDO).
- 7. PUBLIC COMMENTS**
- 8. ADJOURN**

A copy of the agenda and background material provided to the Commissioners is available for public inspection at the Marion Lassa/Chino Valley Library, 1020 W. Palomino Road, Chino Valley, Arizona.

Further details may be obtained by contacting Development Services Department at 1982 Voss, Chino Valley, Arizona (928) 636-4427. The Town endeavors to make all public meetings accessible to persons with disabilities. With 72 hours advance notice, special assistance can also be provided for sight and/or hearing impaired persons at public meetings. Please call 636-2646 (voice), 636-1787 (TDD) or use the AZ Statewide Relay Service at 1-800-367-8939 (TDD) to request an accommodation to participate in this meeting.

TOWN OF CHINO VALLEY
PLANNING AND ZONING COMMISSION
Regular Meeting Minutes
Chino Valley South Campus
202 N. State Route 89
November 6, 2012
6:00 p.m.

1. CALL TO ORDER

2. ROLL CALL

Meeting was called to order at 6:00 p.m.

Members Present: Garland Miner, Acting Chairperson
Florence Sloan, Commissioner
Jack Owen, Commissioner
Charles Merritt, Commissioner
Gwen Rowitsch, Commissioner
Michael Edmonds, Commissioner (Telephonically)

Staff Absent: Phil Rice, Chairperson

Staff Present: David Nicolella, Associate Planner
Robert Smith, Town Manager
Mary Brasher, Administrative Technician

3. PLEDGE OF ALLEGIANCE

4. APPROVAL OF MINUTES

4A. For consideration, discussion, and possible action regarding the regular meeting minutes of September 4, 2012.

Commissioner Rowitsch MOVED, seconded by Commissioner Merritt to approve the regular meeting minutes of September 4, 2012.

MOTION CARRIED 6-0

- 5. STAFF REPORT:** David Nicolella, Associate Planner informed the Commission that the Development Services Department is developing a Small Business Center as a way to connect local business people to the resources available locally and throughout the region to help them establish and grow their business.

Robert Smith, Town Manager mentioned the resources throughout the county offer businesses all the support necessary for businesses to succeed and the Town's Business Support Center will offer potential customers the necessary information they need for their business.

Mary Brasher informed the Commission that Hilda Little who handles the Town's Business Licenses has relocated from Town Hall to the Development Services Department. Business Licensing is only one aspect of our Small Business Center.

6. PUBLIC HEARING: Acting Chairperson Miner opened the public hearing.

6A. For consideration, discussion and possible recommendation to the Town Council regarding a Text Amendment to Section 4.25.F.1.a, of the Unified Development Ordinance for the purpose of increasing the maximum height allowed for a wireless communication tower from 65 feet to 99 feet. Clear Blue Services, which is representing AT&T, is proposing the text amendment in order to construct a new wireless communication tower located at 2655 North State Route (SR) 89 (Assessor's Parcel Number 306-14-021C).

Mr. Nicolella gave a brief presentation explaining that the Town's current code does not allow a communications tower over sixty five feet and the applicant is requesting to amend that text to allow them to construct a communications tower at ninety-nine feet. The applicant has complied with all the public notification requirements and Mr. Nicolella gave a brief overview of the comments from citizens that attended the neighborhood meeting. Mr. Nicolella stated that the section of the code that relates to communications towers should be revised, and this is something that will be coming to them for revision in the near future, but right now the section regarding the height restriction is what the applicant is proposing. There are other sites within the Town that contain communications towers and all are on public property. Mr. Nicolella provided information about other communications towers in the surrounding area some as tall as two hundred feet. He indicated this communication tower could help the much needed telecommunications infrastructure the Town needs and desires.

Commissioner Rowitsch asked if this text amendment was approved, would the applicant still need a cup?

Mr. Nicolella indicated that was correct.

Commissioner Merritt commented on the taller tower heights that other municipalities have and wondered how many more they would need to place if kept to the sixty five feet.

Commissioner Edmonds stated he was concerned if there was a catastrophic event that the tower would not remain on the footprint of the property, and wanted to know if there would be lights on the tower causing pollution. He also wondered if the tower was allowed, could it be camouflaged, and if there is a way there could be a public notice put out so the entire community would be aware of the tower.

Mr. Nicolella indicated he didn't know if there would be any lights, but stated lights were not needed until a tower reaches two hundred feet. When the Town moves forward on amendments to the communication section, those things and others will be addressed, and there are mechanisms where additional aesthetics can be requested. Mr. Nicolella also stated that when there is an amendment to the zoning address there is not a broad mailing done, however there is a notification placed in the newspaper.

Robert Smith, Town Manager stated he knows the fail points on these towers do work and in New Orleans when the hurricane went through, the towers remained standing, antennas were blown off and dangling but the tower remained standing. He commented that he has seen cable held towers fall but has never seen a monopole fall.

Adam Brixius indicated he did not have any information with him to back up the fail statistics but assured the Commission that the towers are designed by a registered engineer. They would have to place at least two towers if they couldn't have one tower at ninety nine feet, but the location is very specific to fill the gap in coverage. The height of the tower is what is needed for this area for a wider range of coverage and to lessen the number of towers that would need to be constructed for the same coverage. Many of these towers are placed in residential areas, but this can cause disruption with residents. Constructing this tower along State Route 89 commercial corridor would cover the large traffic volume, site selection is crucial to the placement of these towers to fill gaps.

Acting Chairperson Miner opened the public portion of the meeting.

The citizens that spoke were concerned about how this tower would affect the aesthetics of the neighborhood. One citizen commented that it would fit into how the area currently looks and was not opposed to the tower. There was some concern about what impact this tower will have to the future development of the surrounding vacant properties. Another citizen was concerned it would be a distraction to the traffic on State Route 89.

Acting Chairperson Miner closed the public portion.

Acting Chairperson Miner asked if there were any health concerns associated with this tower.

Adam Brixius stated they follow all guidelines established by the FCC.

Commission members discussed prior zoning locations where these towers have been placed through a broad adoption involving several municipalities. However, other municipalities have revised their codes since then.

Commissioner Rowitsch pointed out that towers exceeding the height restriction are all placed on public property. She wasn't comfortable moving forward with a text amendment for the height only, if the Town is looking at making other changes to the rest of that section. She felt this might be premature since they don't know what the rest of the amendments for the telecommunications section would be. She would like to see the whole picture, not just one piece. She asked if the text amendment needed to take place in order for council to approve a CUP.

Mr. Nicolella indicated that the text amendment would have to take place; otherwise the applicant would be limited to sixty five feet.

Mr. Smith informed the applicant and the Commission that they could table this item until the Commission could review the text amendment further.

The applicant stated that AT&T is very specific about this height and is doing whatever is necessary to obtain that.

Mr. Smith thought it might be a good idea if the Commission has a workshop to look at this item further, and then bring it back for a recommendation to Council in January 2013.

Commissioner Owen offered his time when staff starts revising the telecommunication section of the UDO.

It was decided that there would be a workshop in December 2012 so the Commission could discuss further the different aspects of the telecommunications section of the code and the possibility of amendments to that code.

Commissioner Rowitsch MOVED, seconded by Commissioner Merritt to table this item to the January 15, 2013 meeting.

MOTION CARRIED: 6-0

6B. CUP-12-001: For consideration, discussion and possible recommendation to the Town Council regarding a Conditional Use Permit (CUP) to allow for the construction of a new 99' mono-pole with an equipment shelter on a leased area of 30' x 40' on an approximately 1 acre parcel in a Commercial Heavy (CH) zoning district. Clear Blue Services, which is representing AT&T, is planning to construct a new wireless communication tower located at 2655 North State Route (SR) 89 (Assessor's Parcel

Number 306-14-021C). The site is located on the east side of SR 89 approximately 600 feet north of the Road 3 1/2 North alignment.

Commissioner Rowitsch MOVED, seconded by Commissioner Merritt to table this item until the January 15, 2013 meeting.
MOTION CARRIED: 6-0

7. **PUBLIC COMMENTS:** None

8. **ADJOURN:** 7:05 p.m.

Garland Miner Acting Chairperson Date:

ITEM

6A



4.25 Wireless Telecommunications Facilities

A. Purpose: The purpose of this section is to establish general guidelines for the siting of wireless communications towers and antennas. The goals of this section are to:

1. Protect residential areas and land uses from potential adverse impacts of towers and antennas.
2. Encourage the location of towers in non-residential areas.
3. Minimize the total number of towers throughout the community.
4. Strongly encourage the joint use of new and existing tower sites as a primary option rather than construction of additional single-use towers.
5. Encourage users of towers and antennas to locate them, to the extent possible, in areas where the adverse impact on the community is minimal.
6. Encourage users of towers and antennas to configure them in a way that minimizes the adverse visual impact of the towers and antennas through careful design, siting, landscape screening, and innovative camouflaging techniques.
7. Enhance the ability of the providers of telecommunications services to provide such services to the community quickly, effectively, and efficiently.
8. Consider the public health and safety of communication towers.
9. Avoid potential damage to adjacent properties from tower failure through engineering and careful siting of tower structures. In furtherance of these goals, the Town shall give due consideration to the General Plan, other provisions of this Ordinance, existing land uses, and environmentally sensitive areas in approving sites for the location of towers and antennas.

B. Definitions: As used in this section, the following terms shall have the meanings set forth below:

ALTERNATIVE TOWER STRUCTURE means man-made trees, clock towers, bell steeples, light poles and similar alternative-design mounting structures that camouflage or conceal the presence of antennas or towers.

ANTENNA means any exterior transmitting or receiving device mounted on a tower, building or structure and used in communications that radiates or captures electromagnetic waves, digital signals, analog signals, radio frequencies (excluding



radar signals), wireless telecommunications signals or other communication signals.

BACKHAUL NETWORK means the lines that connect a provider's towers/cell sites to one or more cellular telephone switching offices, and/or long distance providers, or the public switched telephone network.

CO-LOCATION means the use by two or more wireless communications providers of the same support structure or the same site, as defined in subsection "I" below.

EXISTING STRUCTURE means light poles, power poles, chimneys, billboards, and other similar structures that are placed within the Town at the time of adoption of this Ordinance, except existing buildings.

FAA means the Federal Aviation Administration.

FCC means the Federal Communications Commission.

HEIGHT means, when referring to a tower or other structure, the vertical distance measured from the natural grade level to the highest point of the structure directly above the natural grade when such structure is not located in a platted subdivision. If the structure is located in a platted subdivision, the height shall be the vertical distance measured from the finished grade as shown on the subdivision grading plans or finished grade as shown on the individual lot's grading plans (whichever is lower), to the highest point of the structure directly above the finished grade. In the event that terrain problems prevent an accurate determination of height, the Development Services Director shall rule as to height and appeal from that decision shall be to the Board of Adjustment.

PREEXISTING TOWERS AND PREEXISTING ANTENNAS means any tower or antenna for which a building permit has been properly issued prior to the effective date of this Ordinance, including permitted towers or antennas that have not yet been constructed so long as such approval is current and not expired.

SITE means the physical location upon which wireless telecommunications facilities are located. Unless otherwise stated in this Section, "site" shall be limited to the area occupied by a single tower and its accompanying ground or roof-mounted equipment.

TOWER means any structure that is designed and constructed primarily for the purpose of supporting one or more antennas for telephone, radio and similar communication purposes, including monopole towers. The term includes radio and television transmission towers, microwave towers, common-carrier towers, cellular telephone towers, alternative tower structures, and the like. The term also includes the structure and any support thereto.



WIRELESS COMMUNICATION means any technology for transmitting communication through the air.

WIRELESS COMMUNICATIONS FACILITIES means any combination of one or more antennae, towers and/or structures or equipment used for the transmission of wireless communication.

C. Applicability

1. New towers and antennas. All new towers or antennas in the Town shall be subject to these regulations.
2. Exceptions
 - a. Amateur radio station operators and/or receive only operations. This Section shall not govern any tower, or the installation of any antenna, that is under the maximum building height of the zoning district in which such structure is located and which is solely used by a federally-licensed amateur radio station operator or is used exclusively for receive only operations, including devices necessary for individual subscriptions to commercial wireless services.
 - b. Preexisting towers or antennas. Legally established preexisting towers and preexisting antennas shall not be required to meet the requirements of this Section, other than the requirements of subsections D.6 and D.7 below.
 - c. AM array. For purposes of implementing this Ordinance, an AM array, consisting of one or more tower units and supporting ground system which functions as one AM broadcasting antenna, shall be considered one tower. Measurements for setbacks and separation distances shall be measured from the outer perimeter of the towers included in the AM array. Additional tower units may be added within the perimeter of the AM array by right.

D. General Requirements

1. Principal or accessory. Antennas and towers may be considered either principal or accessory uses. A different existing use of an existing structure on the same lot shall not preclude the installation of an antenna or tower on such lot.
2. Lot size. For purposes of determining whether the installation of a tower or antenna complies with district development regulations, including but not li-



mitted to setback requirements, lot-coverage requirements, and other such requirements, the dimensions of the entire lot shall control, even though the antennas or towers may be located on leased parcels within such lot.

3. Inventory of existing sites. Each applicant for an antenna and/or tower shall provide to the Development Services Director an inventory of its existing towers, antennas, or sites approved for towers or antennas, that are either within the jurisdiction of the Town or within one mile of the border thereof, including specific information about the location, height, and design of each tower. Each applicant shall also provide a one-year build out plan for all other proposed wireless communications facilities within the Town. The Development Services Director may share such information with other applicants applying for administrative approvals or conditional use permits under this Section or with other organizations seeking to locate antennas within the jurisdiction of the Town, provided, however that the Development Services Director is not, by sharing such information, in any way representing or warranting that such sites are available or suitable.
4. Aesthetics. Towers and antennas shall meet the following requirements:
 - a. Towers shall either maintain a galvanized steel finish or, subject to any applicable standards of the FAA, be painted a neutral color so as to reduce visual obtrusiveness.
 - b. At a tower site, the design of the buildings and related structures shall, to the extent possible, use materials, colors, textures, screening, and landscaping that will blend them into the natural setting and surrounding buildings.
 - c. If an antenna is installed on a structure other than a tower, the antenna and supporting electrical and mechanical equipment must be of a neutral color that is identical to, or closely compatible with, the color of the supporting structure so as to make the antenna and related equipment as visually unobtrusive as possible.
5. Lighting. Towers shall not be artificially lighted, unless required by the FAA or other applicable authority. If lighting is required, the lighting alternatives and design chosen must cause the least disturbance to the surrounding views.
6. State of Federal Requirements. All towers must meet or exceed current standards and regulations of the FAA, the FCC, and any other agency of the state or federal government with the authority to regulate towers and antennas. If such standards and regulations are changed, the owners of the towers and antennas governed by this chapter shall bring such towers and an-



tennas into compliance with such revised standards and regulations within six (6) months of the effective date of such standards and regulations, unless a different compliance schedule is mandated by the controlling state or federal agency. Failure to bring towers and antennas into compliance with such revised standards and regulations shall constitute grounds for the removal of the tower or antenna at the owner's expense. State or federal requirements.

7. **Building Codes; Safety Standards.** To ensure the structural integrity of towers, the owner of a tower shall ensure that it is maintained in compliance with standards contained in applicable state or local building codes and the applicable standards for towers that are published by the Electronic Industries Association (EIA) and by the Telecommunications Industries Association (TIA), as amended from time to time. If, upon inspection, the Town concludes that a tower fails to comply with such codes and standards and constitutes a danger to persons or property, then upon notice being provided to the owner of the tower, the owner shall have thirty (30) days to bring such tower into compliance with such standards. Failure to bring such tower into compliance within thirty (30) days shall constitute grounds for the removal of the tower or antenna at the owner's expense. Building codes; safety standards.
8. **Measurement.** For purposes of measurement, tower setbacks and separation distances shall be calculated and applied to facilities located in the Town irrespective of municipal and County jurisdictional boundaries. Measurement.
9. **Not essential services.** Towers and antennas shall be regulated and permitted pursuant to this Section and shall not be regulated or permitted as essential services, public utilities or private utilities.
10. **Franchises.** Owners and/or operators of towers or antennas shall certify that all franchises required by law for the construction and/or operation of a wireless communication system in the Town have been obtained and shall file a copy of all required franchises with the Development Services Director.
11. **Public notice.** For purposes of this Section, any Conditional Use Permit request shall be pursuant to Section 1.9.3 of this Ordinance except that the notice required shall include posting of the property, and mailing to all property owners within 1,000 feet of the proposed wireless communications facility, and publication in a newspaper of general circulation regardless of any expression to the contrary in Section 1.9.2.
12. **Signs.** No signs shall be allowed on an antenna, on a tower, or on any portion of the premises leased for wireless telecommunication use.



-
13. Buildings and support equipment. Buildings and support equipment associated with antennas or towers shall comply with the requirements of Section 4.25.H of this Ordinance.
 14. Co-location and multiple antenna/tower plan. The Town encourages tower and antenna users to submit a single application for approval of multiple towers and/or antenna sites and to submit applications that utilize co-location with an existing wireless telecommunications provider. Applications for approval of multiple sites or for co-location with an existing provider shall be given priority in the review process.
 15. Security fencing. Towers shall be enclosed by security fencing not less than six (6) feet in height and no more than eight (8) feet in height and shall be constructed of block or masonry, and shall be equipped with an appropriate anti-climbing device; provided however, that the Town Council may waive such requirements as it deems appropriate.
 16. Landscaping. The following requirements shall govern the landscaping surrounding towers; provided, however, that the Town Council may waive such requirements if the goals of this Section would be better served thereby.
 - a. Tower facilities shall be landscaped with a buffer of plant materials that effectively screens the view of the tower compound from residential property. The standard buffer shall consist of a landscaped strip at least four (4) feet wide outside the perimeter of the compound.
 - b. In locations where the visual impact of the tower would be minimal, the landscaping requirement may be reduced or waived.
 - c. Existing mature plant growth and natural landforms on the site shall be preserved to the maximum extent possible.

E. Permitted Uses

1. General. The uses listed in this subsection are deemed to be permitted uses and shall not require a conditional use permit.
2. Permitted uses. The following uses are specifically permitted:
 - a. Antennas or towers located on property owned, leased, or otherwise controlled by the Town; provided, however, a license or lease authorizing such antenna or tower has been approved by the Council. No such license or lease shall be issued for a tower located within three hundred (300) feet of any residentially zoned property until an informational hearing has been held at a regular or special Town Council meeting and notice of such hearing has been advertised according to subsection 4.25.D.11 at least seven (7) days but not



earlier than fourteen (14) days prior to such hearing. b. Antennas or towers located in any Industrial Zoning district (IND), provided, however, that freestanding towers or antennas shall not exceed forty (40) feet in height without a conditional use permit, and that roof mounted antennas shall not extend more than ten (10) feet above the tallest point on such roof and in no case shall the total combined height of the building and the roof mounted antenna exceed fifty (50) feet in height.

