Personal Wireless Service Facilities Policy

Albemarle County Department of Planning and Community Development

Kreines & Kreines, Inc.

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Acknowledgments

The staff who produced the personal wireless service facilities policy would like to thank all the citizens and agencies who have participated in its preparation. We would also like to acknowledge the various County officials and staff who have contributed to this document.

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Introduction

This Policy for personal wireless service facilities is based on the following:

- The federal Telecommunications Act of 1996 preserves Albemarle County's zoning authority to regulate the placement, construction and modification of personal wireless service facilities ("cell towers").
- Albemarle County has significant natural, scenic and historical resources. Thomas Jefferson chose Albemarle County for his homesite and as the site for the University of Virginia. The reason for those choices is why many others have come to revere this place … and why County residents must be stewards of the land.
- Personal wireless service facilities are not well understood by some. This Policy is intended to help the County, the public, and the wireless industry understand planning and zoning for personal wireless service facilities.

There are reasonable and feasible options to highly visible personal wireless service facilities and Albemarle County will require them.

Albemarle County …

- Land of magnificent vistas.
- Place of rich history.
- Maintained through private stewardship.

Governed by a tradition of planning and zoning.

"The Rocks" Mountain at I-64 at Ivy Interchange.

Purpose, Principles & Intended Achievements

The purpose of the personal wireless service facilities policy is to establish policies and guidelines and to recommend standards and approaches for Albemarle County to use in the review of personal wireless service facility applications. Wireless carriers are encouraged to follow the ideas in this Policy in preparing applications for personal wireless service facilities. Planning Commissioners, Supervisors and staff should follow this Policy when evaluating personal wireless service facilities applications.

- This Policy is intended to allow for the provision of personal wireless service facilities.

Regulations based on the following principles are recommended:

- The most important principle for siting personal wireless service facilities in Albemarle County is *visibility*. Albemarle County should require that sufficient information be submitted with the application to enable the County to measure the visibility of a facility. The less a personal wireless service facility can be seen, the more likely it is that it will be approved.
- Personal wireless service facilities should not be located in Avoidance Areas.
- Applications for personal wireless service facilities in Avoidance Areas should be denied unless mitigated, sited, located and designed so as to minimize visibility.
- Personal wireless service facilities should be located in Opportunity Sites.
- Applications for personal wireless service facilities sites outside of, but nearby, Opportunity Sites should demonstrate why they couldn't be located in an Opportunity Site.
- Siting and design standards can be used anytime, but they are particularly useful for reviewing personal wireless service facility sites when they are not in or near an Opportunity Site and not in an Avoidance Area.

A successful personal wireless service facilities policy will achieve the following:

- Protection of Albemarle County resources.
- A predictable outcome for personal wireless service facility applicants.
- Equal evaluation and review for all applicants.
- The development of standards to be used as findings for decisions on personal wireless service facility applications.

SUMMARY OF PERSONAL WIRELESS SERVICE FACILITIES POLICY

This Policy allows for the location of personal wireless service facilities throughout the County. The Policy encourages the construction of facilities that have limited visual impact on the community.

- Visibility is the primary focus in the review of personal wireless service facilities. Facilities with limited visibility are encouraged.
- Personal wireless service facilities should not be located on ridgetops or along the ridgeline and they should be provided with an adequate backdrop so that they are not skylined.
- Personal wireless service facilities should not adversely impact resources identified in the Open Space Plan or designated as Avoidance Areas.
- Personal wireless service facilities should utilize existing structures where possible.
- Personal wireless service facilities, if appropriately sited and designed, may be appropriate in any zoning district.
- Ground based equipment should be limited in size and be designed in keeping with the character of the area.
- Antennas should be mounted close to the supporting structure and be designed to minimize visibility.
- The personal wireless service facilities policy is primarily intended to address facilities providing personal wireless service. Other types of wireless facilities are encouraged to adhere to this policy to the extent possible.

Summary of Proposed Regulatory Concepts

To enhance the implementation of this Policy, the following review concepts are proposed:

- Tier One Review. Administrative approval of personal wireless service facilities located within an existing structure and having no exterior visibility.

- Tier Two Review. Planning Commission approval of personal wireless service facilities attached to an existing structure or a "Treetop Tower".

- Tier Three Review. Special Use Permit review by the Planning Commission and Board of Supervisors of anything other than a Tier One or a Tier Two facility.

The following regulatory changes are also recommended:

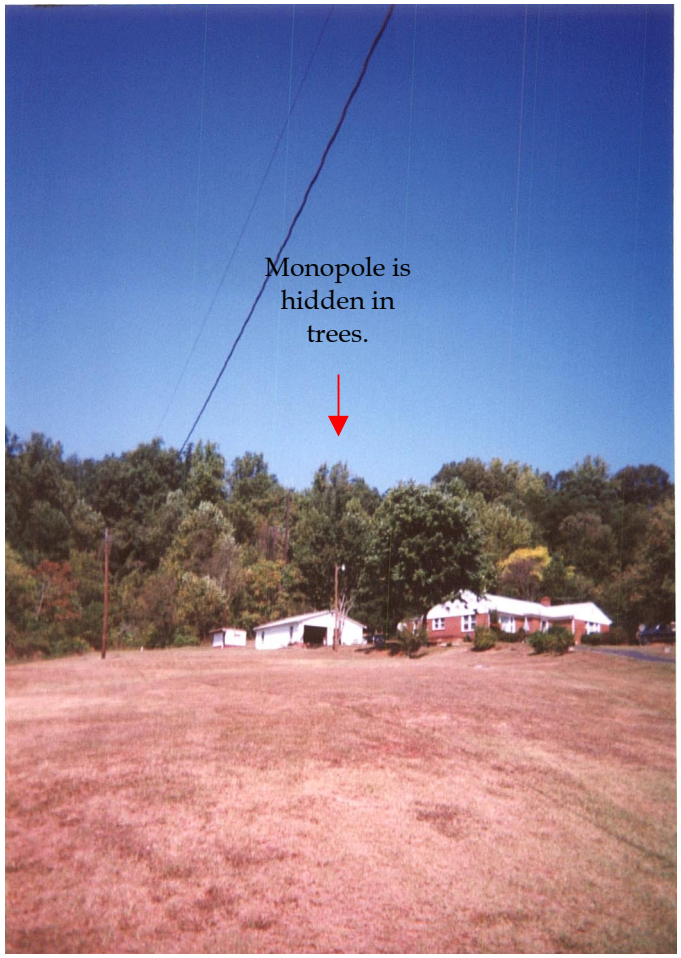
- At the time of preparation of this Policy each Zoning District contains minimum setbacks for all structures that can only be varied by the Board of Zoning Appeals. This Policy recommends that the Planning Commission be authorized to modify the setbacks for personal wireless service facility structures.