F. Conditional Use Permits

1. General. There is hereby created for this section only a Conditional use permit for Wireless Towers and Antennas which may be granted by the Town Council as follows:
 - a. If the tower or antenna is not a permitted use under subsection 4.25.E of this Ordinance, a conditional use permit shall be required for the construction of a tower or the placement of an antenna in all zoning districts. The maximum height of any such tower shall be sixty-five (65) feet.
 - b. Applications for conditional use permits under this Section shall be subject to the procedures and requirements of Section B of this Ordinance, except as modified in this Section.
 - c. In granting a conditional use permit, the Town Council may impose conditions to the extent such conditions are necessary to minimize any adverse effect of the proposed tower on adjoining properties.
 - d. Any information of an engineering nature that the applicant submits, whether civil, mechanical or electrical, shall be certified by an Arizona licensed professional engineer.
 - e. An applicant for a conditional use permit shall submit the information described in this section and a non-refundable fee established pursuant to a Resolution of the Town Council.
 - f. A Conditional use permit issued under this Section shall be conditioned upon verification by the Town Engineer or his/her designee that such tower structure is structurally sound. Such verification shall be received by the applicant prior to submission and shall be reviewed annually.

2. Towers.



-
- a. Information required. In addition to any information required for applications for conditional use permits pursuant to this Ordinance, applicants for a conditional use permit for a tower shall submit the following information:
- i. A scaled Site Plan clearly indicating the location, type and height of the proposed tower, on-site land uses and zoning, adjacent land uses and zoning (including when adjacent to other municipalities), General Plan classification of the site and all properties within the applicable separation distances set forth in subsection 4.25.G.2, adjacent roadways, proposed means of access, setbacks from property lines, elevation drawings of the proposed tower and any other structures, and other information deemed by the Development Services Director to be necessary to assess compliance with this article.
 - ii. The setback distance between the proposed tower and the nearest residential unit and residentially zoned properties.
 - iii. The separation distance from other towers described in the inventory of existing sites submitted pursuant to subsection 4.25.D.3 shall be shown on an updated Site Plan or map. The applicant shall also identify the type of construction of the existing tower(s) and the owner/operator of the existing tower(s), if known.
 - iv. Method of fencing and finished color and, if applicable, the method of camouflage and illumination.
 - v. A description of compliance with subsections 4.25.D.3, 4, 5, 6, 7, 10, 12, 13, 14, 15 and 16, subsections 4.25.G.1 and 2 and all applicable federal, state or local laws.
 - vi. A notarized statement by the applicant as to whether construction of the tower will accommodate co-location of additional antennas for future users.
 - vii. Identification of the entities providing the backhaul network for the tower(s) described in the application and other cellular sites owned or operated by the applicant in the municipality.
 - viii. A description of the suitability of the use of existing towers, other structures or alternative technology not requiring the use of towers or structures to provide the services to be provided through the use of the proposed new tower.



-
- ix. A description of the feasible alternative location(s) of future towers or antennas within the Town based upon existing physical, engineering, technological or geographical limitations in the event the proposed tower is erected.
 - x. A statement of compliance with Federal Communications Commission (FCC) Radio Frequency (RF) exposure standards. b. Noise. No permit shall be issued for any facility which generates a noise level greater than fifty decibels (50 db) as measured at the edge of the property upon which such facility is sited.
- b. Factors considered in granting conditional use permits for towers. In addition to any standards for consideration of applications pursuant to Section 4.25 of this Ordinance, the Town Council shall consider the following factors in determining whether to issue a conditional use permit, although the Town Council may waive or reduce the burden on the applicant of one or more of these criteria if the Town Council concludes that the goals of this Ordinance are better served thereby:
- i. Height of the proposed tower.
 - ii. Proximity of the tower to residential structures and residentially zoned district boundaries.
 - iii. Nature of uses on adjacent and nearby properties.
 - iv. Surrounding topography.
 - v. Surrounding tree coverage and vegetation.
 - vi. Design of the tower, with particular reference to design characteristics that have the effect of reducing or eliminating visual obtrusiveness.
 - vii. Proposed ingress and egress.
 - viii. Availability of suitable existing towers, other structures, or alternative technologies not requiring the use of towers or structures, as discussed in subsection 4.25.F.2.d of this Ordinance.
- c. Availability of suitable existing towers, other structures, or alternative technology. No new tower shall be permitted unless the applicant demonstrates to the reasonable satisfaction of the Town Council that no existing tower, structure or alternative technology that does not require the use of towers or structures can accommodate the applicant's proposed antenna. An applicant shall submit information requested by the Town Council related to the



availability of suitable existing towers, other structures or alternative technology. Evidence submitted to demonstrate that no existing tower, structure or alternative technology can accommodate the applicant's proposed antenna may consist of any of the following:

- i. No existing towers or structures are located within the geographic area which meets applicant's engineering requirements.
- ii. Existing towers or structures are not of sufficient height to meet applicant's engineering requirements.
- iii. Existing towers or structures do not have sufficient structural strength to support applicant's proposed antenna and related equipment.
- iv. The applicant's proposed antenna would cause electromagnetic interference with the antenna on the existing towers or structures,

or the antenna on the existing towers or structures would cause interference with the applicant's proposed antenna.
- v. The fees, costs, or contractual provisions required by the owner in order to share an existing tower or structure or to adapt an existing tower or structure for sharing are unreasonable. Costs exceeding new tower development are presumed to be unreasonable.
- vi. The applicant demonstrates that there are other limiting factors that render existing towers and structures unsuitable.
- vii. The applicant demonstrates that an alternative technology that does not require the use of towers or structures, such as a cable micro cell network using multiple low-powered transmitters/receivers attached to a wire line system, is unsuitable. Costs of alternative technology that exceed new tower or antenna development shall not be presumed to render the technology unsuitable.

G. Minimum Setbacks and Separation:

1. Setbacks. The following setback requirements shall apply to all towers and antennas; provided, however, that the Town Council may reduce the standard setback requirements if the goals of this Section would be better served thereby.
 - a. Towers must be set back a distance equal to at least one hundred percent (110%) of the height of the tower from any adjoining lot line; pro-



vided, however, that separation distances from residential uses shall be in accordance with Table 4.25.G.1 as set forth below.

- b. Accessory buildings must satisfy the minimum zoning district setback requirements.
2. Separation. The following separation requirements shall apply to all towers and antennas; provided, however, that the Town Council may reduce the standard separation requirements if the goals of this Section would be better served thereby.
 - a. Tower separation shall be measured from the base of the tower to the lot line of the offsite uses and/or designated areas as specified in 4.25.G.1, except as otherwise provided thereto.
 - b. Separation requirements for towers shall comply with the minimum standards established in Table 4.25.G.1.

Table 4.25.G.1 SEPARATION REQUIREMENTS FROM OFF-SITE USES/AREAS	
USE/DESIGNATED AREA	SEPARATION DISTANCE
1, 2 & 3-Family Dwelling units	200' or 300% of the tower height, whichever is greater.
Modular or Manufactured Homes	200' or 300% of the tower height, whichever is greater.
Vacant residentially zoned land that has been previously platted	200' or 300% of the tower height, whichever is greater.
Vacant un-platted residentially zoned land	100' or 110% of tower height, whichever is greater.
Existing Multi-Family residential units (4 or more units)	100' or 110% of tower height, whichever is greater.
Non-residential land/use	110% of the tower height.

3. Separation distances between towers.

- a. Separation distances between towers shall be applicable for and measured between the proposed tower and preexisting towers. The separation distances shall be measured by drawing or following a straight line between the base of the existing tower and the proposed base, pursuant to a Site Plan, of the proposed tower. The separation distances (listed in linear feet) shall be as shown in Table 4.25.G.2 below.
- b. Exception. The minimum separation requirements of this section shall not apply to towers, which are co-located on a single site.



Table 4.25.G.2
MINIMUM SEPARATION BETWEEN TOWERS

	Structure 65' or greater	Structure less than 65' and greater than 40'	Structure less than 40'
Structure 65' or greater	2,000'	1,500'	1,000'
Structure less than 65' and greater than 40'	1,500'	1,500'	1,000'
Structure less than 40'	1,000'	1,000'	750'

H. Buildings or Other Equipment Storage

4. The equipment cabinet or structure used in association with antennas shall comply with the following:
 - a. The cabinet or structure shall not contain more than one hundred-twenty (120) square feet of gross floor area or be more than eight (8) feet in height and shall be located on the ground.
 - b. Equipment storage buildings or cabinets shall comply with all applicable building codes.
5. Antennas mounted on utility poles, light poles, or towers. The equipment cabinet or structure used in association with antennas shall be located in accordance with the following:
 - a. In residential districts, the equipment cabinet or structure may be located:
 - a. In a required front yard or required street side yard provided the cabinet structure is no greater than three and one-half (3.5) feet in height or twenty (20) square feet of gross floor area and the cabinet/structure is located a minimum of three (3) feet from all lot lines. The cabinet/structure shall be screened by sight obscuring landscaping which obscures at least ninety-five percent (95%) of the structure at planting and throughout the duration of the cabinet or structure's existence with an ultimate height not to exceed forty-two (42) inches.
 - b. In a required rear yard, provided the cabinet or structure is no greater than five (5) feet in height or one hundred twenty (120) square feet in gross floor area. The cabinet/structure shall be screened by sight ob-



scuring landscaping which obscures at least ninety-five percent (95%) of the structure at planting and throughout the duration of the cabinet or structure's existence with an ultimate height of six (6) feet.

- c. The entry or access side of a cabinet or structure shall be gated by a solid, sight-obscuring gate that is separate from the cabinet or structure.
- 6. In Commercial or Industrial Districts the equipment cabinet or structure shall be no greater than fourteen (14) feet in height or three hundred (300) square feet in gross floor area. The structure or cabinet shall be screened by sight-obscuring landscaping with an ultimate height of sixteen (16) feet and a planted height of at least six (6) feet. The entry or access side of a cabinet or structure shall be gated by a solid, sight-obscuring gate that is separate from the cabinet or structure. Such access way shall not face residentially zoned property.
- 7. Modification of building size requirements. The requirements of subsections 4.25.H.1 through 3 may be modified by the Town Council in the case of uses permitted by special use to encourage co-location.

I. Co-Location

- 1. Required. Any new tower constructed in connection with an application under this Section shall be suitable for co-location. The applicant shall accept for co-location an FCC licensed wireless communication provider (hereinafter "additional user") using any compatible technology on commercially reasonable terms. Any additional user seeking co-location shall submit specifications for its equipment and use to the applicant and the applicant shall, within thirty (30) days from receipt, respond to the additional user in writing, furnishing all technical requirements which must be resolved before co-location.
- 2. Good faith. Applicants, additional users and permittees shall cooperate and exercise good faith in co-locating wireless telecommunications facilities on the same support structures or site. For the purposes of this section only, a "site" may accommodate more than one tower and its accompanying equipment; provided, however, that no "site" shall exceed ten (10) acres. Good faith shall include sharing technical information to evaluate the feasibility of co-location, and may include negotiations for erection of a replacement support structure to accommodate co-location. A competitive conflict to co-location or financial burden caused by sharing such information normally will not be considered as an excuse to the duty of good faith.
- 3. Third party technical review. In the event a dispute arises as to whether an applicant or permittee has exercised good faith in accommodating other us-



ers, the Town may require the applicant or additional user to obtain a third party technical study at the applicant's or additional user's expense. The Town may review any information submitted by the applicant and permittee(s) in determining whether good faith has been exercised.

4. Exceptions. No co-location may be required where the shared use would or does result in significant interference in the broadcast or reception capabilities of the existing wireless telecommunications facilities or failure of the existing wireless telecommunications facilities to meet federal standards for emissions. The Town Council may, upon a determination that the Town's citizens would be better served, waive any portion of the requirements of this subsection.
5. Violation; penalty. Failure to comply with co-location requirements may result in denial of a permit request or revocation of an existing permit.

J. Removal of Abandoned Antennas or Towers

Any antenna or tower that is not operated for a continuous period of ninety (90) days shall be considered abandoned, and the owner of such antenna or tower shall remove the same within ninety (90) days of receipt of notice from the Town notifying the owner of such abandonment. Failure to remove an abandoned antenna or tower within said ninety (90) day period shall be grounds to remove the tower or antenna at the owner's expense. If there are two or more users of a single tower, then this provision shall not become effective until all users cease using the tower for the prescribed period.

K. Non-conforming Uses

1. Not expansion of nonconforming use. Towers that are constructed and antennas that are installed, in accordance with the provisions of this chapter shall not be deemed to constitute the expansion of a nonconforming use or structure.
2. Preexisting towers. Preexisting towers shall be allowed to continue their usage as they presently exist. Routine maintenance shall be permitted on such preexisting towers. New construction other than routine maintenance on a preexisting tower shall comply with the requirements of this chapter.
3. Rebuilding damaged or destroyed nonconforming towers or antennas. Notwithstanding other provisions of this Section, bona fide nonconforming towers or antennas that are damaged or destroyed may be rebuilt without having to first obtain a conditional use permit and without having to meet the separation requirements specified in subsections 4.25.G.1 and 2. The type, height, and location of the tower on-site shall be of the same type and inten-



sity as the original facility approval; provided, however, that any destroyed lattice or guyed tower shall be replaced with a monopole structure only. Building permits to rebuild the facility shall comply with the then applicable building codes and shall be obtained within ninety (90) days from the date the facility is damaged or destroyed. If no permit is obtained or if said permit expires,

the tower or antenna shall be deemed abandoned as specified in subsection 4.25.J.



**Federal
Communications
Commission**

**Local and State
Government
Advisory
Committee**

**A Local Government Official's Guide to
Transmitting Antenna RF Emission Safety:
Rules, Procedures, and Practical Guidance**



June 2, 2000

A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance

Over the past two years, the Federal Communications Commission (FCC) and its Local and State Government Advisory Committee (LSGAC) have been working together to prepare a voluntary guide to assist state and local governments in devising efficient procedures for ensuring that the antenna facilities located in their communities comply with the FCC's limits for human exposure to radiofrequency (RF) electromagnetic fields. The attached guide is the product of this joint effort.

We encourage state and local government officials to consult this guide when addressing issues of facilities siting within their communities. This guide contains basic information, in a form accessible to officials and citizens alike, that will alleviate misunderstandings in the complex area of RF emissions safety. This guide is not intended to replace OET Bulletin 65, which contains detailed technical information regarding RF issues, and should continue to be used and consulted for complex sites. The guide contains information, tables, and a model checklist to assist state and local officials in identifying sites that do not raise concerns regarding compliance with the Commission's RF exposure limits. In many cases, the model checklist offers a quick and effective way for state and local officials to establish that particular RF facilities are unlikely to exceed specific federal guidelines that protect the public from the environmental effects of RF emissions. Thus, we believe this guide will facilitate federal, state, and local governments working together to protect the public while bringing advanced and innovative communications services to consumers as rapidly as possible. We hope and expect that use of this guide will benefit state and local governments, service providers, and, most importantly, the American public.

We wish all of you good luck in your facilities siting endeavors.

William E. Kennard, Chairman
Federal Communications Commission

Kenneth S. Fellman, Chair
Local and State Government
Advisory Committee

A LOCAL GOVERNMENT OFFICIAL'S GUIDE TO TRANSMITTING ANTENNA RF EMISSION SAFETY: RULES, PROCEDURES, AND PRACTICAL GUIDANCE

A common question raised in discussions about the siting of wireless telecommunications and broadcast antennas is, "Will this tower create any health concerns for our citizens?" We have designed this guide to provide you with information and guidance in devising efficient procedures for assuring that the antenna facilities located in your community comply with the Federal Communication Commission's (FCC's) limits for human exposure to radiofrequency (RF) electromagnetic fields.¹

We have included a checklist and tables to help you quickly identify siting applications that do not raise RF exposure concerns. Appendix A to this guide contains a checklist that you may use to identify "categorically excluded" facilities that are unlikely to cause RF exposures in excess of the FCC's guidelines. Appendix B contains tables and figures that set forth, for some of the most common types of facilities, "worst case" distances beyond which there is no realistic possibility that exposure could exceed the FCC's guidelines.

As discussed below, FCC rules require transmitting facilities to comply with RF exposure guidelines. The limits established in the guidelines are designed to protect the public health with a very large margin of safety. These limits have been endorsed by federal health and safety agencies such as the Environmental Protection Agency and the Food and Drug Administration. The FCC's rules have been upheld by a Federal Court of Appeals.² As discussed below, most facilities create maximum exposures that are only a small fraction of the limits. Moreover, the limits themselves are many times below levels that are generally accepted as having the potential to cause adverse health effects. Nonetheless, it is recognized that any instance of noncompliance with the guidelines is potentially very serious, and the FCC has therefore implemented procedures to enforce compliance with its rules. At the same time, state and local governments may wish to verify compliance with the FCC's exposure limits in order to protect their own citizens. As a state or local government official, you can play an important role in ensuring that innovative and beneficial communications services are provided in a manner that is consistent with public health and safety.

This document addresses only the issue of compliance with RF exposure limits established by the FCC. It does not address other issues such as construction, siting, permits, inspection, zoning, environmental review, and placement of antenna facilities within communities. Such issues fall generally under the jurisdiction of states and local governments, within the limits imposed for personal wireless service facilities by Section 332(c)(7) of the Communications Act.³

¹ This guide is intended to complement, but not to replace, the FCC's OET Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," August 1997. Bulletin 65 can be obtained from the FCC's Office of Engineering and Technology (phone: 202-418-2464 or e-mail: rfsafety@fcc.gov). Bulletin 65 can also be accessed and downloaded from the FCC's "RF Safety" website: <http://www.fcc.gov/oet/rfsafety>.

² See *Cellular Phone Taskforce v. FCC*, 205 F.3d 82 (2d Cir. 2000).

This document is not intended to provide legal guidance regarding the scope of state or local government authority under Section 332(c)(7) or any other provision of law. Section 332(c)(7)⁴ generally preserves state and local authority over decisions regarding the placement, construction, and modification of personal wireless service facilities,⁵ subject to specific limitations set forth in Section 332(c)(7). Among other things, Section 332(c)(7) provides that “[n]o State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the [FCC’s] regulations concerning such emissions.” The full text of Section 332(c)(7) is set forth in Appendix C.

State and local governments and the FCC may differ regarding the extent of state and local legal authority under Section 332(c)(7) and other provisions of law. To the extent questions arise regarding such authority, they are being addressed by the courts. Rather than address these legal questions, this document recognizes that, as a practical matter, state and local governments have a role to play in ensuring compliance with the FCC’s limits, and it provides guidance to assist you in effectively fulfilling that role. The twin goals of this document are: (1) to define and promote locally-adaptable procedures that will provide you, as a local official concerned about transmitting antenna emissions, with adequate assurance of compliance, while (2), at the same time, avoiding the imposition of unnecessary burdens on either the local government process or the FCC’s licensees.

First, we'll start with a summary of the FCC's RF exposure guidelines and some background information that you'll find helpful. Next, we'll review the FCC's procedures for verifying compliance with the guidelines and enforcing its rules. Finally, we'll offer you some practical guidance to help you determine if personal wireless service facilities may raise compliance concerns. Note, however, that this guide is only intended to help you distinguish sites that are unlikely to raise compliance concerns from those that may raise compliance concerns, not to identify sites that are out of compliance. Detailed technical information necessary to determine compliance for individual sites is contained in the FCC's OET Bulletin 65 (see footnote 1, above).

³ 47 U.S.C. § 332(c)(7). Under limited circumstances, the FCC also plays a role in the siting of wireless facilities. Specifically, the FCC reviews applications for facilities that fall within certain environmental categories under the National Environmental Policy Act of 1969 (NEPA), *see* 47 C.F.R. § 1.1307(a). Antenna structures that are over 200 feet in height or located near airport runways must be marked or lighted as specified by the Federal Aviation Administration and must be registered with the FCC, *see* 47 C.F.R. Part 17.

⁴ Section 332(c)(7) of the Communications Act is identical to Section 704(a) of the Telecommunications Act of 1996.

⁵ “Personal wireless services” generally includes wireless telecommunications services that are interconnected with the public telephone network and are offered commercially to the public. Examples include cellular and similar services (such as Personal Communications Service or “PCS”), paging and similar services, certain dispatch services, and services that use wireless technology to provide telephone service to a fixed location such as a home or office.

Before we start, however, let's take a short tour of the radiofrequency spectrum. RF signals may be transmitted over a wide range of frequencies. The frequency of an RF signal is expressed in terms of cycles per second or "Hertz," abbreviated "Hz." One kilohertz (kHz) equals one thousand Hz, one megahertz (MHz) equals one million Hz, and one gigahertz (GHz) equals one billion Hz. In the figure below, you'll see that AM radio signals are at the lower end of the RF spectrum, while other radio services, such as analog and digital TV (DTV), cellular and PCS telephony, and point-to-point microwave services are much higher in frequency.

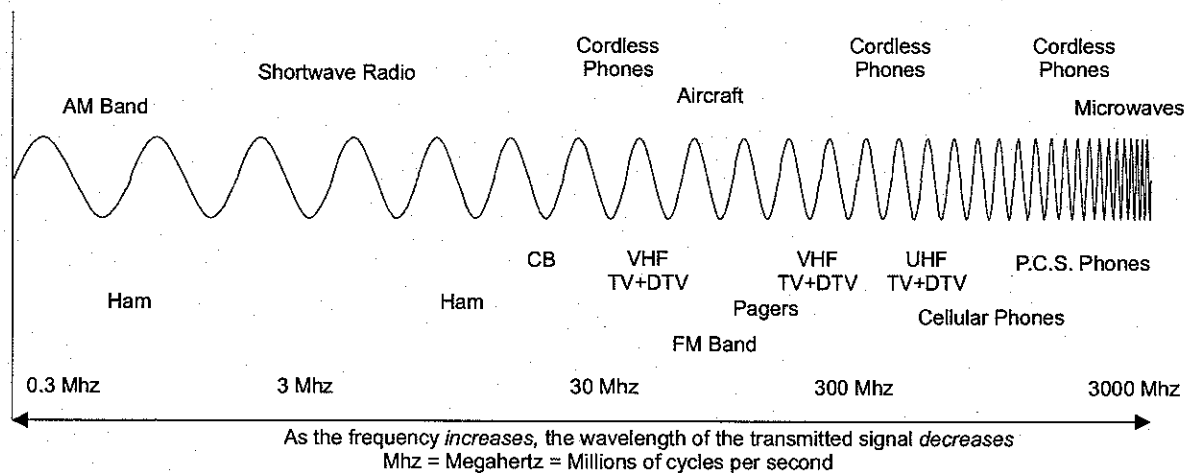


Illustration 1

The FCC's limits for maximum permissible exposure (MPE) to RF emissions depend on the frequency or frequencies that a person is exposed to. Different frequencies may have different MPE levels. Later in this document we'll show you how this relationship of frequency to MPE limit works.

I. The FCC's RF Exposure Guidelines and Rules.

Part 1 of the FCC's Rules and Regulations contains provisions implementing the National Environmental Policy Act of 1969 (NEPA). NEPA requires all federal agencies to evaluate the potential environmental significance of an agency action. Exposure to RF energy has been identified by the FCC as a potential environmental factor that must be considered before a facility, operation or transmitter can be authorized or licensed. The FCC's requirements dealing with RF exposure can be found in Part 1 of its rules at 47 C.F.R. § 1.1307(b). The exposure limits themselves are specified in 47 C.F.R. § 1.1310 in terms of frequency, field strength, power density and averaging time. Facilities and transmitters licensed and authorized by the FCC must either comply with these guidelines or else an applicant must file an Environmental Assessment (EA) with the FCC as specified in 47 C.F.R. § 1.1301 *et seq.* An EA is an official document required by the FCC's rules whenever an action may have a significant environmental impact (see discussion below). In practice, however, a potential environmental RF exposure problem is typically resolved before an EA would become necessary. Therefore, compliance with the FCC's RF guidelines constitutes a *de facto* threshold for obtaining FCC approval to construct or operate a station or transmitter. The FCC guidelines are based on exposure criteria

recommended in 1986 by the National Council on Radiation Protection and Measurements (NCRP) and on the 1991 standard developed by the Institute of Electrical and Electronics Engineers (IEEE) and later adopted as a standard by the American National Standards Institute (ANSI/IEEE C95.1-1992).

The FCC's guidelines establish separate MPE limits for "general population/uncontrolled exposure" and for "occupational/controlled exposure." The general population/uncontrolled limits set the maximum exposure to which most people may be subjected. People in this group include the general public not associated with the installation and maintenance of the transmitting equipment. Higher exposure limits are permitted under the "occupational/controlled exposure" category, but only for persons who are exposed as a consequence of their employment (e.g., wireless radio engineers, technicians). To qualify for the occupational/controlled exposure category, exposed persons must be made fully aware of the potential for exposure (e.g., through training), and they must be able to exercise control over their exposure. In addition, people passing through a location, who are made aware of the potential for exposure, may be exposed under the occupational/controlled criteria. The MPE limits adopted by the FCC for occupational/controlled and general population/uncontrolled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

Determining whether a potential health hazard could exist with respect to a given transmitting antenna is not always a simple matter. Several important factors must be considered in making that determination. They include the following: (1) What is the frequency of the RF signal being transmitted? (2) What is the operating power of the transmitting station and what is the actual power radiated from the antenna?⁶ (3) How long will someone be exposed to the RF signal at a given distance from the antenna? (4) What other antennas are located in the area, and what is the exposure from those antennas? We'll explore each of these issues in greater detail below.

For all frequency ranges at which FCC licensees operate, Section 1.1310 of the FCC's rules establishes maximum permissible exposure (MPE) limits to which people may be exposed. The MPE limits vary by frequency because of the different absorptive properties of the human body at different frequencies when exposed to whole-body RF fields. Section 1.1310 establishes MPE limits in terms of "electric field strength," "magnetic field strength," and "far-field equivalent power density" (power density). For most frequencies used by the wireless services, the most relevant measurement is power density. The MPE limits for power density are given in terms of "milliwatts per square centimeter" or mW/cm^2 . One milliwatt equals one thousandth of one watt (1/1000 of a watt).⁷ In terms of power density, for a given frequency the FCC MPE limits can be interpreted as specifying the maximum rate that energy can be transferred (*i.e.*, the power) to a square centimeter of a person's body over a period of time (either 6 or 30 minutes, as explained

⁶ Power travels from a transmitter through cable or other connecting device to the radiating antenna. "Operating power of the transmitting station" refers to the power that is fed from the transmitter (transmitter output power) into the cable or connecting device. "Actual power radiated from the antenna" is the transmitter output power minus the power lost (power losses) in the connecting device plus an apparent increase in power (if any) due to the design of the antenna. Radiated power is often specified in terms of "effective radiated power" or "ERP" or "effective isotropic radiated power" or "EIRP" (see footnote 14).

⁷ Thus, by way of illustration, it takes 100,000 milliwatts of power to fully illuminate a 100 watt light bulb.

below). In practice, however, since it is unrealistic to measure separately the exposure of each square centimeter of the body, actual compliance with the FCC limits on RF emissions should be determined by “spatially averaging” a person’s exposure over the projected area of an adult human body (this concept is discussed in the FCC’s OET Bulletin 65).

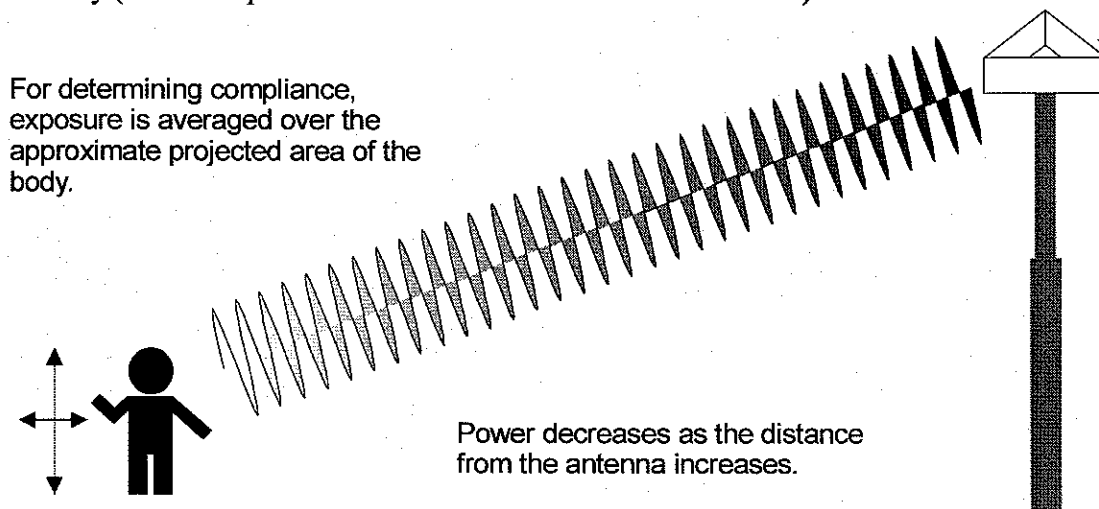


Illustration 2

Electric field strength and magnetic field strength are used to measure “near field” exposure. At frequencies below 300 MHz, these are typically the more relevant measures of exposure, and power density values are given primarily for reference purposes. However, evaluation of far-field equivalent power density exposure may still be appropriate for evaluating exposure in some such cases. For frequencies above 300 MHz, only one field component need be evaluated, and exposure is usually more easily characterized in terms of power density. Transmitters and antennas that operate at 300 MHz or lower include radio broadcast stations, some television broadcast stations, and certain personal wireless service facilities (*e.g.*, some paging stations). Most personal wireless services, including all cellular and PCS, as well as some television broadcast stations, operate at frequencies above 300 MHz. (See Illustration 1.)

As noted above, the MPE limits are specified as time-averaged exposure limits. This means that exposure can be averaged over the identified time interval (30 minutes for general population/uncontrolled exposure or 6 minutes for occupational/controlled exposure). However, for the case of exposure of the general public, time averaging is usually not applied because of uncertainties over exact exposure conditions and difficulty in controlling time of exposure. Therefore, the typical conservative approach is to assume that any RF exposure to the general public will be continuous. The FCC’s limits for exposure at different frequencies are shown in Illustration 3, below:

Illustration 3. FCC Limits for Maximum Permissible Exposure (MPE)**(A) Limits for Occupational/Controlled Exposure**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

NOTE 1: 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. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Finally, it is important to understand that the FCC's limits apply cumulatively to all sources of RF emissions affecting a given area. A common example is where two or more wireless operators have agreed to share the cost of building and maintaining a tower, and to place their antennas on that joint structure. In such a case, the total exposure from the two facilities taken together must be within the FCC guidelines, or else an EA will be required.

A. Categorically Excluded Facilities

The Commission has determined through calculations and technical analysis that due to their low power or height above ground level, many facilities by their very nature are highly unlikely to

cause human exposures in excess of the guideline limits, and operators of those facilities are exempt from routinely having to determine compliance. Facilities with these characteristics are considered "categorically excluded" from the requirement for routine environmental processing for RF exposure.

Section 1.1307(b)(1) of the Commission's rules sets forth which facilities are categorically excluded.⁸ If a facility is categorically excluded, an applicant or licensee may ordinarily assume compliance with the guideline limits for exposure. However, an applicant or licensee must evaluate and determine compliance for a facility that is otherwise categorically excluded if specifically requested to do so by the FCC.⁹ If potential environmental significance is found as a result, an EA must be filed with the FCC.

No radio or television broadcast facilities are categorically excluded. Thus, broadcast applicants and licensees must affirmatively determine their facility's compliance with the guidelines before construction, and upon every facility modification or license renewal application. With respect to personal wireless services, a cellular facility is categorically excluded if the total effective radiated power (ERP) of all channels operated by the licensee at a site is 1000 watts or less. If the facility uses sectorized antennas, only the total effective radiated power in each direction is considered. Examples of a 3 sector and a single sector antenna array are shown below:

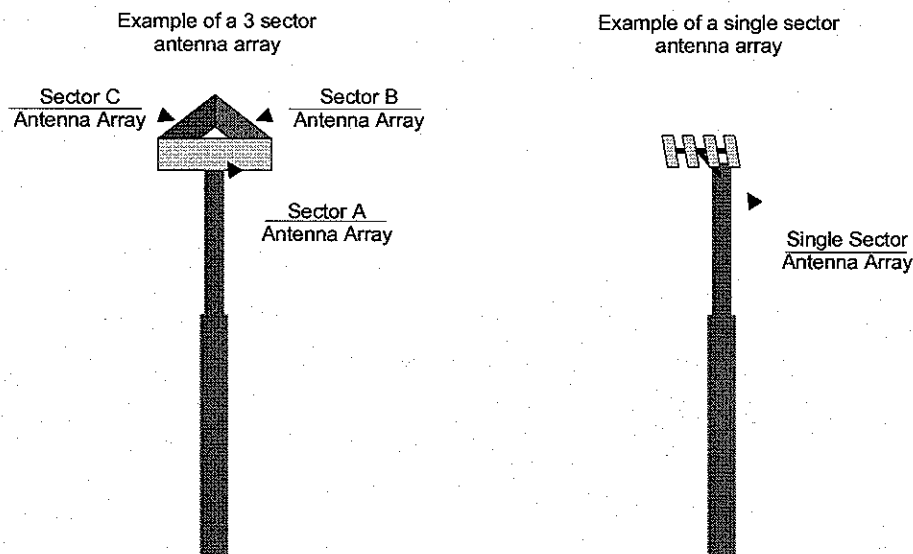


Illustration 4

⁸ "The appropriate exposure limits . . . are generally applicable to all facilities, operations and transmitters regulated by the Commission. However, a determination of compliance with the exposure limits . . . (routine environmental evaluation), and preparation of an EA if the limits are exceeded, is necessary only for facilities, operations and transmitters that fall into the categories listed in table 1 [of §1.1307], or those specified in paragraph (b)(2) of this section. All other facilities, operations and transmitters are categorically excluded from making studies or preparing an EA . . ."

⁹ See 47 C.F.R. §1.1307(c) and (d).

In addition, a cellular facility is categorically excluded, regardless of its power, if it is not mounted on a building and the lowest point of the antenna is at least 10 meters (about 33 feet) above ground level. A broadband PCS antenna array is categorically excluded if the total effective radiated power of all channels operated by the licensee at a site (or all channels in any one direction, in the case of sectorized antennas) is 2000 watts or less. Like cellular, another way for a broadband PCS facility to be categorically excluded is if it is not mounted on a building and the lowest point of the antenna is at least 10 meters (about 33 feet) above ground level. The power threshold for categorical exclusion is higher for broadband PCS than for cellular because broadband PCS operates at a higher frequency where exposure limits are less restrictive. For categorical exclusion thresholds for other personal wireless services, consult Table 1 of Section 1.1307(b)(1).¹⁰

For your convenience, we have developed the checklist in Appendix A that may be used to streamline the process of determining whether a proposed facility is categorically excluded. You are encouraged to adopt the use of this checklist in your jurisdiction, although such use is not mandatory.

B. What If An Applicant Or Licensee Wants To Exceed The Limits Shown In Illustration 3?

Any FCC applicant or licensee who wishes to construct or operate a facility that, by itself or in combination with other sources of emissions (*i.e.*, other transmitting antennas), may cause human exposures in excess of the guideline limits must file an Environmental Assessment (EA) with the FCC. Where more than one antenna is collocated (for example, on a single tower or rooftop or at a hilltop site), the applicant must take into consideration all of the RF power transmitted by all of the antennas when determining maximum exposure levels. Compliance at an existing site is the shared responsibility of all licensees whose transmitters produce exposure levels in excess of 5% of the applicable exposure limit. A new applicant is responsible for compliance (or submitting an EA) at a multiple-use site if the proposed transmitter would cause non-compliance and if it would produce exposure levels in excess of 5% of the applicable limit.¹¹

An applicant or licensee is not permitted to construct or operate a facility that would result in exposure in excess of the guideline limits until the FCC has reviewed the EA and either found no significant environmental impact, or pursued further environmental processing including the preparation of a formal Environmental Impact Statement. As a practical matter, however, this process is almost never invoked for RF exposure issues because applicants and licensees normally undertake corrective actions to ensure compliance with the guidelines before submitting an application to the FCC.

Unless a facility is categorically excluded (explained above), the FCC's rules require a licensee to evaluate a proposed or existing facility's compliance with the RF exposure guidelines and to

¹⁰ Table 1 of §1.1307(b)(1) is reproduced in Appendix A to this guide.

¹¹ For more information, see OET Bulletin 65, or see 47 CFR §1.1307(b)(3).

determine whether an EA is required. In the case of broadcast licensees, who are required to obtain a construction permit from the FCC, this evaluation is required before the application for a construction permit is filed, or the facility is constructed. In addition, if a facility requires the filing of an EA for any reason other than RF emissions, the RF evaluation must be performed before the EA is filed. Factors other than RF emissions that may require the filing of an EA are set out in 47 C.F.R. § 1.1307(a). Otherwise, new facilities that do not require FCC-issued construction permits should be evaluated before they are placed in operation. The FCC also requires its licensees to evaluate existing facilities and operations that are not categorically excluded if the licensee seeks to modify its facilities or renew its license. These requirements are intended to enhance public safety by requiring periodic site compliance reviews.

All facilities that were placed in service before October 15, 1997 (when the current RF exposure guidelines became effective) are expected to comply with the current guidelines no later than September 1, 2000, or the date of a license renewal, whichever is earlier.¹² If a facility cannot meet the September 1, 2000, date, the licensee of that facility must file an EA by that date. Section 1.1307(b) of the FCC's rules requires the licensee to provide the FCC with technical information showing the basis for its determination of compliance upon request.

II. How the FCC Verifies Compliance with and Enforces Its Rules.

A. Procedures Upon Initial Construction, Modification, and Renewal.

The FCC's procedures for verifying that a new facility, or a facility that is the subject of a facility modification or license renewal application, will comply with the RF exposure rules vary depending upon the service involved. Applications for broadcast services (for example, AM and FM stations, and television stations) are reviewed by the FCC's Mass Media Bureau (MMB). As part of every relevant application, the MMB requires an applicant to submit an explanation of what steps will be taken to limit RF exposure and comply with FCC guidelines. The applicant must certify that RF exposure procedures will be coordinated with all collocated entities (usually other stations at a common transmitter site or hill or mountain peak). If the submitted explanation does not adequately demonstrate a facility's compliance with the guidelines, the MMB will require additional supporting data before granting the application.

The Wireless Telecommunications Bureau (WTB) reviews personal wireless service applications (for cellular, PCS, SMR, etc.). For those services that operate under blanket area licenses, including cellular and PCS, the license application and renewal form require the applicant to certify whether grant of the application would have a significant environmental impact so as to require submission of an EA. The applicant's answer to this question covers all of the facilities sites included within the area of the license.