- At the time of preparation of this Policy, the Zoning Ordinance requires that towers be setback from the property line a distance equal to the height of the tower unless a modification is granted by the Planning Commission. This Policy recommends that service providers be able to acquire easements around the tower a distance equal to the height of the structure. If this easement is acquired no modification of the setback will be needed. If the easement is not obtained, the wireless service provider would need to request that the Planning Commission grant a modification of the setback.

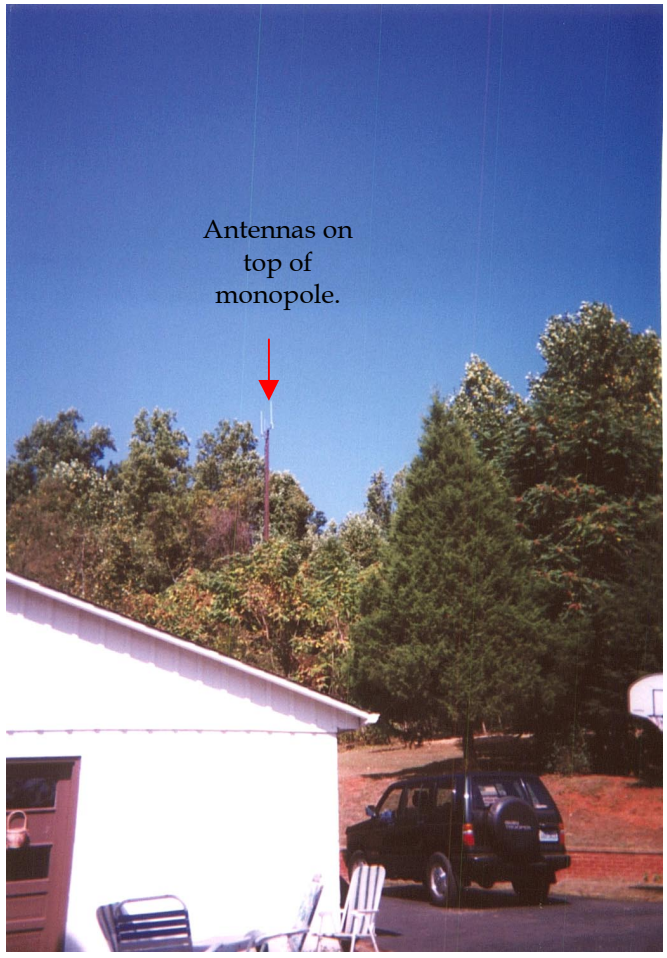
- Minimum submittal standards are recommended.

The Situation in the Year 2000

Shown below are two photographs (one long shot and the other mid-range) of a "treetop tower". This is an example of the type of facility supported by the County.