For those services that continue to be licensed by site (e.g., certain paging renewals), the WTB requires a similar certification on the application form for each site. To comply with the FCC's rules, an applicant must determine its own compliance before completing this certification for

¹² Prior to October 15, 1997, the Commission applied a different set of substantive guidelines.

every site that is not categorically excluded. The WTB does not, however, routinely require the submission of any information supporting the determination of compliance.

B. Procedures For Responding To Complaints About Existing Facilities.

The FCC frequently receives inquiries from members of the public as to whether a particular site complies with the RF exposure guidelines. Upon receiving these inquiries, FCC staff may ask the inquiring party to describe the site at issue. In many instances, the information provided by the inquiring party does not raise any concern that the site could exceed the limits in the guidelines. FCC staff will then inform the inquiring party of this determination.

In some cases, the information provided by the inquiring party does not preclude the possibility that the limits could be exceeded. Under these circumstances, FCC staff may ask the licensee who operates the facility to supply information demonstrating its compliance. FCC staff may also inspect the site to determine whether it is accessible to the public, and examine other relevant physical attributes. Usually, the information obtained in this manner is sufficient to establish compliance. If compliance is established in this way, FCC staff will inform the inquiring party of this determination.

In some instances, a licensee may be unable to provide information sufficient to establish compliance with the guideline limits. In these cases, FCC staff may test the output levels of individual facilities and evaluate the physical installation. Keep in mind, however, that instances in which physical testing is necessary to verify compliance are relatively rare.

If a site is found to be out of compliance with the RF guidelines, the FCC will require the licensees at the site to remedy the situation. Depending on the service and the nature and extent of the violation, these remedies can include, for example, an immediate reduction in power, a modification of safety barriers, or a modification of the equipment or its installation. Actions necessary to bring a site into compliance are the shared responsibility of all licensees whose facilities cause exposures in that area that exceed 5% of the applicable MPE limit. In addition, licensees may be subject to sanctions for violating the FCC's rules and/or for misrepresentation.

The FCC is committed to responding fully, promptly, and accurately to all inquiries regarding compliance with the RF exposure guidelines, and to taking swift and appropriate action whenever the evidence suggests potential noncompliance. To perform this function effectively, however, the FCC needs accurate information about potentially problematic situations. By applying the principles discussed in this guide about RF emissions, exposure and the FCC's guidelines, state and local officials can fulfill a vital role in identifying and winnowing out situations that merit further attention.

III. Practical Guidance Regarding Compliance.

This section is intended to provide some general guidelines that can be used to identify sites that should not raise serious questions about compliance with FCC RF exposure guidelines. Sites that don't fall into the categories described here may still meet the guidelines, but the determination

of compliance will not be as straightforward. In such cases, a detailed review may be required. The tables and graphs shown in Appendix B are intended only to assist in distinguishing sites that should not raise serious issues from sites that may require further inquiry. They are not intended for use in identifying sites that are out of compliance. As noted above, the factors that can affect exposure at any individual site, particularly a site containing multiple facilities, are too numerous and subtle to be practically encompassed within this framework.

Applying the basic principles discussed in this guide should allow you to eliminate a large number of sites from further consideration with respect to health concerns. You may find it useful to contact a qualified radio engineer to assist you in your inquiry. Many larger cities and counties, and most states, have radio engineers on staff or under contract. In smaller jurisdictions, we recommend you seek initial assistance from other jurisdictions, universities that have RF engineering programs, or perhaps the engineer in charge of your local broadcast station(s).

We'll exclude any discussion of broadcast sites. As explained before, broadcast licensees are required to submit site-specific information on each facility to the FCC for review, and that information is publicly available at the station as long as the application is pending. The focus in this section is on personal wireless services, particularly cellular and broadband PCS, the services that currently require the largest numbers of new and modified facilities. Many other personal wireless services, however, such as paging services, operate in approximately the same frequency ranges as cellular and broadband PCS.¹³ Much of the information here is broadly applicable to those services as well, and specific information is provided in Appendix B for paging and narrowband PCS operations over frequency bands between 901 and 940 MHz.

Finally, this section only addresses the general population/uncontrolled exposure guidelines, since compliance with these guidelines generally causes the most concern to state and local governments. Compliance with occupational/controlled exposure limits should be examined independently.

A. Categorically Excluded Facilities.

As a first step in evaluating a siting application for compliance with the FCC's guidelines, you will probably want to consider whether the facility is categorically excluded under the FCC's rules from routine evaluation for compliance. The checklist in Appendix A will guide you in making this determination. Because categorically excluded facilities are unlikely to cause any exposure in excess of the FCC's guidelines, determination that a facility is categorically excluded should generally suffice to end the inquiry.

B. Single Facility Sites.

If a wireless telecommunications facility is not categorically excluded, you may want to evaluate potential exposure using the methods discussed below and the tables and figures in Appendix B.

¹³ The major exception is fixed wireless services, which often operate at much higher frequencies. In addition, some paging and other licensees operate at lower frequencies

If you "run the numbers" using the conservative approaches promoted in this paper and the site in question does not exceed these values, then you generally need look no further. Alternately, if the "numbers" don't pass muster, you may have a genuine concern. But remember, there may be other factors (*i.e.*, power level, height, blockages, etc.) that contribute to whether the site complies with FCC guidelines.

Where a site contains only one antenna array, the maximum exposure at any point in the horizontal plane can be predicted by calculations. The tables and graphs in Appendix B show the maximum distances in the horizontal plane from an antenna at which a person could possibly be exposed in excess of the guidelines at various levels of effective radiated power (ERP).¹⁴ Thus, if people are not able to come closer to an antenna than the applicable distance shown in Appendix B, there should be no cause for concern about exposure exceeding the FCC guidelines. The tables and graphs apply to the following wireless antennas: (1) cellular omni-directional antennas (Table B1-1 and Figure B1-1); (2) cellular sectorized antennas (Table B1-2 and Figure B1-2); (3) broadband PCS sectorized antennas (Table B1-3 and Figure B1-3),¹⁵ and (4) high-power (900 MHz-band) paging antennas (Table B1-4 and Figure B1-4). Table B1-4 and Figure B1-4 can also be used for omni-directional, narrowband (900 MHz) PCS antennas. Note that both tables and figures in Appendix B have been provided. In some cases it may be easier to use a table to estimate exposure distances, but figures may also be used when a more precise value is needed that may not be listed in a table.

It's important to note that the predicted distances set forth in Appendix B are based on a very conservative, "worst case" scenario. In other words, Appendix B identifies the furthest distance from the antenna that presents even a remote realistic possibility of RF exposure that could exceed the FCC guidelines. The power levels are based on the approximate maximum number of channels that an operator is likely to operate at one site. It is further assumed that each channel operates with the maximum power permitted under the FCC's rules and that all of these channels are "on" simultaneously, an unlikely scenario. This is a very conservative assumption. In reality, most sites operate at a fraction of the maximum permissible power and many sites use fewer than the maximum number of channels. Therefore, actual exposure levels would be expected to be well below the predicted values. Another mitigating factor could be the presence of intervening structures, such as walls, that will reduce RF exposure by variable amounts. For all these reasons, the values given in these tables and graphs are considered to be quite conservative and should over-predict actual exposure levels.

¹⁴ ERP is the apparent effective amount of power leaving the transmit antenna. The ERP is determined by factors including but not limited to transmitter output power, coaxial line loss between the transmitter and the antenna, and the "gain" (focusing effect) of the antenna. In some cases, power may also be expressed in terms of EIRP (effective isotropically radiated power). Therefore, for convenience, the tables in Appendix B also include a column for EIRP. ERP and EIRP are related by the mathematical expression: $(1.64) \times \text{ERP} = \text{EIRP}$.

¹⁵ Because broadband PCS antennas are virtually always sectorized, no information is provided for omni-directional PCS antennas.

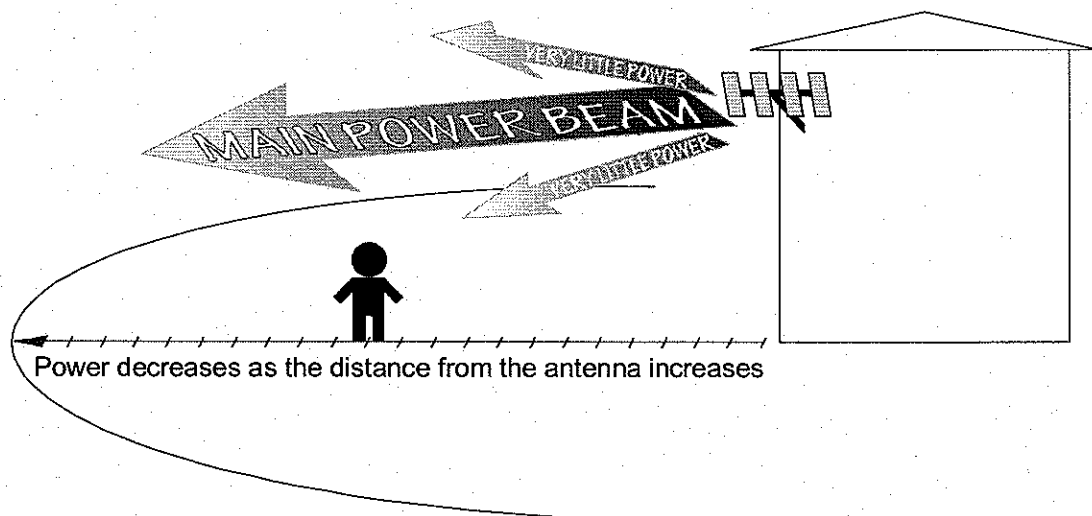


Illustration 5

Personal wireless service antennas typically do not emit high levels of RF energy directed above or below the horizontal plane of the antenna. Although the precise amount of energy transmitted outside the horizontal plane will depend upon the type of antenna used, we are aware of no wireless antennas that produce significant non-horizontal transmissions. Thus, exposures even a small distance below the horizontal plane of these antennas would be significantly less than in the horizontal plane. As discussed above, the tables and figures in Appendix B show distances in the horizontal plane from typical antennas at which exposures could potentially exceed the guidelines, assuming “worst case” operating conditions at maximum possible power levels. In any direction other than horizontal, including diagonal or straight down, these “worst case” distances would be significantly less.

Where unidirectional antennas are used, exposure levels within or outside the horizontal plane in directions other than those where the antennas are aimed will typically be insignificant. In addition, many new antennas are being designed with shielding capabilities to minimize emissions in undesired directions.

C. Multiple Facility Sites.

Where multiple facilities are located at a single site, the FCC’s rules require the total exposure from all facilities to fall within the guideline limits, unless an EA is filed and approved. In such cases, however, calculations of predicted exposure levels and overall evaluation of the site may become much more complicated. For example, different transmitters at a site may operate different numbers of channels, or the operating power per channel may vary from transmitter to transmitter. Transmitters may also operate on different frequencies (for example, one antenna array may belong to a PCS operator, while the other belongs to a cellular operator). A large number of variables such as these make the calculations more time consuming, and make it difficult to apply a simple rule-of-thumb test. See the following illustration.

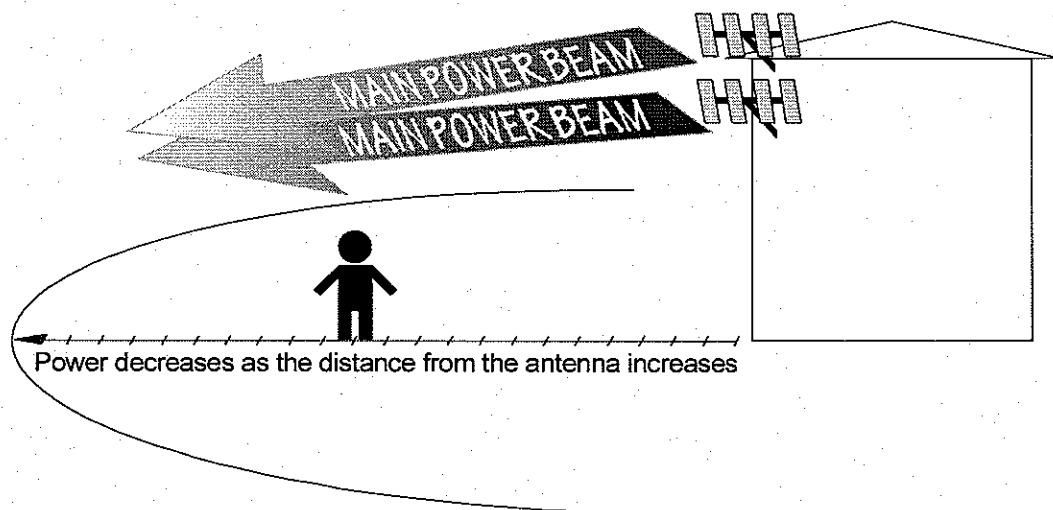


Illustration 6

However, we can be overly conservative and estimate a "worst case" exposure distance for compliance by assuming that the total power (e.g., ERP) of all transmitting antennas at the site is concentrated in the antenna that is closest to the area in question. (In the illustration above, this would be the antenna that is mounted lower on the building.) Then the values in the tables and graphs in Appendix B may be used as if this were the only antenna at the site, with radiated power equal to the sum of the actual radiated power of all antennas at the site. Actual RF exposure at any point will always be less than the exposure calculated using these assumptions. Thus, if people are not able to come closer to a group of antennas than the applicable distance shown in Appendix B using these assumptions, there should be no cause for concern about exposure exceeding the FCC guidelines. This is admittedly an extremely conservative procedure, but it may be of assistance in making a "first cut" at eliminating sites from further consideration.

IV. Conclusion.

We've highlighted many of the most common concerns and questions raised by the siting of wireless telecommunications and broadcast antennas. Applying the principles outlined in this guide will allow you to make initial conservative judgments about whether RF emissions are or should be of concern, consistent with the FCC's rules.

As we have explained, when first evaluating a siting application for compliance with the FCC's guidelines, you will probably want to consider whether the facility is categorically excluded under the FCC's rules from routine evaluation for compliance. The checklist in Appendix A will guide you in making this determination. Because categorically excluded facilities are unlikely to cause any exposure in excess of the FCC's guidelines, determination that a facility is categorically excluded should generally suffice to end the inquiry.

If a wireless telecommunications facility is not categorically excluded, you may want to evaluate potential exposure using the methods discussed in Part III of this paper and the tables and figures in Appendix B. If the site in question does not exceed the values, then you generally need look no further. Alternately, if the values don't pass muster, you may have a genuine concern. But

remember, there may be other factors (*i.e.*, power level, height, blockages, etc.) that contribute to whether the site complies with FCC guidelines.

If you have questions about compliance, your initial point of exploration should be with the facilities operator in question. That operator is required to understand the FCC's rules and to know how to apply them in specific cases at specific sites. If, after diligently pursuing answers from the operator, you still have genuine questions regarding compliance, you should contact the FCC at one of the numbers listed below. Provision of the information identified in the checklist in Appendix A may assist the FCC in evaluating your inquiry.

General Information: Compliance and Information Bureau, (888) CALL-FCC

Concerns About RF Emissions Exposure at a Particular Site: Office of Engineering and Technology, RF Safety Program, phone (202) 418-2464, FAX (202) 418-1918, e-mail rfsafety@fcc.gov

Licensing and Site Information Regarding Wireless Telecommunications Services: Wireless Telecommunications Bureau, Commercial Wireless Division, (202) 418-0620

Licensing and Site Information Regarding Broadcast Radio Services: Mass Media Bureau, Audio Services Division, (202) 418-2700

Licensing and Site Information Regarding Television Service (Including DTV): Mass Media Bureau, Video Services Division, (202) 418-1600

Also, note that the RF Safety Program Web site is a valuable source of general information on the topic of potential biological effects and hazards of RF energy. For example, OET recently updated its OET Bulletin 56 ("Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields"). This latest version is available from the program and can be accessed and downloaded from the FCC's web site at:

<http://www.fcc.gov/oet/rfsafety/>

APPENDIX A

***Optional Checklist for Determination
Of Whether a Facility is Categorically Excluded***

**Optional Checklist for Local Government
To Determine Whether a Facility is Categorically Excluded**

Purpose: The FCC has determined that many wireless facilities are unlikely to cause human exposures in excess of RF exposure guidelines. Operators of those facilities are exempt from routinely having to determine their compliance. These facilities are termed "categorically excluded." Section 1.1307(b)(1) of the Commission's rules defines those categorically excluded facilities. This checklist will assist state and local government agencies in identifying those wireless facilities that are categorically excluded, and thus are highly unlikely to cause exposure in excess of the FCC's guidelines. Provision of the information identified on this checklist may also assist FCC staff in evaluating any inquiry regarding a facility's compliance with the RF exposure guidelines.

BACKGROUND INFORMATION

1. Facility Operator's Legal Name: _____
2. Facility Operator's Mailing Address: _____
3. Facility Operator's Contact Name/Title: _____
4. Facility Operator's Office Telephone: _____
5. Facility Operator's Fax: _____
6. Facility Name: _____
7. Facility Address: _____
8. Facility City/Community: _____
9. Facility State and Zip Code: _____
10. Latitude: _____
11. Longitude: _____

continue
→

Optional Local Government Checklist (page 2)

EVALUATION OF CATEGORICAL EXCLUSION

12. Licensed Radio Service (see attached Table 1): _____
13. Structure Type (free-standing or building/roof-mounted): _____
14. Antenna Type [omnidirectional or directional (includes sectored)]: _____
15. Height above ground of the lowest point of the antenna (in meters): _____
16. ☐ Check if all of the following are true:
- (a) This facility will be operated in the Multipoint Distribution Service, Paging and Radiotelephone Service, Cellular Radiotelephone Service, Narrowband or Broadband Personal Communications Service, Private Land Mobile Radio Services Paging Operations, Private Land Mobile Radio Service Specialized Mobile Radio, Local Multipoint Distribution Service, or service regulated under Part 74, Subpart I (see question 12).
 - (b) This facility will not be mounted on a building (see question 13).
 - (c) The lowest point of the antenna will be at least 10 meters above the ground (see question 15).

If box 16 is checked, this facility is categorically excluded and is unlikely to cause exposure in excess of the FCC's guidelines. The remainder of the checklist need not be completed. If box 16 is not checked, continue to question 17.

17. Enter the power threshold for categorical exclusion for this service from the attached Table 1 in watts ERP or EIRP* (note: $EIRP = (1.64) \times ERP$): _____
18. Enter the total number of channels if this will be an omnidirectional antenna, or the maximum number of channels in any sector if this will be a sectored antenna: _____
19. Enter the ERP or EIRP per channel (using the same units as in question 17): _____
20. Multiply answer 18 by answer 19: _____
21. Is the answer to question 20 less than or equal to the value from question 17 (yes or no)? _____

If the answer to question 21 is YES, this facility is categorically excluded. It is unlikely to cause exposure in excess of the FCC's guidelines.

If the answer to question 21 is NO, this facility is not categorically excluded. Further investigation may be appropriate to verify whether the facility may cause exposure in excess of the FCC's guidelines.

*"ERP" means "effective radiated power" and "EIRP" means "effective isotropic radiated power"

TABLE 1: TRANSMITTERS, FACILITIES AND OPERATIONS SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
Experimental Radio Services (part 5)	power > 100 W ERP (164 W EIRP)
Multipoint Distribution Service (subpart K of part 21)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1640 W EIRP <u>building-mounted antennas</u> : power > 1640 W EIRP
Paging and Radiotelephone Service (subpart E of part 22)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u> : power > 1000 W ERP (1640 W EIRP)
Cellular Radiotelephone Service (subpart H of part 22)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> total power of all channels > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u> : total power of all channels > 1000 W ERP (1640 W EIRP)

TABLE 1 (cont.)

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
Personal Communications Services (part 24)	(1) Narrowband PCS (subpart D): <u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m and total power of all channels > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u>: total power of all channels > 1000 W ERP (1640 W EIRP) (2) Broadband PCS (subpart E): <u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m and total power of all channels > 2000 W ERP (3280 W EIRP) <u>building-mounted antennas</u>: total power of all channels > 2000 W ERP (3280 W EIRP)
Satellite Communications (part 25)	all included
General Wireless Communications Service (part 26)	total power of all channels > 1640 W EIRP
Wireless Communications Service (part 27)	total power of all channels > 1640 W EIRP
Radio Broadcast Services (part 73)	all included

TABLE 1 (cont.)

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
Experimental, auxiliary, and special broadcast and other program distributional services (part 74)	subparts A, G, L: power > 100 W ERP subpart I: <u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1640 W EIRP <u>building-mounted antennas</u> : power > 1640 W EIRP
Stations in the Maritime Services (part 80)	ship earth stations only
Private Land Mobile Radio Services Paging Operations (part 90)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u> : power > 1000 W ERP (1640 W EIRP)
Private Land Mobile Radio Services Specialized Mobile Radio (part 90)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> total power of all channels > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u> : total power of all channels > 1000 W ERP (1640 W EIRP)

TABLE 1 (cont.)

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
Amateur Radio Service (part 97)	transmitter output power > levels specified in § 97.13(c)(1) of this chapter
Local Multipoint Distribution Service (subpart L of part 101)	<u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m and power > 1640 W EIRP <u>building-mounted antennas</u>: power > 1640 W EIRP LMDS licensees are required to attach a label to subscriber transceiver antennas that: (1) provides adequate notice regarding potential radiofrequency safety hazards, <i>e.g.</i>, information regarding the safe minimum separation distance required between users and transceiver antennas; and (2) references the applicable FCC-adopted limits for radiofrequency exposure specified in § 1.1310 of this chapter.

APPENDIX B

*Estimated "Worst Case" Distances that Should be Maintained from
Single Cellular, PCS, and Paging Base Station Antennas*

Table B1-1. Estimated "worst case" horizontal* distances that should be maintained from a single, omni-directional, **cellular base-station** antenna to meet FCC RF exposure guidelines

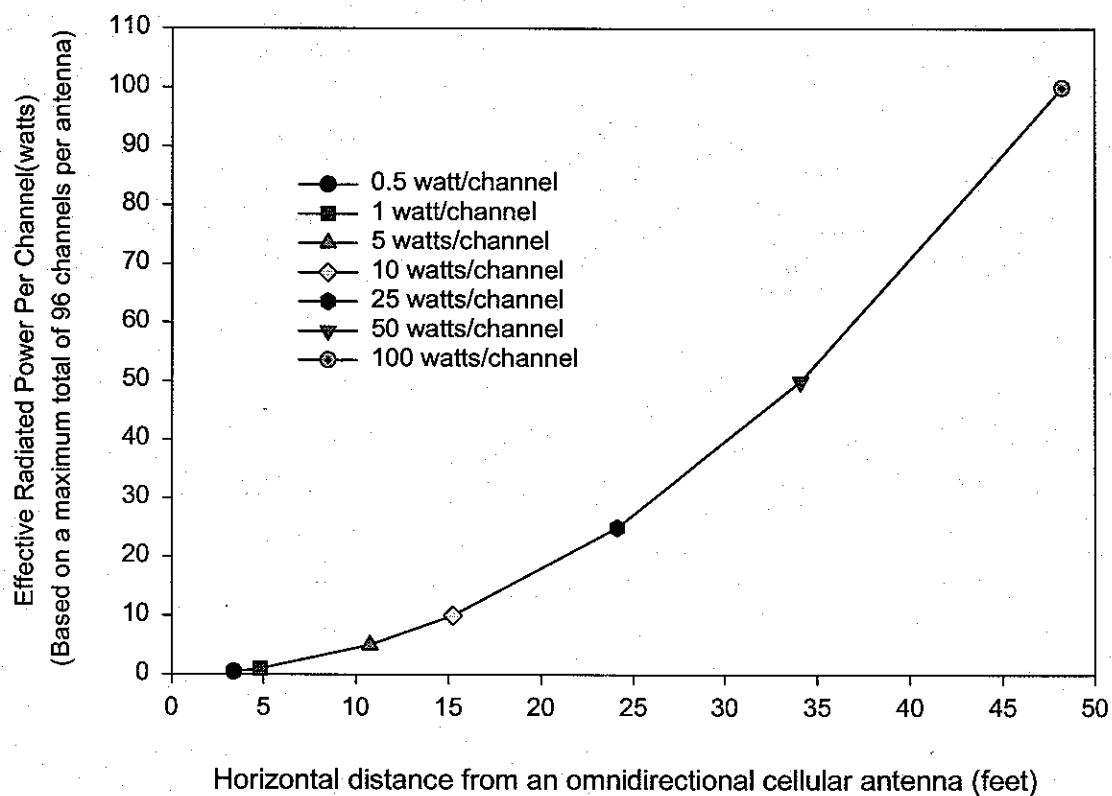
Effective Radiated Power (watts) per channel based on maximum total of 96 channels per antenna	Effective Isotropic Radiated Power (watts) per channel based on a maximum total of 96 channels per antenna	Horizontal* distance (feet) that should be maintained from a single omni-directional cellular antenna
0.5	0.82	3.4
1	1.6	4.8
5	8.2	10.8
10	16.4	15.2
25	41	24.1
50	82	34.1
100	164	48.2

For intermediate values not shown on this table, please refer to the Figure B1-1

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are worst case, assuming an omnidirectional antenna using 96 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular omnidirectional antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy directly toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-1. Estimated "worst case" horizontal* distances that should be maintained from a single omni-directional **cellular base station** antenna to meet FCC RF exposure guidelines



* These distances are based on exposure at same level as antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are worst case, assuming an omnidirectional antenna using 96 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular omnidirectional antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy directly toward the ground.

Table B1-2. Estimated "worst case" horizontal* distances that should be maintained from a single, sectorized, **cellular base-station** antenna to meet FCC RF exposure guidelines

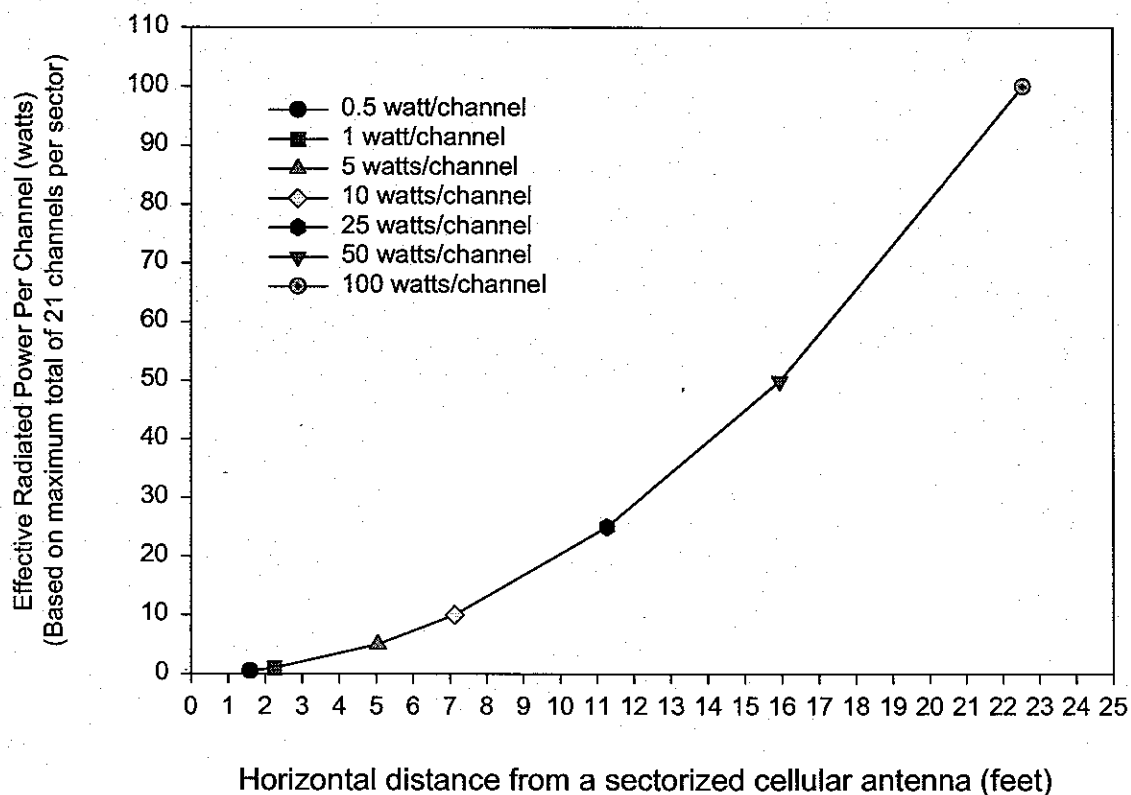
Effective Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Effective Isotropic Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Horizontal* distance (feet) that should be maintained from a single sectorized cellular antenna
0.5	0.82	1.6
1	1.6	2.3
5	8.2	5
10	16.4	7.1
25	41	11.3
50	82	16
100	164	22.6

For intermediate values not shown on this table, please refer to the Figure B1-2

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case," assuming a sectorized antenna using 21 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-2. Estimated "worst case" horizontal* distances that should be maintained from a single sectorized, **cellular base station** antenna to meet FCC RF exposure guidelines



* These distances are based on exposure at same level as antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case", assuming a sectorized antenna using 21 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground.

Table B1-3. Estimated "worst case" horizontal* distances that should be maintained from a single sectorized **Broadband PCS base station** antenna to meet FCC RF exposure guidelines

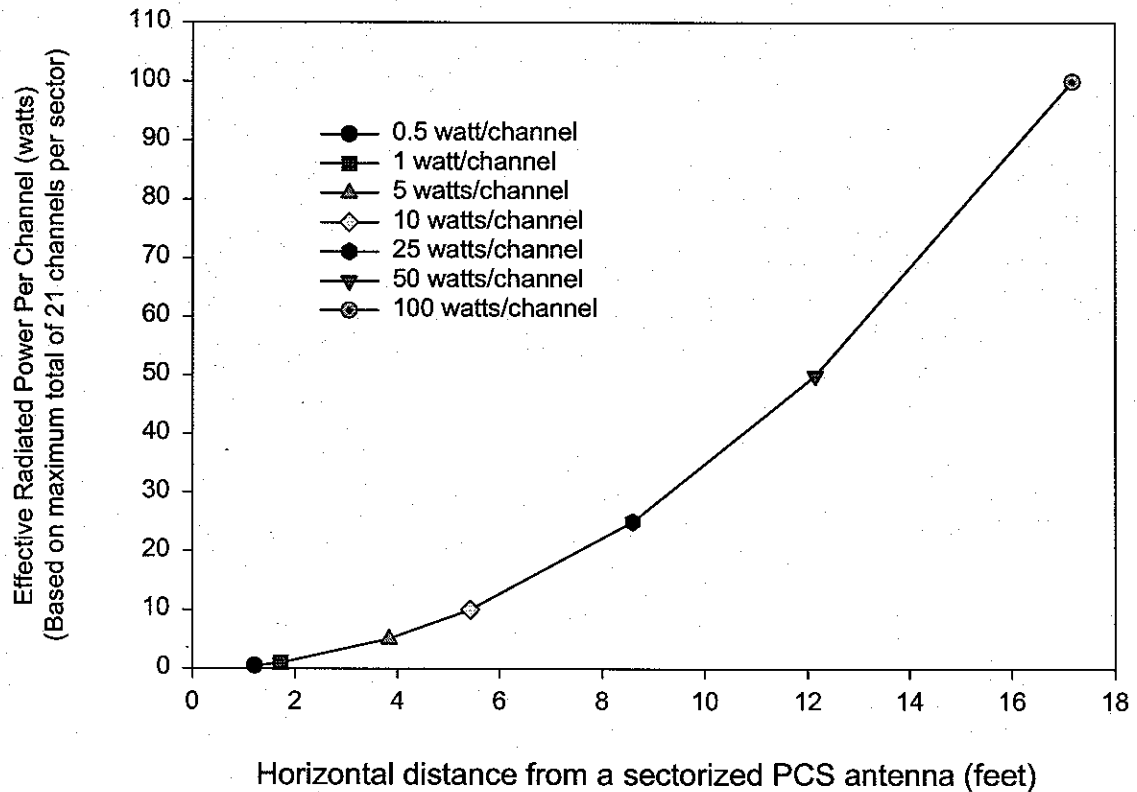
Effective Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Effective Isotropic Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Horizontal* distance (feet) that should be maintained from a single sectorized Broadband PCS antenna
0.5	0.82	1.2
1	1.6	1.7
5	8.2	3.8
10	16.4	5.4
25	41	8.6
50	82	12.1
100	164	17.2

For intermediate values not shown on this table, please refer to the Figure B1-3

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case," assuming a sectorized antenna using 21 channels. If the system is using fewer than 21 channels, the actual horizontal distances that must be maintained will be less. PCS sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-3. Estimated "worst case" horizontal* distances that should be maintained from a single sectorized, **PCS base station** antenna to meet FCC RF exposure guidelines



* These distances are based on exposure at same level as antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case", assuming a sectorized antenna using 21 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. PCS sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground.

Table B1-4. Estimated "worst case" horizontal* distances that should be maintained from a single omnidirectional **paging** or **narrowband PCS** antenna to meet FCC RF exposure guidelines. Note: this table and the associated figure only apply to the 900-940 MHz band; paging antennas at other frequencies are subject to different values.

Effective Radiated Power (watts) based on one channel per antenna	Effective Isotropic Radiated Power (watts)	Horizontal* distance (feet) that should be maintained from a single omnidirectional paging or narrowband PCS antenna
50	82	3.4
100	164	4.8
250	410	7.5
500	820	10.6
1,000	1,640	15.1
2,000	3,280	21.3
3,500	5,740	28.2

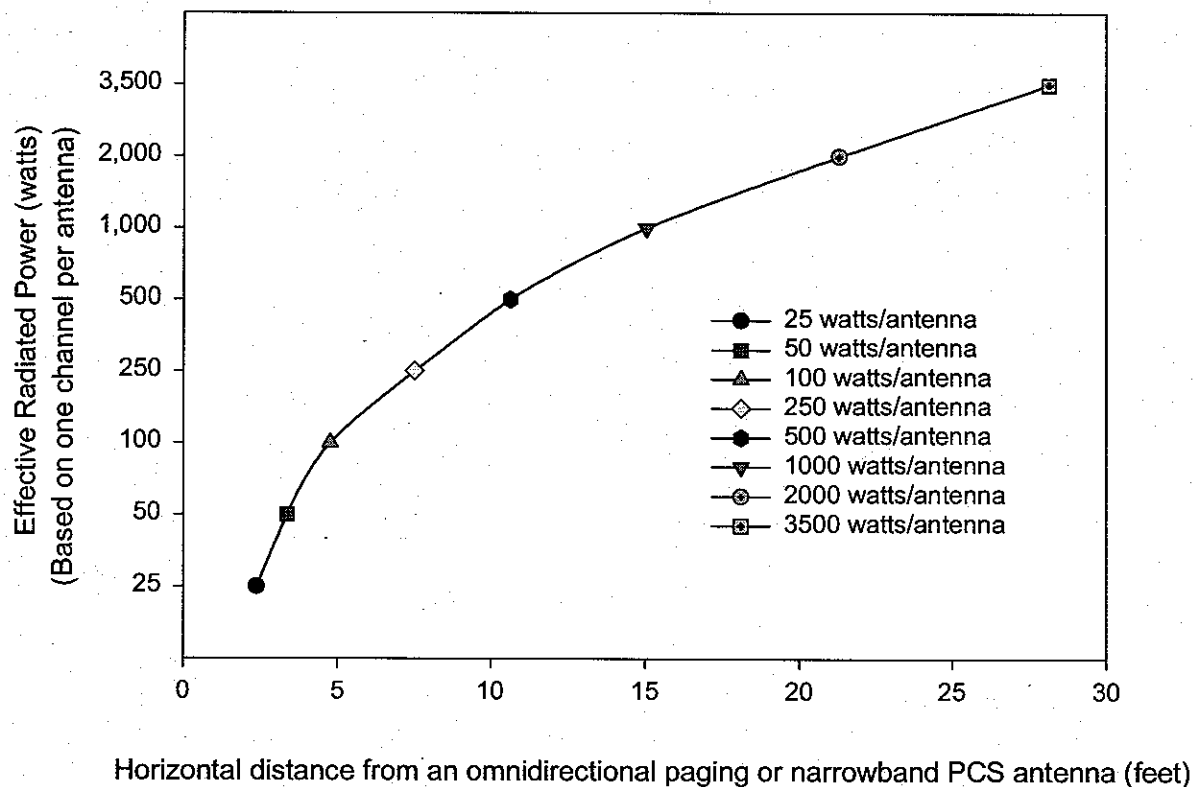
For intermediate values not shown on this table, please refer to the Figure B1-4

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These distances assume only one frequency (channel) per antenna. Distances would be greater if more than one channel is used per antenna. Omnidirectional paging and narrowband PCS antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-4. Estimated "worst case" horizontal* distances that should be maintained from a single omnidirectional **paging** or **narrowband PCS** antenna to meet FCC RF exposure guidelines.

Note: this figure and the associated table only apply to the 900-940 MHz band; paging antennas at other frequencies are subject to different values



* These distances are based on exposure at the same level as the antenna, for example, on a rooftop or building directly across from and at the same height as the antenna.

Note: These distances assume only one frequency (channel) per antenna. Distances would be greater if more than one channel is used per antenna. Omnidirectional paging and narrowband PCS antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy towards the ground.

APPENDIX C

Text of 47 U.S.C. § 332(c)(7)

(7) PRESERVATION OF LOCAL ZONING AUTHORITY.

(A) GENERAL AUTHORITY. Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

(B) LIMITATIONS.

- (i) The regulation of the placement, construction, and modification of personal wireless service facilities by and State or local government or instrumentality thereof (I) shall not unreasonably discriminate among providers of functionally equivalent services; and (II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.
- (ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.
- (iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.
- (iv) No State or local government or instrumentality thereof may regulate the placement, construction, or modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.
- (v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

(C) DEFINITIONS. For purposes of this paragraph

- (i) the term "personal wireless services" means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;
- (ii) the term "personal wireless service facilities" means facilities for the provision of personal wireless services; and
- (iii) the term "unlicensed wireless service" means the offering of telecommunications service using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v)).