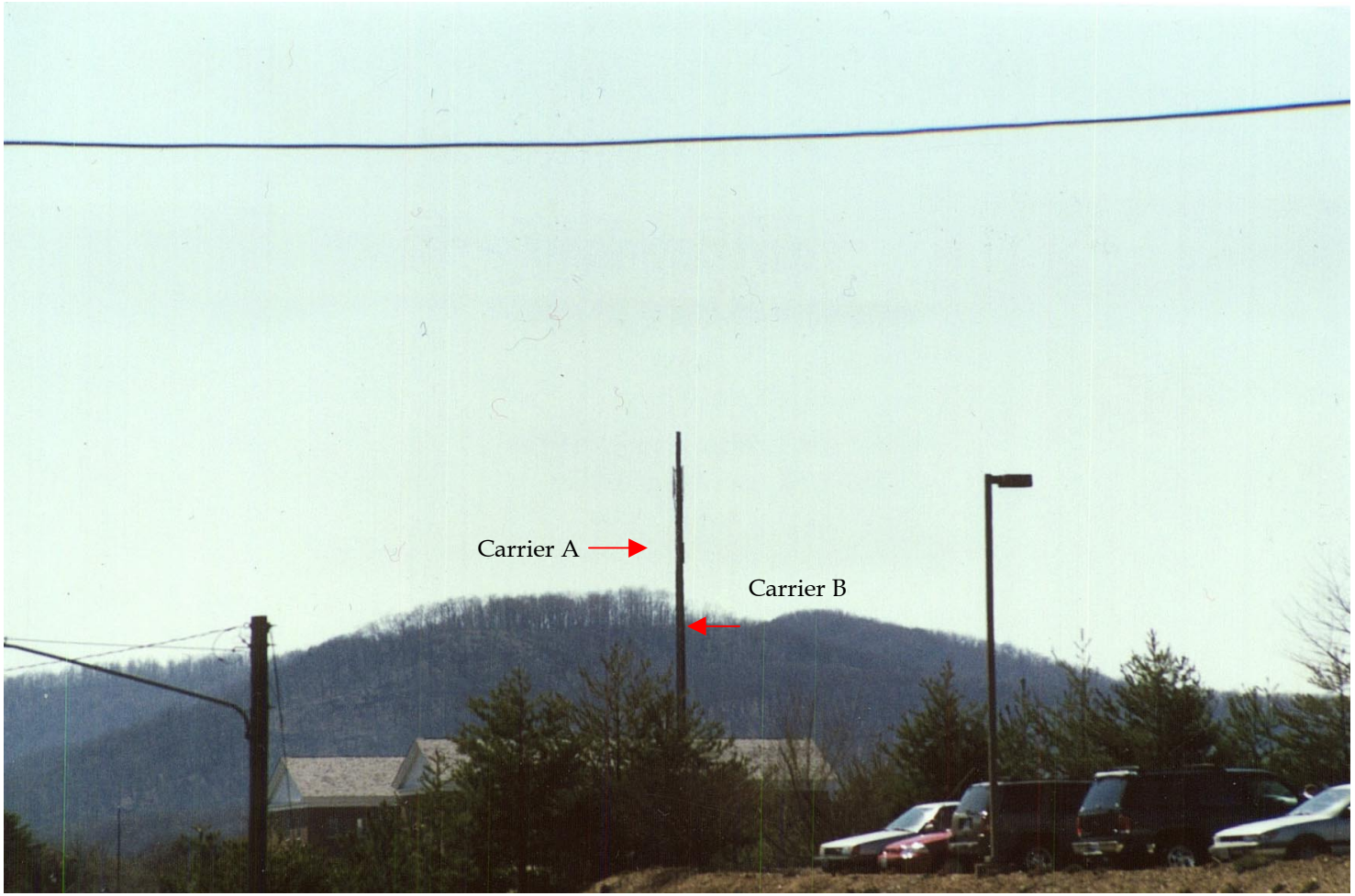


Invisible personal wireless service facility site on U.S. 29 south (long shot).



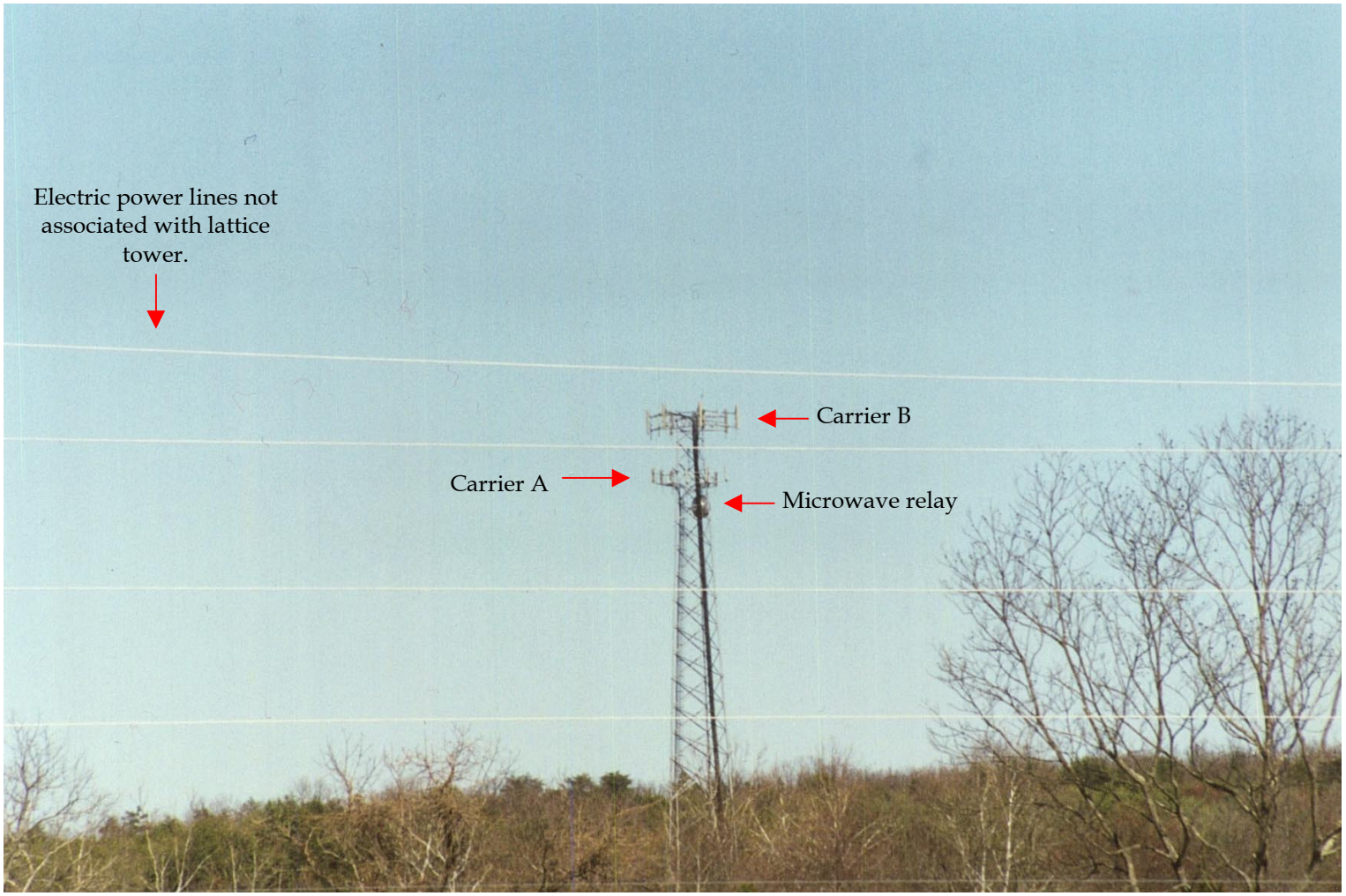
Close up of the same personal wireless service facility site. Even though it is short, it works and, most importantly, it was approved.

The County supports co-location of personal wireless service facilities provided that it has no or negligible adverse visual impact. The site below, while skylined and much taller than adjacent buildings and trees, does allow for the use of an existing facility. Skylining of new facilities should be avoided.



The monopole in the middle of these vertical poles is at 5th Street and supports two dual-polarized antenna arrays.

Below is an example of the type of facility not supported by the County.



This is a tri-location of personal wireless service facilities near Boyd Tavern on a lattice tower. The microwave relay can be used for backhaul by both Cellular and PCS carriers, which also use wireline (telephone) for backhaul when it is readily available.

Some wireless carriers want to serve County residents with tall towers.

The taller the wireless facilities are, the fewer the carriers have to build. The lattice tower in this picture in Crozet is a photosimulation.