MODEL WIRELESS TELECOMMUNICATIONS ORDINANCE

PCIA, THE WIRELESS INFRASTRUCTURE ASSOCIATION

December, 2006

About PCIA

PCIA is an association of companies that seek the advancement of the wireless communications industry through advocacy, technical and marketplace initiatives. PCIA supports programs and policies that expand the growth of the wireless network infrastructure and deployment industry. PCIA's goal is to create a better financial and business environment in which its members can grow and succeed. For more information, please go to www.pcia.com.

MODEL WIRELESS TELECOMMUNICATIONS ORDINANCE

I. Purpose and Legislative Intent.

The purpose of this Wireless Telecommunications Ordinance is to ensure that residents and businesses in [the Municipality] have reliable access to wireless telecommunications networks and state of the art communications services while also ensuring that this objective is achieved in a fashion that preserves the intrinsic aesthetic character of the community and is accomplished according to [the Municipality's] zoning, planning, and design standards. The Telecommunications Act of 1996 preserved, with certain limitations, local government land use and zoning authority concerning the placement, construction, and modification of wireless telecommunications facilities. [The Municipality] recognizes that facilitating the development of wireless service technology can be an economic development asset to [the Municipality] and a significant benefit to its residents. To accomplish the above stated objectives and to ensure that the placement, construction or modification of wireless telecommunications facilities complies with all applicable Federal laws, and is consistent with [the Municipality's] land use policies, [the Municipality] is adopting a single, comprehensive, wireless telecommunications ordinance.

This Ordinance establishes parameters for the siting of Wireless Telecommunications Facilities. By enacting this Ordinance it is [the Municipality's] intent to:

- (1) Ensure access to reliable wireless communications services throughout all areas of [the Municipality];
- (2) Encourage the use of existing Monopoles, Towers, Utility Poles and other structures for the collocation of Telecommunications Facilities;
- (3) Encourage the location of new Monopoles and Towers in non-residential areas;
- (4) Minimize the number of new Monopoles and Towers that would otherwise need to be constructed by providing incentives for the use of existing structures;
- (5) Encourage the location of Monopoles and Towers, to the extent possible, in areas where the adverse impact on the community will be minimal;
- (6) Minimize the potential adverse effects associated with the construction of Monopoles and Towers through the implementation of reasonable design, landscaping and construction practices;
- (7) Ensure public health, safety, welfare, and convenience; and
- (8) Conform to Federal and State laws that allow certain antennas to be exempt from local regulations.

II. Definitions.

For the purposes of this Ordinance, the following terms shall be defined as:

Accessory Equipment -- Any equipment serving or being used in conjunction with a Telecommunications Facility or Support Structure. This equipment includes, but is not limited to, utility or transmission equipment, power supplies, generators, batteries, cables, equipment buildings, cabinets and storage sheds, shelters or other structures.

Administrative Approval -- Zoning approval that the [Zoning Administrator] or designee is authorized to grant after Administrative Review.

Administrative Review -- The procedures established in Section IV E of this Ordinance.

Antenna -- Any structure or device used to collect or radiate electromagnetic waves for the provision of cellular, paging, personal communications services (PCS) and microwave communications. Such structures and devices include, but are not limited to, directional antennas, such as panels, microwave dishes and satellite dishes, and omnidirectional antennas, such as whips.

Collocation -- The act of siting Telecommunications Facilities in the same location on the same Support Structure as other Telecommunications Facilities. Collocation also means locating Telecommunications Facilities on an existing structure (for example: buildings, water tanks, towers, utility poles, etc.) without the need to construct a new support structure.

“Carrier on Wheels” or “Cell on Wheels” (“COW”) -- A portable self-contained cell site that can be moved to a location and set up to provide personal wireless services on a temporary or emergency basis. A COW is normally vehicle-mounted and contains a telescoping boom as the Antenna support structure.

Ordinary Maintenance -- Ensuring that Telecommunications Facilities and Support Structures are kept in good operating condition. Ordinary Maintenance includes inspections, testing and modifications that maintain functional capacity, aesthetic and structural integrity; for example the strengthening of a Support Structure’s foundation or of the Support Structure itself. Ordinary Maintenance includes replacing Antennas and Accessory Equipment on a like-for-like basis within an existing Telecommunications Facility and relocating the Antennas of approved Telecommunications Facilities to different height levels on an existing Monopole or Tower upon which they are currently located. Ordinary Maintenance does not include Minor and Major Modifications.

Major Modifications -- Improvements to existing Telecommunications Facilities or Support Structures that result in a substantial change to the Facility or Structure. Collocation of new Telecommunications Facilities to an existing Support Structure without Replacement of the structure shall not constitute a Major Modification. Major Modifications include, but are not limited to, extending the height of the Support Structure by more than twenty (20) feet or ten percent (10%) of its current height whichever is greater, and the Replacement of the structure.

Minor Modifications -- Improvements to existing Telecommunications Facilities and Support Structures, that result in some material change to the Facility or Support Structure but of a level,

quality or intensity that is less than a “substantial” change. Such Minor Modifications include, but are not limited to, extending the height of the Support Structure by less than twenty (20) feet or ten percent (10%) of its current height, whichever is greater, and the expansion of the compound area for additional Accessory Equipment.

Monopole --A single, freestanding pole-type structure supporting one or more Antenna. For purposes of this Ordinance, a Monopole is not a Tower.

Replacement -- Constructing a new Support Structure of proportions and of equal height or such other height as would be allowed under the definition of Minor Modification to a pre-existing Support Structure in order to support a Telecommunications Facility or to accommodate Collocation and removing the pre-existing Support Structure.

Stealth Telecommunications Facility -- Any Telecommunications Facility that is integrated as an architectural feature of a structure so that the purpose of the Facility for providing wireless services is not readily apparent to a casual observer.

Support Structure(s) – A structure designed to support Telecommunications Facilities including, but not limited to, Monopoles, Towers, Utility Poles and other freestanding self- supporting structures.

Telecommunications Facility(ies) -- Any unmanned facility established for the purpose of providing wireless transmission of voice, data, images or other information including, but not limited to, cellular telephone service, personal communications service (PCS), and paging service. A Telecommunication Facility can consists of one or more Antennas and Accessory Equipment or one base station.

Tower -- A lattice-type structure, guyed or freestanding, that supports one or more Antennas.

III. Approvals Required for Telecommunications Facilities and Support Structures.

- (A) Administrative Review. Telecommunications Facilities located on any existing support structure shall be permitted in any zoning district after Administrative Review and Administrative Approval in accordance with the standards set forth in this Ordinance. New Support Structures that are less than sixty (60) feet in height shall be permitted in any zoning district after Administrative Review and Administrative Approval in accordance with the standards set forth in this Ordinance. New Support Structures up to one hundred ninety-nine (199) feet in height shall be permitted in any Industrial District after Administrative Review and Administrative Approval in accordance with the standards set forth in this Ordinance. Monopoles or replacement poles located in utility easements or rights-of-way shall be permitted in any zoning district after Administrative Review and Administrative Approval in accordance with the standards set forth in this Ordinance. Stealth Telecommunications Facilities shall be permitted in any zoning district after Administrative Review and Administrative Approval in accordance with the standards set forth in this Ordinance.

- (B) Special Permit. Telecommunications Facilities and Support Structures not permitted by Administrative Approval shall be permitted in any district upon the granting of a Special Permit from the [Zoning Board] in accordance with the standards set forth in this Ordinance.
- (C) Exempt. Ordinary Maintenance of existing Telecommunications Facilities and Support Structures, as defined herein, shall be exempt from zoning and permitting requirements. In addition, the following facilities are not subject to the provisions of this Ordinance: (1) antennas used by residential households solely for broadcast radio and television reception ; (2) satellite antennas used solely for residential or household purposes; (3) COWs placed for a period of not more than one hundred twenty (120) days at any location within [The Municipality] after a declaration of an emergency or a disaster by the Governor or by the responsible official of [The Municipality]; and (4) television and AM/FM radio broadcast towers and associated facilities.

IV. Telecommunications Facilities and Support Structures Permitted by Administrative Approval.

A. Telecommunications Facilities Located on Existing Structures

- (1) Antennas and Accessory Equipment are permitted in all zoning districts when located on any existing structure, including, but not limited to, buildings, water tanks, utility poles, broadcast towers or any existing Support Structure in accordance with the requirements of this Part.
- (2) Antennas and Accessory Equipment may exceed the maximum building height limitations, provided the Antenna and Accessory Equipment are in compliance with the requirements and standards of this Part.
- (3) Each Antenna mounted on existing structures and any Accessory Equipment shall meet the following standards:
 - (a) Omnidirectional or whip Antennas shall not exceed twenty (20) feet in length and not exceed seven (7) inches in diameter and shall be of a color that is identical or similar to the color of the supporting structure to make the Antenna and related Accessory Equipment visually unobtrusive.
 - (b) Directional or panel Antennas shall not exceed ten (10) feet in length and two (2) feet in width and shall be of a color that is identical or similar to the color of the supporting structure to make the Antenna and related Accessory Equipment visually unobtrusive.

- (c) Cylinder-type Antennas shall not exceed ten (10) feet in length and not exceed twelve (12) inches in diameter and shall be of a color that is identical or similar to the color of the supporting structure to make the Antenna and related Accessory Equipment visually unobtrusive.
- (d) Satellite and microwave dishes shall not exceed ten (10) feet in diameter. Dish antennas greater than three (3) feet in diameter shall be screened with an appropriate architectural treatment that is compatible with or integral to the architecture of the building to which they are attached. This screening requirement shall not apply to dishes located upon Towers or Monopoles.
- (e) Other Antenna types not specifically mentioned above shall be permitted if they are not significantly greater in size and will have a visual impact no greater than the Antennas listed above. This provision is specifically included in this Ordinance to allow for future technological advancements in the development of Antennas.
- (f) Accessory Equipment must comply with Section VI (E).

B. New Support Structures

- (1) New Support Structure less than fifty (60) feet in height shall be permitted in all zoning districts in accordance with the requirements of this Part.
- (2) New Support Structures up to one hundred ninety-nine (199) feet in height shall be permitted in all Industrial Districts in accordance with the requirements of this Part. The height of any proposed support structure shall not exceed the minimum height necessary to meet the coverage objectives of the Facility. The setback of the structure shall be governed by the setback requirements of the underlying zone.
- (3) In the case of a monopoles or replacement poles that will support utility lines as well as a Telecommunications Facility shall be permitted within utility easements or rights-of-way, in accordance with requirements of this Part.
 - (a) The utility easement or right-of-way shall be a minimum of one hundred (100) feet in width.
 - (b) The easement or right-of-way shall contain overhead utility transmission and/or distribution structures that are eighty (80) feet or greater in height.

- (c) The height of the Monopole or replacement pole may not exceed by more than thirty (30) feet the height of existing utility support structures.
 - (d) Monopoles and the Accessory Equipment associated there with shall be set back a minimum of fifteen (15) feet from all boundaries of the easement or right-of-way.
 - (e) Single carrier Monopoles may be used within utility easements and rights-of-way due to the height restriction imposed by Subsection (c) above.
 - (f) Poles that use the structure of a utility tower for support are permitted under this Section. Such poles may extend up to twenty (20) feet above the height of the utility tower.
- (4) Monopoles or replacement poles located on public property or within public rights-of-way that will support public facilities or equipment in addition to Telecommunications Facilities shall be permitted in accordance with requirements of this Part. Examples include, but are not limited to, municipal communication facilities, athletic field lights, traffic lights, street lights, and other types of utility poles in the public right-of-way.

C. Stealth Telecommunications Facilities

- (1) Stealth Telecommunications Facilities shall be permitted in all zoning districts after Administrative Review and Administrative Approval in accordance with the requirements below:
- (a) Antennas must be enclosed, camouflaged, screened, obscured or otherwise not readily apparent to a casual observer.
 - (b) The structure utilized to support the Antennas must be allowed within the underlying zone district. Such structures may include, but are not limited to, flagpoles, bell towers, clock towers, crosses, monuments, smoke stacks, parapets, and steeples.
 - (c) Setbacks for the supporting structure shall be governed by the setback requirements of the underlying zoning district.

D. General Standards, Design Requirements, and Miscellaneous Provisions

- (1) Unless otherwise specified herein, all Telecommunications Facilities and Support Structures permitted by Administrative Approval are subject to

the applicable general standards and design requirements of Section VI and the provisions of Section VII.

E. Administrative Review Process

- (1) All Administrative Review applications must contain the following:
 - (a) Administrative Review application form signed by applicant.
 - (b) Copy of lease or letter of authorization from property owner evidencing applicant's authority to pursue zoning application
 - (c) Zoning Drawings detailing proposed improvements. Drawings must depict improvements related to the requirements listed in this Part, including property boundaries, setbacks, topography, elevation sketch, and dimensions of improvements.
 - (d) In the case of a new Support Structure:
 - (i) Statement documenting why collocation cannot meet the applicant's requirements. Such statement may include such technical information and other justifications as are necessary to document the reasons why collocation is not a viable option; and
 - (ii) The applicant shall provide a list of all existing structures considered as alternatives to the proposed location. The applicant shall provide a written explanation why the alternatives considered were either unacceptable or infeasible due to technical, physical, or financial reasons. If an existing tower or monopole is listed among the alternatives, applicant must specifically address why the modification of such structure is not a viable option.
 - (iii) Applications for new Support Structures with proposed Telecommunications Facilities shall be considered together as one application requiring only a single application fee.
 - (e) Administrative Review application fee.
- (2) Procedure.
 - (a) Within ten (10) business days of the receipt of an application for Administrative Review, the [Zoning Administrator] shall either:
 - (1) inform the Applicant in writing the specific reasons why the application is incomplete and does not meet the submittal requirements; or
 - (2) schedule an Administrative Review meeting

with the Applicant within thirty (30) days of the receipt of a complete application. This meeting is not a public hearing.

- (b) An applicant that receives notice of an incomplete application may submit additional documentation to complete the application. An applicant's failure to complete the application within sixty (60) business days after receipt of written notice shall constitute a withdrawal without prejudice of the application. An application withdrawn without prejudice may be resubmitted upon the filing of a new application fee.
- (c) The Administrative Review meeting will be conducted to confirm that the proposed application is consistent with this Ordinance. The [Zoning Administrator] must issue a written decision granting or denying the request within fifteen (15) days of the meeting unless an extension of time is agreed to by the Applicant. Failure to issue a written decision within (15) days shall constitute a denial of the application. The applicant may appeal such a denial as provided in this Ordinance or applicable State or Federal Law.
- (d) Should the [Zoning Administrator] deny the application, the [Zoning Administrator] shall provide written justification for the denial. The denial must be based on substantial evidence of inconsistencies between the application and this Ordinance.
- (f) Applicant may appeal any decision of the [Zoning Administrator] approving, approving with conditions, or denying an application or deeming an application incomplete, within thirty (30) days to [the Local Appeals Board] in accordance with this Ordinance.

V. Telecommunications Facilities and Support Structures Permitted by Special Permit.

A. Any Telecommunications Facility or Support Structures Not Meeting the Requirements of Section IV Shall Be Permitted by Special Permit in all Zoning Districts Subject to:

- (1) The submission requirements of Section V (B) below; and
- (2) The applicable standards of Sections VI and VII below; and
- (3) The requirements of the special permit general conditions at Code Section _____. [Insert cross reference to Municipality code section that establishes general conditions applicable to Special Permits.]

B. Submission Requirements for Special Permit Applications

- (1) All Special Permit applications for Telecommunications Facility and Support Structures must contain the following:
 - (a) Special Permit application form signed by applicant.
 - (b) Copy of lease or letter of authorization from the property owner evidencing applicant's authority to pursue zoning application.
 - (b) Written description and scaled drawings of the proposed Support Structure, including structure height, ground and structure design, and proposed materials.
 - (c) Number and type of proposed Antennas and their height above ground level, including the proposed placement of Antennas on the Support Structure.
 - (d) When locating within a residential area, a written technical and operational analysis of why a Monopole or similar structure at a height of less than one hundred (100) feet cannot be used.
 - (e) Line-of-sight diagram or photo simulation, showing the proposed Support Structure set against the skyline and viewed from at least four (4) directions within the surrounding areas.
 - (f) A statement justifying why Collocation is not feasible. Such statement shall include:
 - (i) Such technical information and other justifications as are necessary to document the reasons why collocation is not a viable option; and
 - (ii) The applicant shall provide a list of all existing structures considered as alternatives to the proposed location. The applicant shall provide a written explanation why the alternatives considered were either unacceptable or infeasible due to technical, physical, or financial reasons. If an existing tower was listed among the alternatives, applicant must specifically address why the modification of such tower is not a viable option.
 - (g) A statement that the proposed Support Structure will be made available for Collocation to other service providers at commercially reasonable rates.
 - (h) If required of other Special Permit applications, a property owner list that includes the name, address, and tax parcel information for each parcel entitled to notification of the application.

(j) Special Permit application fee.

(C) Procedure.

- (1) Within ten (10) business days of the receipt of an Application for a Special Permit, the [Zoning Administrator or the Zoning Board's designee] shall meet with the applicant to confirm that the application is complete or to inform the applicant in writing the specific reasons why the application is incomplete. This review meeting with staff is not a public hearing and is not subject to any public notification requirements.
- (2) If an application is deemed incomplete, an Applicant may submit additional materials to complete the application. An applicant's failure to complete the application within sixty (60) business days after receipt of written notice shall constitute a withdrawal without prejudice of the application. An application withdrawn without prejudice may be resubmitted upon the filing of a new application fee.
- (3) Once an application is deemed complete, a review meeting shall be held within ten (10) days.
- (4) At this review meeting, staff shall provide applicant, in writing, a list of additional potential alternative structures, including readily-available identifying information (e.g., address, tax map identification, latitude and longitude) or such other information as will allow the applicant to identify the potential alternative structures. If, after investigation, the applicant concludes that the potential alternative structures identified by municipal staff are not acceptable or feasible, the applicant shall provide an explanation for its decision using technical, physical, or financial information at the hearing on the Special Permit.
- (5) A complete application for a Special Permit shall be scheduled for a hearing date at this review meeting in accordance with the requirements of this Ordinance.
- (6) Applications for new Support Structures with proposed Telecommunications Facilities shall be considered as one application requiring only a single application fee.
- (7) The posting of the property and public notification of the application shall be accomplished in the same manner required for any Special Permit application under this Ordinance.

VI. General Standards and Design Requirements.

(A) Design.

(1) Monopoles shall be subject to the following:

- (a) Monopoles shall be designed to accommodate at least three (3) telecommunications providers.
- (b) The compound area surrounding the Monopole must be of sufficient size to accommodate Accessory Equipment for at least three (3) telecommunications providers.
- (c) Unless otherwise required by the Federal Communications Commission, the Federal Aviation Administration, or [the Municipality], Monopoles shall have a galvanized silver or gray finish.

(2) Towers shall be subject to the following:

- (a) Towers shall be designed to accommodate at least four (4) telecommunications providers.
- (b) A compound area surrounding the Tower must be of sufficient size to accommodate Accessory Equipment for at least four (4) telecommunications providers.
- (c) Unless otherwise required by the Federal Communications Commission, the Federal Aviation Administration, or [the Municipality], Towers shall have a galvanized silver or gray finish.

(3) Stealth Telecommunications Facilities shall be designed to accommodate the Collocation of other Antennas whenever economically and technically feasible or aesthetically appropriate, as determined by the [Zoning Board] or [Zoning Administrator].