When personal wireless service facility sites are smaller, they aren't as easily seen, even though there may be more of them. The Telecommunications Act of 1996 and State Law give localities the choice.

There are five different personal wireless service facility sites in this photosimulation. Although there may never be any sites in this area, they have been photosimulated to show how they can blend with the landscape. Albemarle County requires less visible and less intrusive solutions such as those shown here.

This Policy shows wireless carriers how to deploy wireless facilities in a manner that respects the Albemarle County environment and the community's values. Albemarle County will approve those applications that comply with adopted policies, plans, ordinances and this Policy and Albemarle County will deny those that do not comply.

Telecommunications facilities in the Pantops area have been successfully blended into the built environment.

Definitions

Analog – In radio telephony, a process where voice messages are electronically replicated and amplified as they are carried from the transmitting antenna to the receiving antenna.

Antenna – A whip (omni-directional antenna), panel (directional antenna), disc (parabolic antenna) or similar device used for transmission and/or reception of radio frequency signals. Panel antennas are used by both Cellular and PCS carriers.

Avoidance Area – Locations in Albemarle County where visible personal wireless service facilities should not be located. An avoidance area is not a "prohibited area," since there are conditions under which personal wireless service facilities might be located in an avoidance area.

Backhaul – A method for relaying signals from one wireless facility to another and from the wireless facility to a common carrier. Methods of backhaul include microwave relay and wireline.

Camouflage – A way of painting and mounting a personal wireless service facility that requires minimal changes to the host structure in order to accommodate the facility.

Cellular – A mobile telephone service operating in the 800 MHz spectrum.

Co-location (Collocation) – The use of a common personal wireless service facility or common site by two or more wireless license holders or by one wireless license holder for more than one type of communications technology and/or placement of two or more personal wireless service facilities on adjacent properties.

Comprehensive Plan – The Albemarle County Comprehensive Plan establishes governmental policy to help guide public and private activities as they relate to land use and resource utilization.

Concealment – To enclose a personal wireless service facility within a natural or man-made feature resulting in the facility being either invisible or made part of the feature enclosing it.

Design – The appearance of personal wireless service facilities such as their materials, colors and shape.

Digital – Digital technology converts voice messages into digits (zeros and ones) that represent sound intensities. Because natural pauses in the conversation are eliminated, more call capacity is realized than with analog and background noise is minimized. Digital is not the same as PCS, since Cellular can be digital also. Siting and design approaches recommended in this Policy are equally available to both Analog and Digital technologies.

Disguise – A personal wireless service facility designed to appear to be something other than a personal wireless service facility.

Enhanced Specialized Mobile Radios (ESMR) - Private land mobile radio with telephone services. In the year 2000, Nextel is the only ESMR carrier.

Entrance Corridor Overlay District – Section 30.6 of Chapter 18 (Zoning) of the Albemarle County Code establishes an overlay district that regulates certain outdoor uses along significant tourist access routes and requires architectural review for consistency with design guidelines.

Equipment Cabinet (Shelter, Shed) – An enclosed structure at the base of the mount within which is housed the equipment for the personal wireless service facility such as batteries and electrical equipment.

Guy Wires – Strategically placed cables from a tower to anchors in the ground in order to secure a tower and to keep it from shifting position.

Guyed Tower – A monopole or lattice tower that is tied to the ground or other surface by guy wires.

Lattice Tower – A type of mount that is self-supporting with multiple legs and cross-bracing of structural steel.

Location – The area where a personal wireless service facility is located or proposed to be located.

Mast – A type of mount that is thinner and shorter than a monopole.

Mitigation – The reduction or elimination of visual impacts by the use of one or more methods:

- Concealment.
- Camouflage.

- Disguise.

Monopole – The shape of mount that is self-supporting with a single shaft of wood, steel or concrete and antennas at the top. Monopoles are often called "towers" but they are different in that monopoles are a single shaft of material without any other support structure.

Open Space Plan – A component of the Albemarle County Comprehensive Plan that consolidates all currently available information regarding natural, scenic, historic, and agricultural/forestal resources in the County in order to identify the most important areas to preserve or to conserve as open space.

Opportunity Sites – Areas within properties where placement of personal wireless service facilities is encouraged by Albemarle County.

Paging – Text messaging (and sometimes one-way voice messaging) that is sent to small receivers (e.g., beepers) from one tall mount. Paging messages are not handed off from one cell to another cell as in the case of Cellular, Personal Communications Services and Enhanced Specialized Mobile Radio.

Personal Communications Services (PCS) – A form of mobile telephony provided in the 1900 MHz frequencies.

Personal Wireless Service - Any personal wireless service defined in the Federal Telecommunications Act which includes Federal Communications Commission (FCC) licensed commercial wireless telecommunications services including cellular, personal communications services (PCS), specialized mobile radio (SMR), enhanced specialized mobile radio (ESMR), as well as unlicensed wireless services, and common carrier wireless exchange access services.

Personal Wireless Service Facility – A facility for the provision of personal wireless services, as defined by Section 704 of the Telecommunications Act of 1996.

Platform – Physically, any base upon which elements, such as antennas, are placed. Technologically, the system architecture around which a design is based.

Prohibited Areas – Many cities and counties prohibit personal wireless service facilities in some areas, such as residential zoning districts. In Albemarle County, personal wireless service facilities are permitted in all areas. There are no areas

where personal wireless service facilities are prohibited and no areas where personal wireless service facilities will be automatically denied.

Radome Shield – A plastic housing within which antennas are placed. The fiberglass-like plastic material is signal-transparent, thereby allowing antennas that are concealed to operate.

RF Isolator – A steel mesh screen that is radio frequency signal-opaque. They stop signals rather than reflect them. They are used to keep one transmitter from affecting another. Use of an RF Isolator can allow for multiple transmitters on a single pole or tower. A photo of an RF Isolator is shown on page 22.

Site - That portion of a subject property where a personal wireless service facility is to be placed. An acceptable location may have several potential sites within it.

Siting - The method and form of placement of personal wireless service facilities on a specific area of a subject property.

Skylining – Locating a personal wireless service facility in such a way that the backdrop of the facility is the sky.

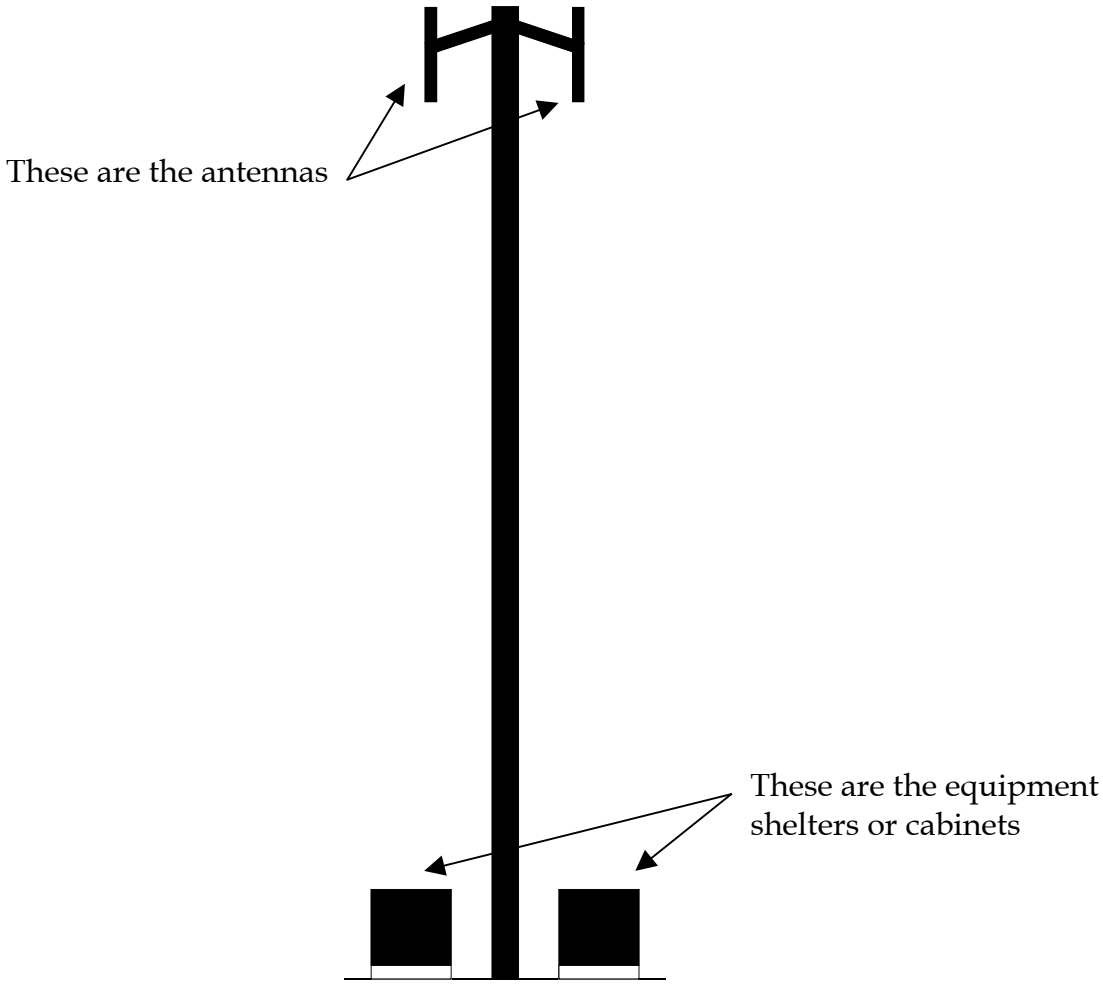
Specialized Mobile Radio (SMR) - A form of data transmission, dispatch or two-way communication used by companies that rent space or time from the high mount of a SMR carrier. Used primarily for sending information, delivery vans, truckers or taxis within a small, definable geographic area, the signal is not "handed off" to another cell as in Cellular, PCS or ESMR.

Stealth – A wireless industry term for "hidden" or "undetectable."

Tower – In telecommunications, any tall structure used for the mounting of antennas is a tower.

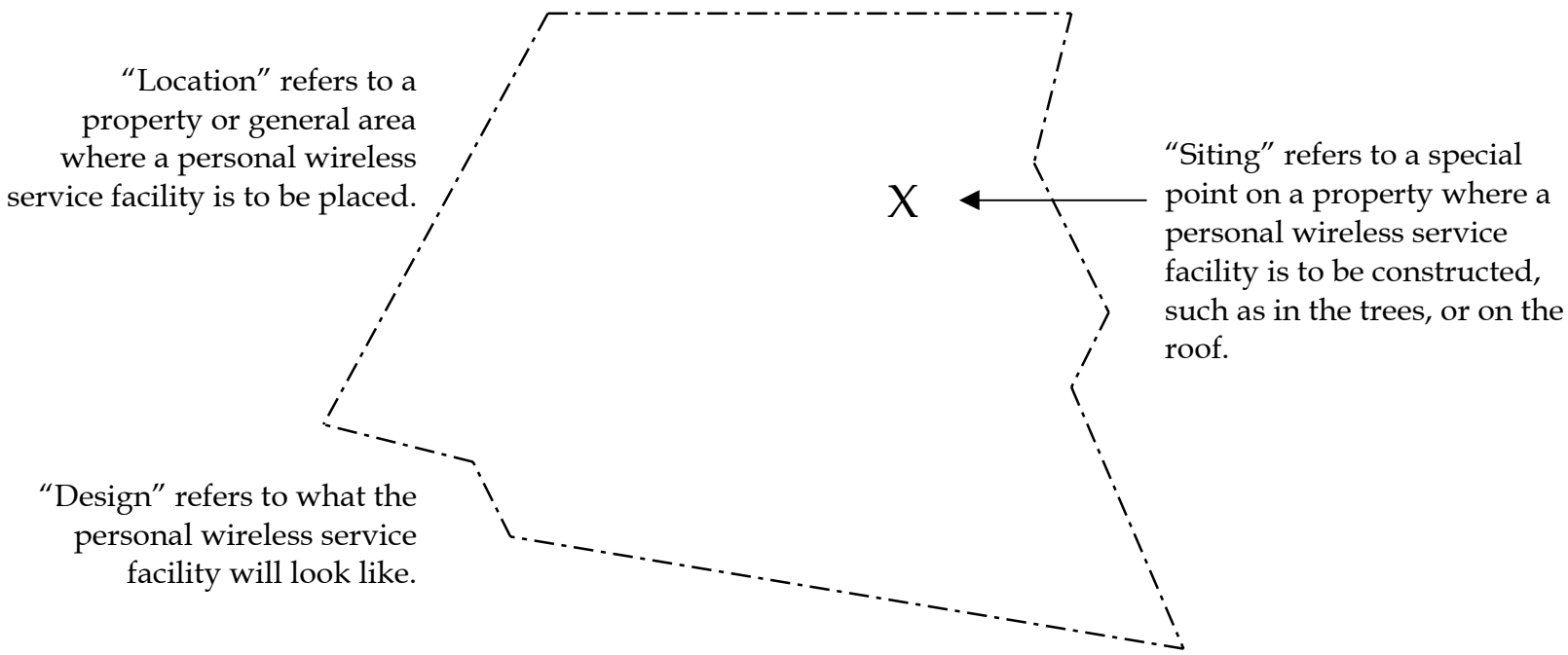
Treetop Tower – A mount for personal wireless service facilities no more than 10 feet taller than the tallest tree within 25 feet of the proposed mount.