(4) Upon request of the Applicant, the [Zoning Board or Zoning Administrator] may waive the requirement that new Support Structures accommodate the collocation of other service providers if it finds that collocation at the site is not essential to the public interest, or that the construction of a shorter support structure with fewer Antennas will promote community compatibility.

(B) Setbacks.

(1) Property Lines. Unless otherwise stated herein, Monopoles and Towers shall be setback from all property lines a distance equal to their height measured from the base of the structure to its highest point. Other Support

Structures shall be governed by the setbacks required by the underlying zoning district.

- (2) Residential Dwellings. Unless otherwise stated herein, Monopoles, Towers and other Support Structures shall be setback from all off-site residential dwellings a distance equal to the height of the structure. There shall be no setback requirement from dwellings located on the same parcel as the proposed structure. Existing or Replacement utility poles shall not be subject to a set back requirement.
- (3) Unless otherwise stated herein, all Accessory Equipment shall be setback from all property lines in accordance with the minimum setback requirements in the underlying zoning district. Accessory Equipment associated with an existing or Replacement utility pole shall not be subject to a set back requirement.
- (4) The [Zoning Board or Zoning Administrator] shall have the authority to reduce or waive any required setback upon the request of the applicant if the Telecommunications Facility or Support Structure will be less visible as a result of the diminished setback. The [Zoning Board or Zoning Administrator] must also find that the reduction or waiver of the setback is consistent with the purposes and intent of this Ordinance. The structure must still meet the underlying setback requirements of the zone.

(C) Height

- (1) In non-residential districts, Support Structures shall not exceed a height of one hundred ninety-nine (199) feet from the base of the structure to the top of the highest point. Any proposed Support Structure shall be designed to be the minimum height needed to meet the service objectives of the applicant.
- (2) In residential districts, Support Structures shall not exceed a height equal of one hundred fifty (150) feet from the base of the structure to the top of the highest point. Any proposed Support Structure shall be designed to be the minimum height needed to meet the service objectives of the applicant.
- (3) In all districts, the [Zoning Board] shall have the authority to reduce or waive the height restrictions listed in this section upon the request of the applicant and a satisfactory showing of need for a greater height. With its waiver request the Applicant shall submit such technical information or other justifications as are necessary to document the need for the additional height to the satisfaction of the [Zoning Board].

(D) Aesthetics.

- (1) Lighting and Marking. Telecommunications Facilities or Support Structures shall not be lighted or marked unless required by the Federal Communications Commission or the Federal Aviation Administration (FAA).
 - (2) Signage. Signs located at the Telecommunications Facility shall be limited to ownership and contact information, FCC antenna registration number (if required) and any other information as required by government regulation. Commercial advertising is strictly prohibited.
 - (3) Landscaping. In all districts, the [Zoning Board or Zoning Administrator] shall have the authority to impose reasonable landscaping requirements surrounding the Accessory Equipment. Required landscaping shall be consistent with surrounding vegetation and shall be maintained by the facility owner. The [Zoning Board or Zoning Administrator] may choose to not require landscaping for sites that are not visible from the public right-of-way or adjacent property or in instances where in the judgment of the [Zoning Board or Zoning Administrator], landscaping is not appropriate or necessary.
- (E) Accessory Equipment, including any buildings, cabinets or shelters, shall be used only to house equipment and other supplies in support of the operation of the Telecommunication Facility or Support Structure. Any equipment not used in direct support of such operation shall not be stored on the site.
- (1) An equipment building, shelter or cabinet must not exceed five hundred sixty (560) square feet and twelve (12) feet in height, including the support structure for the equipment building.
 - (i) Exception to size restriction. A single equipment building or shelter may exceed five hundred sixty (560) square feet, if it: is located at ground level; is used by more than one telecommunication provider; and does not exceed one thousand five hundred (1500) square feet.
 - (ii) Exception to height restriction. Upon the Applicant's request, the [Zoning Board or Zoning Administrator] may waive the height restriction to allow for the stacking of equipment on top of each other. The [Zoning Board or Zoning Administrator] must find that there is a practical necessity for the stacking of the equipment and that any resulting impact on adjoining properties is minimal or may be minimized by the requiring of appropriate screening. [The Zoning Board or Zoning Administrator] may also waive the height restriction where a higher support structure is needed to raise the Equipment above a slope or flood plains.

- (2) If the Accessory Equipment is at ground level in a residential zone, the [Zoning Board or Zoning Administrator] may require that the building or shelter be faced with brick or other suitable material on all sides and that the compound area be surrounded by landscaping providing a screen of at least three (3) feet in height at installation. The Accessory Equipment must conform to the setback standards of the applicable zone. In the situation of stacked equipment buildings, additional screening/landscaping measures may be required by the [Zoning Board or Zoning Administrator].

VII. Miscellaneous Provisions.

(A) Safety.

- (1) Ground mounted Accessory Equipment and Support Structures shall be secured and enclosed with fence not less than six (6) feet in height as deemed appropriate by the [Zoning Board] or [Zoning Administrator].
- (2) The [Zoning Board or Zoning Administrator] may waive the requirement of Subsection (1) above if it is deemed that a fence is not appropriate or needed at the proposed location..

(B) Abandonment and Removal.

- (1) Abandonment. Any Telecommunications Facility or Support Structure that is not operated for a period of twelve (12) consecutive months shall be considered abandoned.
- (2) Removal. The owner of the Telecommunications Facility or Support Structure shall remove the Facility within six (6) months of its abandonment. The [Municipal Authority] shall ensure and enforce removal by means of its existing regulatory authority.

- (C) Multiple Uses on a Single Parcel or Lot: Telecommunications Facilities and Support Structures may be located on a parcel containing another principal use on the same site.

VIII. Telecommunications Facilities and Support Structures in Existence on the Date of Adoption of this Ordinance.

- (A) Telecommunications Facilities and Support Structures that were legally permitted on or before the date this Ordinance was enacted shall be considered a permitted and lawful use.
- (B) Non-Conforming Telecommunications Facility.

- (1) Non-conforming Antennas or Accessory Equipment: Ordinary Maintenance may be performed on Non-conforming Antennas and Accessory Equipment.
 - (2) Minor Modifications to non-conforming Telecommunications Facilities may be permitted upon the granting of Administrative Approval by the [Zoning Administrator].
 - (3) Major Modifications to non-conforming Telecommunications Facilities may be permitted only upon the granting of Special Permit approval by the [Zoning Board].
- (C) Non-Conforming Support Structures.
- (1) Non-conforming Support Structure: Ordinary Maintenance may be performed on a Non-conforming Support Structure.
 - (2) Collocation of Telecommunications Facilities on an existing non-conforming Support Structure is permitted upon the granting of Administrative Approval by the Zoning Administrator.
 - (3) Minor Modifications may be made to non-conforming Support Structures to allow for Collocation of Telecommunications Facilities. Such Minor Modifications shall be permitted by Administrative Approval granted by the [Zoning Administrator].
 - (3) Major Modifications may be made to non-conforming Support Structures only upon the granting of Special Permit approval by the [Zoning Board].

For Further Questions Please Contact:

Andrea Bruns
Director, Government Relations
PCIA
500 Montgomery St. Suite 700
Alexandria, VA 22315
(703) 535-7492
brunsa@pcia.com

Anne Perkins
Manager, Industry Affairs
PCIA
500 Montgomery St. Suite 700
Alexandria, VA 22315
(703) 535-7409
anne.perkins@pcia.com



American Planning Association *Making Great Communities Happen*

Planning Essentials

Managing Wireless Infrastructure Deployment

by Robert E. Smith, AICP

This planning essentials article provides a primer on local land-use management of wireless infrastructure with an emphasis on regulatory issues. Local government planners are the primary audience. The article includes a true story about a local discretionary land-use decision involving a tower, identifies resources that planners can draw upon to ensure their knowledge of telecommunications infrastructure is up to date, and discusses major issues in regulating the wireless industry.

I contend that local land-use regulations should make it easier for local governments to ensure the appropriate and timely provision of essential wireless infrastructure. Being employed in the wireless industry, I offer an industry perspective, but it is cast in the frame of reference of a local planner administering a zoning ordinance and development regulations. Planners will be better prepared to update their wireless ordinances and administer applications for wireless infrastructure after consulting this article.

INTRODUCTION

The Regulatory Environment

Planners have been regulating towers, antennas, and cellular phone infrastructure sites for more than two decades. Local land-use planners administer applications for new towers and antenna additions to existing sites, and they review building and other permits, usually administrative or ministerial, for modifications and colocations to such facilities. In many localities, approval of a cell tower is a discretionary process involving public hearing, planning commission recommendation, or local governing body approval.

The federal Telecommunications Act of 1996 establishes boundaries on local regulatory practices. Nonetheless, federal, state, and local authority have enabled cities and counties to treat wireless telecommunications facilities and equipment with more discretion than other utilities, such as electricity or phone lines. Local land-use regulations can make it easy or difficult to provide essential wireless infrastructure, and extreme examples of both are found in almost every state.

Legal decisions are emerging that enable facial challenges to overly restrictive siting ordinances, offering wireless providers the sanctuary of federal pre-emption in some circumstances. This legal mechanism is rooted in Section 253(a) of the 1996 Telecommunications Act, and between it and the recent Federal Communications Commission (FCC) frequency auction (the largest yet), the wireless industry sector may be ripening for a string of industry-favorable siting decisions in the courts.

Wireless Facilities as Essential Infrastructure

Long-range planners often can view wireless as essential communications infrastructure. Like electricity transmission towers or the power, phone, and water lines running down a street, wireless communication has become an essential service on which we assume we can rely. If local regulations fail to provide for wireless infrastructure deployment in the future, a locality can fall short of its economic development and public safety objectives, which are increasingly reliant on the telecommunications industry.

Rapid Technological Change

Like other technologies, the wireless industry is changing rapidly. It is now offering enhanced communications and data services, and is poised to offer additional innovative services. For instance, a number of new developments in wireless communications may have direct impacts to localities as well as the built environment and quality-of-life issues. These new developments include municipal Wi-Fi/broadband, distributed antenna systems, new camouflaging materials and technology, video on cell phones, smart-phone and PDA development, interoperability, and broadband capable transit. Potential benefits include enhanced public participation in planning, linkages to public safety and emergency medical communication networks, improved intergovernmental collaboration and data sharing, and more support for economic development objectives.



▣ *Figure 1*
Typical Monopole
Location, Installation
and Tower



▣ *Figure 2*
Typical Lattice Tower

The Need to Expand Wireless Infrastructure

The momentum of steadily increasing subscribership and minutes of use is driving the wireless industry to prepare for increased business — new products and services are in development to take advantage of spectrum acquired in the recent FCC auction, and new systems and facilities are being planned to support them. New equipment (infrastructure) will be required to field some of those new services, and land-use permits will be required for siting some of that equipment. The industry is actively targeting residential markets — the last frontier, if you will — for wireless infrastructure.

Planners regulating the telecommunications industry through zoning and land-use laws owe it to themselves and their communities to understand the land-use and community facility implications of these rapid technological changes. Regulators need to ensure that local ordinances and regulatory environments evolve in step with major substantive advancements in the wireless industry. Planners need to lead efforts to update wireless and tower ordinances to ensure wireless infrastructure is there to serve the current and future needs of the community and meet the public's expectations.

A DISCRETIONARY APPROVAL GONE BAD

We've all seen it, and — like a stock car pileup at Talladega — you just can't look away. A wireless services provider new to town has proposed an installation to provide new wireless services to the community, and the item is before the planning commission because the ordinance requires a conditional-use permit for new installations. A seemingly innocuous hearing for a service everybody wants is about to turn just as ugly as an eight-car pileup on turn three — twisted fenders, flying tires, and all.

The public is out in force, swelling the back of the meeting room to capacity. The applicant's nervous glances at the throng have you getting a little twitchy yourself. Anyone bothering to look can tell he's wondering if there are more of them out in the hall with torches and pitchforks. And despite instructions from the city attorney that radio frequency issues are wholly outside the purview of the planning commission's oversight, this evening's input from the public is going to be a message of fear, suspicion, and NIMBYism at its best. The line is already starting to form at the microphone. Get the popcorn, it's show time.

After 18 months of design reviews and wrangling with local staff, the applicant is informed by the planning commission at the hearing that unless the 150-foot tall monopole design is converted over to a stealth pine tree, the project will be denied. The public isn't happy, but they feel the planning commission listened and is taking action. The fact that the Federal Aviation Administration (FAA) requires the tower to be lighted and that it is located in the middle of a rather large parking area was considered in the staff report, but it was not part of the planning commission's last-minute considerations. With the carrier pressing for permit approval so service can be launched, the applicant's planning consultant accepts the last-minute alteration. Now the city will have a giant, very expensive, year-round faux Christmas tree with a flashing light on the top in a large paved area. No other service provider would dream of colocating to the tower for fear of the strange and expensive conditions that might emerge from subsequent applications to amend the site.

The public has been heard by a responsive planning commission, industry will spend three times more to construct this site, and the result will be a local icon of ridicule that will not support future colocations and additional services.

The above actually happened, and I was the unlucky industry planner brought in to appeal the approval and try to have the city council amend the planning commission's last-minute stealth requirement. I was successful, but it was an embarrassing situation for everyone involved. Scenarios similar to the above play themselves out thousands of times a year in our country, resulting in a wide range of unreasonable permit conditions, unnecessary denials, and litigation — and to what end, and why? Everyone wants wireless services — more than 70 percent of Americans have wireless phones. More than 250,000 life-saving calls are being placed every day to 911 on cell phones, but people show up to object to and thwart the installations of the systems that make it all work. What's going on here, and how should cities plan and manage this infrastructure so the community has the communications systems it really needs?

THE EDUCATIONAL PROCESS AND RESOURCES

Many would say that that industry has not provided education so the public and community leaders can understand the mix of

concerns and come to conclusions appropriately focused on the betterment of the community. Others would say that more than 20 years of health research and growing presence in the built environment are enough of a track record, and this land use should be mainstreamed like all other forms of basic community infrastructure. Most of us in the industry keep hoping for something in the middle; any balance point would be better than what we currently face.

Planners need a healthy range of resources when reviewing wireless applications, informing decision makers, and working with interested members of the public. Planners must be able to work with project design issues to ensure a sound proposal is brought forward while negotiating the requirements of local codes and project review processes. Decision makers need to be informed about the relevant, project-related issues at hand, and they also need to understand the larger context in which the proposed project will operate, as well as the impact its operation will have on the community. The interested public needs access to the same information to understand the process, issues, and policies that will guide the decision makers.

Additional information is needed when contemplating revisions to local wireless ordinance and adopting departmental policies or guidelines. Given the fast pace of change in the wireless communications sector, staying on top of current trends and their related issues can be challenging. Thankfully, several organizations and agencies are well positioned to assist planners in acquiring information and accessing additional resources.

Wireless 101

"Nuts and bolts" information, as well as industry perspective and context, can be accessed through the Internet. Such background information is helpful to decision makers, who must consider the facts presented by staff as well as other benefits and impacts that are not so easy to quantify, including economic impact, quality of life and safety enhancements, and community demand for services. This information also helps staff members better understand industry motivations and actions. The following web pages are particularly useful:

- Personal Communications Industry Association (PCIA) — The Wireless Infrastructure Association: www.pcia.com
- CTIA — International Association for Wireless Telecommunications: www.ctia.org
- Federal Communications Commission (FCC), Office of Engineering and Technology, Radio Frequency Safety: www.fcc.gov/oet/rfsafety/rf-faqs.html
- Food and Drug Administration. Cell Phone Facts: Consumer Information on Wireless Phones: www.fda.gov/cellphones/



Figure 3
Representative Facade
Mounted Antennae



Figure 4
Slimline Design

Wireless Industry News

Information and context about market demand, new products, services, applications, and providers is available online. Planning-related information and legal decisions, corporate announcements and regulatory developments all have an impact on local regulations. Staff members can use such information to better manage the wireless infrastructure in their communities. I suggest the following web pages:

- The Wireless Infrastructure News Service: http://wins-news.com/wins/nm_admin/winsnews/default.aspx
- Bennet & Bennet Rural Spectrum Scanner: www.bennetlaw.com
- MuniWireless: The Voice of Public Broadband: www.muniwireless.com/
- RCRW Wireless News: www.rcrnews.com/apps/pbcs.dll/frontpage
- Government Technology News: www.govtech.net
- Wireless Week: www.wirelessweek.com
- Above Ground Level Magazine www.agl-mag.com

- Wireless and Mobile Technology Yahoo! News: <http://news.yahoo.com/i/1899>

Tower Locators

It helps to know where all the towers are in your community — especially when applicants propose new facilities and the issue of colocation on existing facilities needs to be addressed. Beyond asking the applicant to see if other locations for the proposed facility might be superior to the one being proposed, a quick check online to see where the existing towers are located could yield a potential colocation opportunity the applicant may have overlooked. A good way to develop a complete set of location data on towers and wireless facilities in your community is to require each applicant to provide, with their application, the locations of all of their existing facilities within the community.

- Crown Castle International: www.crowncastle.com
- SBA's Owned Site Locator: <http://map.sbsite.com>
- American Tower Site Locator: www.americantower.com/OasisPublic/Mappoint/default.asp

Mapping Tools

Most tower companies provide latitude and longitude information for their towers, as well as street addresses or tax assessor's numbers. With latitude and longitude numbers, planners can use one of several Internet-based mapping utilities to locate coordinates and generate maps. For the small locality, this function is helpful when evaluating projects, performing current and future planning, and tracking the inventory of towers.

- Tiger Based Reverse Geocoder for the United States: www.usnaviguide.com/revtiger.htm
- United States Geological Survey National Map Viewer: <http://nmviewogc.cr.usgs.gov/DecDegPtLookup.htm>

Specific Searches

Several Internet search engines offer users the ability to specify a search and automatically run it on a regular basis, with "hits" or alerts sent to your e-mail address. Google is one company with this service (www.google.com/alerts?hl=en), which can be handy if you are trying to stay current on wireless infrastructure and planning issues.

KEY REASONS FOR AMENDING THE WIRELESS ORDINANCE

There are several reasons, some already mentioned, that local planners should engage in the process of revising their wireless ordinances. Wireless proposals that seem simple can create undue burdens for the applicant and staff. Review and approval processes may require disproportionate or excessive lengths of time and money to negotiate. Industry objectives, construction techniques and technological advances in site design have created more options and new opportunities that might not be considered or allowed within the existing wireless communications codes.

Wireless Has a Public Purpose

Wireless infrastructure and services are becoming more critical as the public and localities begin to use and depend upon them. The impact of this use and reliance has positive and wide-reaching effects — from public safety to economic development. However, those benefits may be limited by the infrastructure systems supporting the services.

Many communities are embarking upon "broadband initiatives" to plan for and develop robust wireless services for a range of reasons, including economic development, public safety, and quality of life. Some communities are planning to link their municipal wireless networks into "wireless clouds" that might cover entire regions. Advancements in wireless video likely will combine with public safety communications and interoperability to one day empower citizens to send video of an emergency in real time to 911 — giving emergency response personnel invaluable information. Wireless linkage to security cameras inside schools may become a reality — and a real advantage to on-site emergency responders. Commuter transit is changing, as wireless-capable buses and trains emerge, and the workplace is also morphing as applications take on wireless platforms in the field. Government services also are being improved by wireless devices. From meter reading to highway construction to building inspections, wireless applications are being used to empower front-line personnel to deliver better, more efficient service.