This is not a diagram of a "tower", it is a monopole.



The entire facility is called a "personal wireless service facility." Albemarle County is engaged in regulating the location of personal wireless service facilities. It is not engaged in "antenna siting." The County's land use policies and regulations deal with more than just "antennas" and regulation is concerned with more than just "siting."

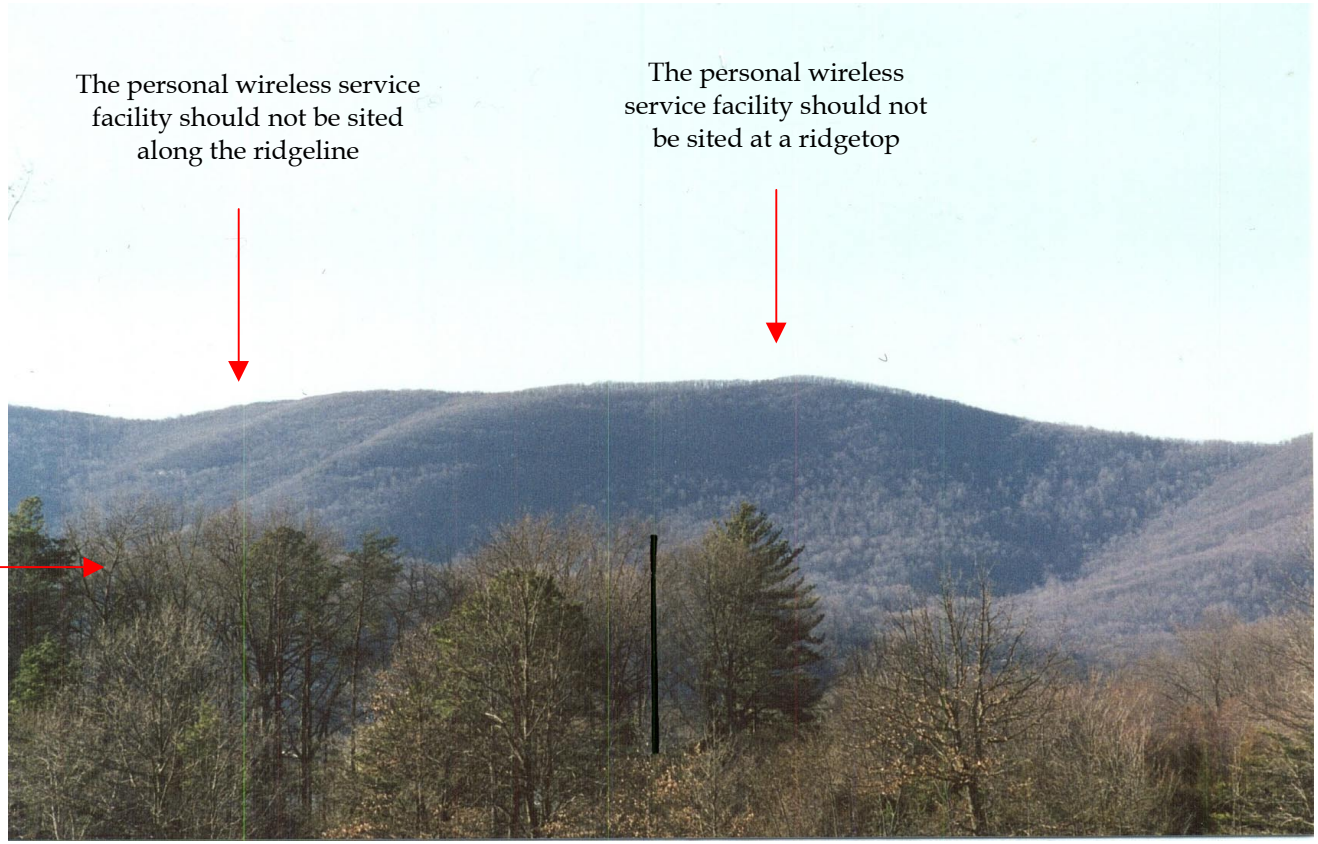
Here are three commonly confused terms:



It is possible to have a well-designed personal wireless service facility that is perfectly sited but in a poor location. This is why location, siting and design should be distinguished from each other. This Policy addresses all three concepts.

It is the intent of Albemarle County to require the use of the least intrusive means possible to provide coverage.