A local ordinance dictating minimum wireless infrastructure that meets only a community's current needs could cripple future enhancement and delivery of new services and products to your citizens. Further, as local government envisions new services and products for the benefit of citizens, private wireless infrastructures should not be overlooked. Rather than taking on the full capital cost of creating entirely new wireless infrastructure systems, localities should reach out to the private wireless infrastructure systems to determine if existing private infrastructures might serve the localities' purposes. Private wireless infrastructures, already in place across most localities, may be the key to local governments being able to offer additional

services to the public at affordable cost.

Colocation

Once a wireless infrastructure facility is in place, usually only minor physical alterations are required to augment the utility of the facility to double or triple its service capability. Such intensification of use is termed "colocation" and, in general, it means that additional service providers can locate on the same tower and at the same facility installation.

Colocation on existing structures has become a standard practice — and often top choice — for most wireless service providers, but the bulk of ordinances in existence were created during a time when that may not have been the case. Changes in siting preferences and the shift from coverage to capacity and quality infill project proposals reflect shifts in the industry's objectives that should be considered in local codes.



▣ *Figure 5*
Tower Disguised as
Chimney



▣ *Figure 6*
Tower Disguised as
Flag Pole

Residential as the New Wireless Frontier

Some siting issues have become more prominent recently because wireless service providers are seeking to respond to people who expect to be able to use their wireless devices at home. The number of work-at-home employees is increasing. There has been a continued rise in numbers of small businesses within residential settings, and the number of multiple wireless users within the household has increased. The number of households eliminating wire-line communication services also is increasing, as demands for wireless residential services and capacity are rising.

As a result, the industry is now actively targeting residential markets more than transportation corridors and employment centers, which generally already have services. Siting proposals are being submitted to local governments from a diverse and growing range of applicants and products. Infill capacity/quality projects to ensure reliable data and video services are becoming common, and they often present different design requirements than the initial coverage sites created during the last decade.

These recent developments have brought a change in the types of permit applications typically being submitted, and new developments in materials and design have opened up more alternatives. Codes based on the standard construction and siting experiences of a decade ago are in need of review.

The Need to Avoid Sameness, or a Lack of Design Variety

Local governments may run the risk of having almost all approved wireless facilities taking on a similar built design, creating a widespread cookie cutter appearance. Codes may tend to homogenize the physical design and siting of proposed wireless facilities, resulting in sites that tend to look the same across a community or area. Is there too much of an emphasis on roof-top facilities, for example, causing rapid rooftop proliferation and wide-scale alteration of the local built aesthetic? Should there be colocation incentives and flexible height requirements offered to existing tower and stealth facilities to better balance the end result in the built environment? Is residential development growing, while wireless coverage to serve these developments is hamstrung by exclusionary language or excessive setbacks in the ordinance?

Given the wider range of design alternatives and construction techniques available today, it might be time to take advantage of these changes and introduce some flexibility and discretion in the approval process. Case-by-case sensitivity is recommended, for it would offer needed flexibility to the applicant. Staff should have discretion to allow a range of solutions, and variety of design in the built environment can result. If flexibility does not exist or is removed from the ordinance, and too much control is exerted over facility design, the wireless industry is not free to solve creatively various siting and design issues, and less-than-optimal results are likely.

A COLLABORATIVE APPROACH TO ORDINANCE REVISION

In revising wireless ordinances, planners should pursue a collaborative, inclusionary public process. By having all the stakeholders involved in the ordinance revision process, planners can ensure that the best combination of controls, incentives, and design guidance is included in the ordinance. Planners need to understand the roles and motivations of the stakeholders present and encourage all participants (including the locality itself) to be transparent about objectives and concerns.

It is not enough to selectively include representatives from the different types of wireless service providers within the industry sector. All legitimate stakeholders (including wireless infrastructure providers) should be invited to participate in the ordinance revision process. An inclusionary approach will ensure that those who have a stake in the issue and a desire to participate will be heard. Such an approach also will increase the potential for new perspectives and approaches to emerge. Set aside ample time for several workshops or meetings to review and consider the draft and to consider all revisions suggested by participants. Concrete suggestions for creating ordinance revision workshops that will produce results include the following:

- Ensure legitimate stakeholders are included: Contact local stakeholders as well as the PCIA and state wireless associations to develop a comprehensive approach to regulatory development.
- Provide ample notice for meetings to ensure good attendance.
- Provide web and e-mail resources, such as those provided in this article, to encourage maximum participation and dissemination of information.
- Provide teleconferencing services for meetings so physical attendance is not necessary.
- Provide ample time to review and comment on draft language so quality feedback is gathered.
- Don't get bogged down in the beginning. Agree to disagree where necessary, and keep things moving.
- Provide multiple opportunities to discuss suggested revisions and resulting drafts. Iterations likely will generate positive developments in regulatory approach and language.

Consider holding an educational workshop for decision makers, and request industry participation.

HALLMARKS OF A GOOD ORDINANCE

Flexibility

Planners face two potentially competing objectives: (1) wanting reliable, pragmatic, and tangible results, and (2) needing to facilitate local infrastructure development and enhancement. Zoning regulations, by their very nature, have had a restrictive effect on siting of towers and wireless infrastructure. Design controls also limit the physical aspects of the proposal. Euclidean zoning tends to push siting and design into certain geographical areas and typical configurations. Planners should recognize that some flexibility and creativity in the regulation will result in potentially superior project proposals and, at the least, a healthy variance from the typical norm in terms of cell tower and cell site installations. Building flexibility into the ordinance can sometimes offer an opportunity to the industry to create new solutions to old problems. A deft hand here is far better than a sledgehammer approach when regulating wireless infrastructure.

For example, it might be more in keeping with a community's character to allow an existing tower that currently stands at the height limit to extend above the height limit in order to facilitate a colocation rather than forcing the development of another site at a new facility. As another example, it might be more beneficial to allow a camouflaged facility to be constructed in a location that doesn't meet setbacks, rather than have a non-camouflaged facility installed elsewhere. Planners and decision makers should emphasize that each proposal is unique, and that each siting decision involves opportunities and alternatives to optimize the facility's "fit" in both the community and the site itself.

Flexibility in regulations can maximize the utility of the community's existing wireless infrastructure while minimizing the creation of new sites. When colocation proposals to existing facilities are considered, allowing some flexibility in the site design can result in a successful colocation rather than the creation of new facilities. For example:

An existing tower has two carriers present and is at the 120-foot height limit for the zone. Another service provider would like to colocate to the facility, but locating below the current carriers would place the equipment too low to serve the carrier's intended RF objective, and multiple new sites would then be necessary. An application is presented to the locality, proposing a 10-foot increase in the height of the tower to accommodate the carrier's equipment and RF objective. This extension represents less than a 10 percent increase in the height of the tower, but the application is denied because of the height limit. The carrier now must seek to create multiple new tower facilities to attain the RF objective.

The community could have had one tower supporting three service providers, but now it will have several towers performing that function. Rather than make an existing 120-foot tower 10 feet taller, the community is encouraging the creation of additional towers and compounds. From a visual impact perspective, this result would seemingly be in conflict with the objectives of the local code.

Avoid Overregulation

Overregulation can stymie the delivery of wireless service. Planners and decision makers should realize that the industry's ability to respond to demand already is handicapped by certain factors. Growing numbers of subscribers already strain existing infrastructure in many places. New services are being offered that require additional bandwidth, further stressing existing systems.

On top of these challenges, regulatory processes can create bottlenecks in the siting of facilities, generate limiting effects on network operations, or otherwise restrict infrastructure deployment. Planners must consider that the future enhancement of wireless infrastructure will have a positive impact that affects the community's quality of life, business development, public safety, and other services.



▣ *Figure 7*
Antennae on Parking
Light Stand



▣ *Figure 8*
Monopinees

Recognize the Limits of Colocation

Colocation has become a widely recognized best practice for siting wireless infrastructure, but it works only when the existing facility has the capacity and location to serve the applicant's radio frequency objective and when the local regulations allow the flexibility necessary to create a viable project. Incentives to encourage colocation, however, can be simple and pragmatic. By-right approval with planning staff comment on the building permit can be offered for applications meeting certain requirements, and streamlined ministerial review and approval processes can be established and implemented for colocation applications that meet certain design standards. These reforms would provide the applicant with swifter reviews and more certainty in the permitting process.

Some states have passed legislation to encourage streamlining the wireless colocation process, while also safeguarding the locality's interests in managing the land use. This movement is a direct result of the difficulties service providers have faced in deploying critical infrastructure to ensure the rapid development of ubiquitous wireless service across the country. As legislation is enacted, localities should evaluate their codes to ensure conformance with state law. State wireless associations also are being formed. Made up of wireless industry representatives and businesses, these associations can assist local governments facing such challenges by providing resources, information, and feedback.



▣ *Figure 9*
Tower Camouflaged as
Palm Tree



▣ *Figure 10*
Tower Camouflaged as
Cactus

Ease Up on Nonconformities by Allowing Colocation

Some communities, upon passage of updated wireless siting ordinances, have towers that are legally nonconforming with the new code. Most communities also have typical language in their codes that constrains the approval of additional permits on nonconforming uses or structures. Typically, applicants attempting to colocate on nonconforming wireless infrastructure sites are informed that they must make the site conforming if they wish to colocate to it. In some circumstances this is physically impossible, because the nonconforming conditions cannot be cured (e.g., increased setbacks have been introduced in the new code). In such circumstances, the applicant would have to abandon collocating to an underutilized site and erect another single-use tower. In other circumstances, it is economically impractical to make a site conforming. The resulting outcome may be that an underutilized, nonconforming facility is passed over in order to create another potentially underutilized facility.

Planners should consider that if applicants no longer submit proposals to colocate to a nonconforming site because of these sorts of circumstances, there is no real opportunity to improve the site. It likely will remain static for its useful life: nonconforming, underutilized, and unimproved. This is not an optimal condition.

Ordinances should allow colocations on nonconforming towers and sites. Doing so will ensure that the maximum utility of existing wireless infrastructure is realized and avoid the unnecessary proliferation of additional towers and sites. Further, in the process of granting that flexibility on nonconforming sites, the locality has the opportunity to address some design issues to improve elements of the appearance or conformity status of the site.

In operational terms, colocation may mean an additional trip or two each month to the site by a maintenance or support person. From a visual perspective, it would mean the addition of antennas to the existing pole or tower, and the placement of ground cabinets containing computerized radio equipment within the facility compound. These are negligible impacts associated with the continued and expected use of the facility that do not require another discretionary review by the local government.

Planners are urged to remind decision makers that colocation works only when the existing wireless facility will provide a platform that serves the new wireless provider's objectives and when the locality has land-use controls that allow outright the addition of users to existing wireless infrastructure facilities.

Respond to Residential Location Needs

In order to provide service to users, wireless communications providers are seeking to site facilities in proximity to residential developments. Many local ordinances exclude wireless infrastructure from residential areas. Some go so far as to define wireless infrastructure facilities as commercial uses and exclude them from residential zoning districts.

Given the increased level of demand for wireless services in residential areas, the wireless infrastructure facility should be treated as essential infrastructure. Codes might define such installations as an accessory use to residential development, similar to the way electrical, water, cable, and landline telephone infrastructure is treated in zoning ordinances. The presence of wireless facilities is warranted — and indeed demanded — anywhere there are legitimate users of the service. That increasingly includes residential areas.

There are negligible if any impacts related to the operation of wireless facilities in residential neighborhoods. Operation of a wireless facility usually includes limited maintenance visits, but such traffic comes nowhere close to the number of trips per day that the average residence generates. Operational impacts, such as noise from emergency generators, can be mitigated by requiring compliance with local nuisance and performance codes. Visual and physical impacts can be mitigated through a variety of means, from design controls to staff or neighborhood design committee reviews. Many and newly developed construction materials, techniques, and designs can be accessed to meet a wide variety of design and performance considerations. In sum, if sited and designed appropriately, and conditioned to mitigate visual impacts, wireless facilities will not necessarily conflict with residential uses.

As the demand for residential wireless services increases, and as the wireless industry moves to meet that demand, one might expect longstanding attitudes about compatibility of wireless infrastructure in residential areas to shift. How fast and how smoothly such change will occur depends largely on individual localities and the contents of the ordinances they adopt.

Provide Incentives

Ordinances should reward certain types of proposals with shorter approval schedules, less rigorous use-permitting requirements, and more certainty in the approval process. An example for a streamlined process incentive would be for a community to allow colocations or minor modifications to existing wireless facilities by building permit, with planning staff commenting on the building permit during the routine plan-check process. By allowing colocations to move forward through the building permit process, process time is shortened and certainty is enhanced, while staff still holds sway over design review and compliance issues related to the use.

Planners should consider other possible incentives. One incentive is to provide "by right" status to certain types of wireless proposals meeting specified location and design criteria. Another incentive or permit streamlining measure is the "pre-authorization" of future colocations indicated on design proposals so that only a building permit is required for subsequent, future colocations. A third possible incentive is to develop an acceptable design template for wireless facilities that would prescribe the physical, aesthetic, and dimensional design aspects of a facility, and then allow facilities and colocations that meet those specifications to be approved and installed by building permit only. In sum, incentives can be used to encourage and expedite certain types of development, and such incentives help ensure that the community's wireless infrastructure and services remain robust, flexible, and positioned for new service deployment.

Include Design Guidelines and Directive Policies

Any ordinance, no matter how well written, will at some point generate questions that cannot be answered by the ordinance language itself. Unforeseen circumstances often will present themselves in a wireless facility proposal. Development and adoption of design guidelines and directive policies can create more consistency of reviews and can help provide direction when questions or uncertainty arise.

Design guidelines and directive policy can offer an opportunity for further refinement of the locality's perspective on wireless infrastructure facilities, design, and siting. Such guidelines and policies help manage expectations on both sides of the project proposal by helping staff provide more consistent project reviews that reflect the community's objectives and the decision maker's intentions. They also can facilitate applicants in filing applications that are more consistent with the expectations of staff and local decision makers.

In general, design guidelines and directive policies should:

- Clearly convey the design and aesthetic expectations of the community.
- Provide existing and desired examples through pictures and photosimulations.
- Provide instruction to staff so administration of the local regulations is consistent.
- Require scrutiny where needed, but not exceed other existing design regulations applicable to other structures and facilities in the community.
- Allow placement of wireless infrastructure in all zones, with appropriate design controls.
- Allow colocation to existing facilities with minimal regulatory requirements.

The author has compiled numerous photos of typical cell tower installations and approaches to camouflaging towers. See the figures below for examples, some of which may be considered better than others. Planners can judge for themselves the aesthetics of typical installations and the relative effectiveness of the various camouflaging techniques.



▣ *Figure 11*
Tower Camouflaged as
Windmill

CONCLUSION

There's no doubt that wireless infrastructure will continue to change and grow. The industry will continue to introduce new designs and services during the next decade, and we will begin to see an increase in the same from local governments. Wireless communications have become tools necessary for public safety and community well-being, and they have integrated themselves solidly within our culture. In such a dynamic environment of technological change, communities are best served by developing local use regulations that provide flexibility and balance, while generating pragmatic and reliable outcomes that meet clearly articulated community objectives.

Ultimately the introduction of incentives and flexibility in a wireless ordinance requires an exercise in balance. That balance is best struck when all the stakeholders have the opportunity to share their perspectives. Colocation is usually the best way for a community to effect the deployment of additional wireless infrastructure and services, as it presents minimal visual and operational impacts. When compared to the creation of a new wireless facility, colocation on an existing facility involves less physical intrusion into the built environment, minimizes the proliferation of wireless infrastructure sites and aggregates the operational impacts of wireless infrastructure to a minimum number of locations.

This article has suggested ways that decisions can be expedited, more certainty can be ensured, and incentives can be created so that the wireless industry can propose projects that are consistent with community objectives. A forward-looking approach to wireless infrastructure is critical, and revised regulations must be adopted if a community wants to position itself in the future for the best possible wireless infrastructure and services.

Robert E. Smith, AICP, is National Zoning Compliance Manager for Crown Castle USA, Inc. He has been employed by Crown Castle since 2001 and serves in the regulatory department as the company's manager for zoning issues. Prior to his assignment as national manager, Smith worked for Crown Castle in California as a zoning specialist to develop, evaluate, present, and secure land-use permits for a wide variety of projects for wireless customers. His experience prior to Crown Castle includes city manager, director of community and economic development, and grants writer/administrator positions at several cities and councils of government. He holds a BA in Fine Arts from the College of Charleston, and master's degrees in urban and regional planning and public administration from Virginia Tech. Smith is a member of APA's Technology Division and is working to create a forum for this issue and others like it.

Nonconformity

Nonconforming towers and wireless communications facilities will be allowed to accept collocations, but such collocation applications shall be subject to a zoning administrator or board of adjustment discretionary permit process. As part of the collocation permitting process, conditions of approval and mitigations may be required to offset some or all of the nonconformity at the existing site.

Maintenance, or 'Like for Like' replacement

'Like for Like' replacement shall meet the following requirements

1. No additional number of elements beyond the permitted number of elements are created
2. Same location, design and physical arrangement as permitted
3. Same dimensional size (within 10%) of permitted dimensions
4. Same color, finish and texture as permitted
5. Same method of attachment as permitted
6. Same operational characteristics as permitted
7. Same or less weight as permitted item

Maintenance shall be any activity which involves work to the site, which conforms to the 'Like for Like' requirements above.

Height

No support structure shall be constructed such that it requires FAA lighting. Existing height limits for existing zones shall apply.

Fall Zones

Fall zones equal to the height of the structure shall be required. The fall zone shall require the structure to be set back from property lines equal to the length of the fall zone, and shall be space that is free and clear of all habitable structures. If pre-engineered structures are used which incorporate a fail point, designed to predictably fail at a preselected location to safely allow the tower to fold, the fall zone may be reduced to a radius equal to the engineered height of the failed structure. Standard setbacks for all zones apply.

Essential Facilities

Any wireless communications infrastructure that serves an Essential Facility as defined within _____ and identified by local plan and or ordinance, shall meet the structural and performance requirements of essential facilities found in _____ of the IBC.

Public property and structures

Certain public properties and structures are appropriate for wireless communications infrastructure siting, and such is encouraged through the following incentives, if project proposals meet specific design requirements.

The locality will permit siting and collocation to public property and structures through an administrative permit process.

Projects must exhibit the following design criteria to qualify for administrative consideration of the permit.

Utility lighting

Exterior lighting of the compound and equipment is allowed if it's design incorporates the following:

1. The lighting is controlled by motion activated switches
2. The lighting is shielded so that the light and glare do not travel beyond the confines of the compound.

Site Performance

Equipment at the compound shall meet the following performance requirements;

Noise – the equipment shall conform to the locality's noise abatement and nuisance codes

Vibration – the equipment shall not generate vibrations which can be perceived beyond the equipment compound.

Site activity -- maintenance and operational work at the site shall occur during normal business hours unless in response to an emergency or disaster.

The site shall not be used for storage, and shall be maintained in good condition, free and clear of all trash, debris and non-essential material.

Unused equipment shall be removed immediately from the compound and/or tower/structure. This will include, but not be limited to, antennas, mounting brackets, standoffs, cabling and other associated fixtures.