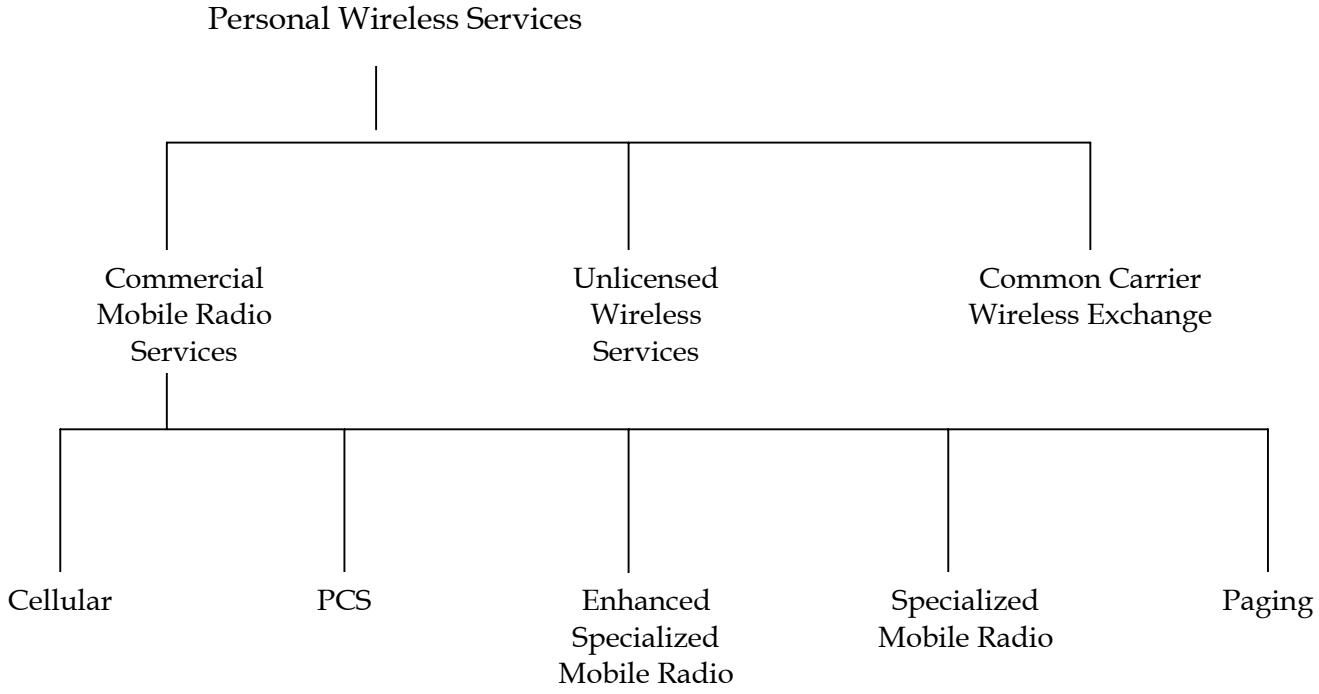
The carrier should <u>locate</u> the personal wireless service facility here and <u>site</u> personal wireless service facilities within trees.



The carrier should <u>design</u> personal wireless service facilities with dual-polarized antennas or a less visible antenna system.

Photosimulation of a monopole with dual-polarization in the Blue Ridge Mountain area of Western Albemarle County.

These are personal wireless services, according to Section 704 of the Telecommunications Act of 1996.



Cellular, PCS, Enhanced Specialized Mobile Radio, Specialized Mobile Radio and Paging are considered "functionally equivalent services" by the Federal Communications Commission. Before it was clarified by a court, this meant that whatever zoning requires of any one of the functionally equivalent services, it must require of the others. However, a federal appellate court found that paging was neither functionally equivalent with the others from a pricing point of view nor from the distance the signal must travel. (*Aegerter v. City of Delafield, 174 F. 3d 886 (7th Cir. 1999)*)

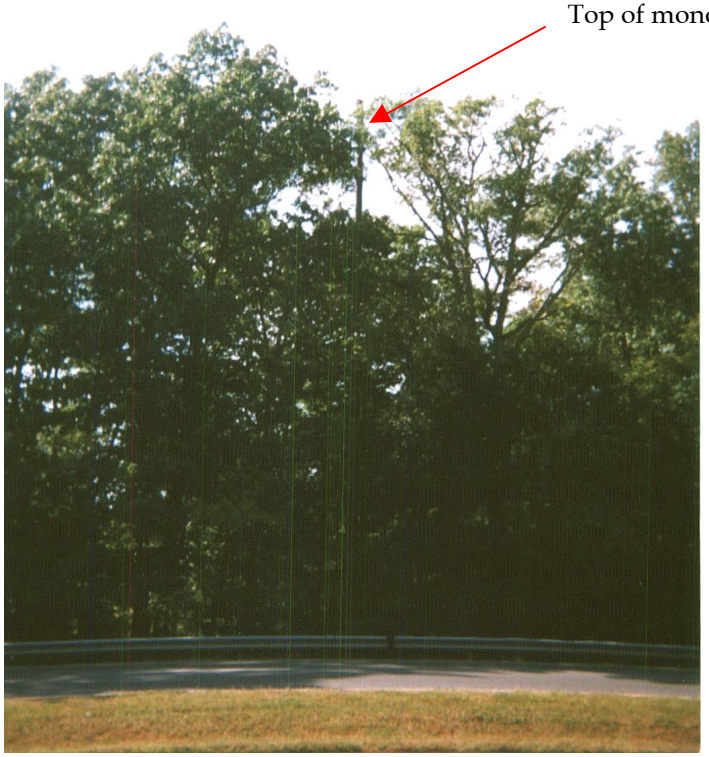
Personal wireless services do not include other services, such as broadcasting or ham radio.

Personal wireless service facilities can go within trees. Leaves, particularly pine needles, tend to diffuse the signal, and thereby attenuate it. Signals from antennas within trees work, they just don't go as far.

Why place personal wireless service facilities in trees?

The reason is *visibility*. A personal wireless service facility site in trees is less visible than a facility that is above the trees.

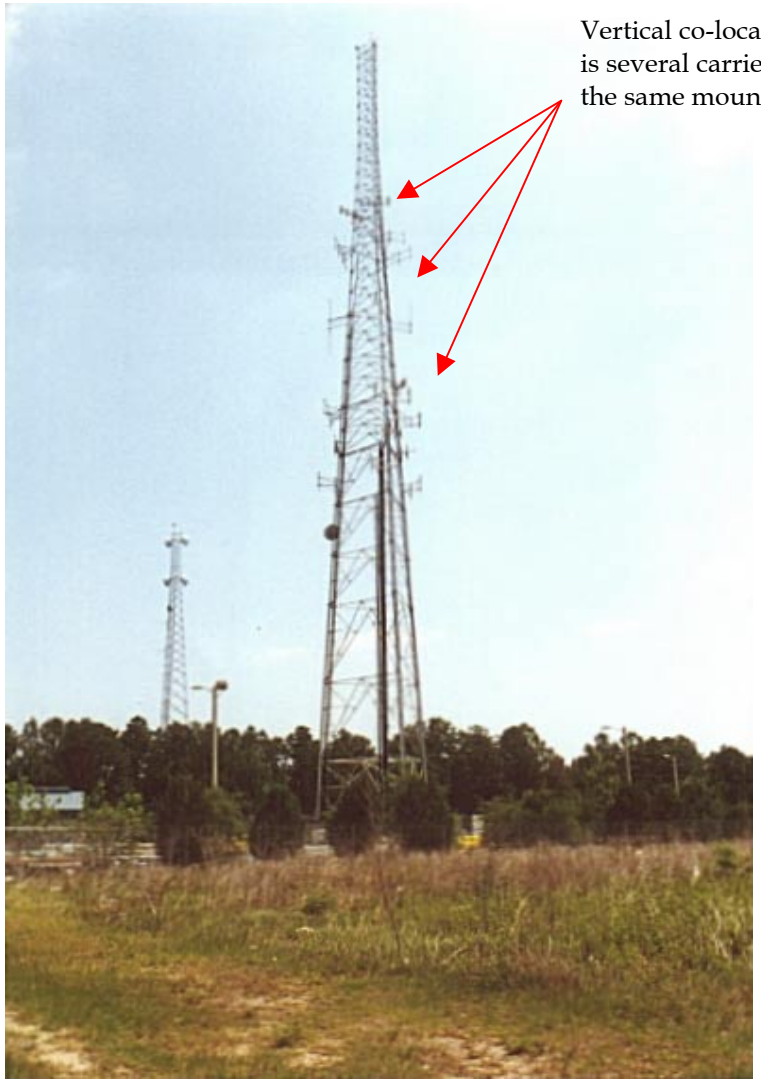
Visibility is not the same as aesthetics.



PCS on a wood monopole in Bellair, along U.S. 250 bypass.

Albemarle County has approved numerous personal wireless service facilities in trees.

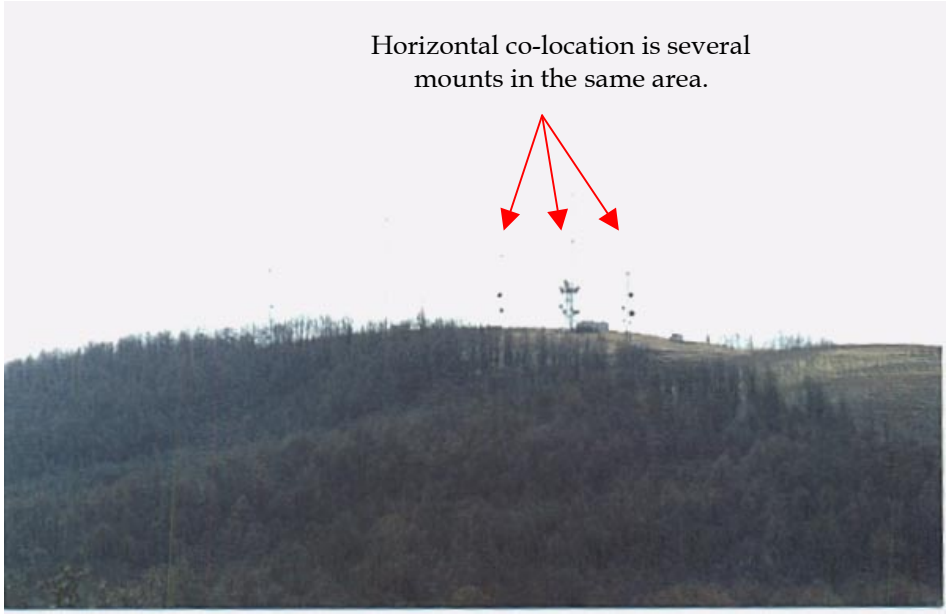
Co-location



Two vertical co-locations in Gainesville, Florida. Increased height and number of positions make these very visible.

Co-location which results in adverse visual impact is not consistent with the goals of Albemarle County.

From a visibility perspective, co-location should be discouraged.



Horizontal co-location at Carters Mountain, Albemarle County. This results in what many people call an "antenna farm" or "tower farm."

Below are examples of RF Isolators and how they are used to shield antenna from other antenna.

Location

Albemarle County developed within and around its mountain resources. Mountain resource areas, as designated in the Albemarle County Open Space and Critical Resources Plan, should be avoided when locating personal wireless service facilities.

Crozet with Bucks Elbow Mountain in the background.

Avoidance Areas have been identified by Albemarle County. These are areas that have resources of significance to the County and where the unwise siting of Personal Wireless Service Facilities could result in adverse impacts. See the map on page 26.

Albemarle County has identified those resources that are important areas to preserve or conserve as open space. These resources are identified in the Open Space Plan, which is a component of the Comprehensive Plan. The Open Space Plan's stated objectives include protecting "the County's natural, scenic and historic resources in the Rural and Growth Areas," preserving and managing "the County's natural resources in order to protect the environment and to conserve resources for future use," and preserving "the County's scenic resources as being essential to the County's rural character, economic vitality, and quality of life." The placement, construction and/or modification of personal wireless service facilities should be reviewed for compliance with the Goals and Objectives of the Open Space Plan. The precise boundaries of resources identified in the Open Space Plan are less important than areas where a personal wireless service facility could compromise the identified resources.

Photosimulation of a lattice tower located outside of the Southwest Mountains National Rural Historic District. The Southwest Mountains contain multiple identified resources that are characteristic of Avoidance Areas.

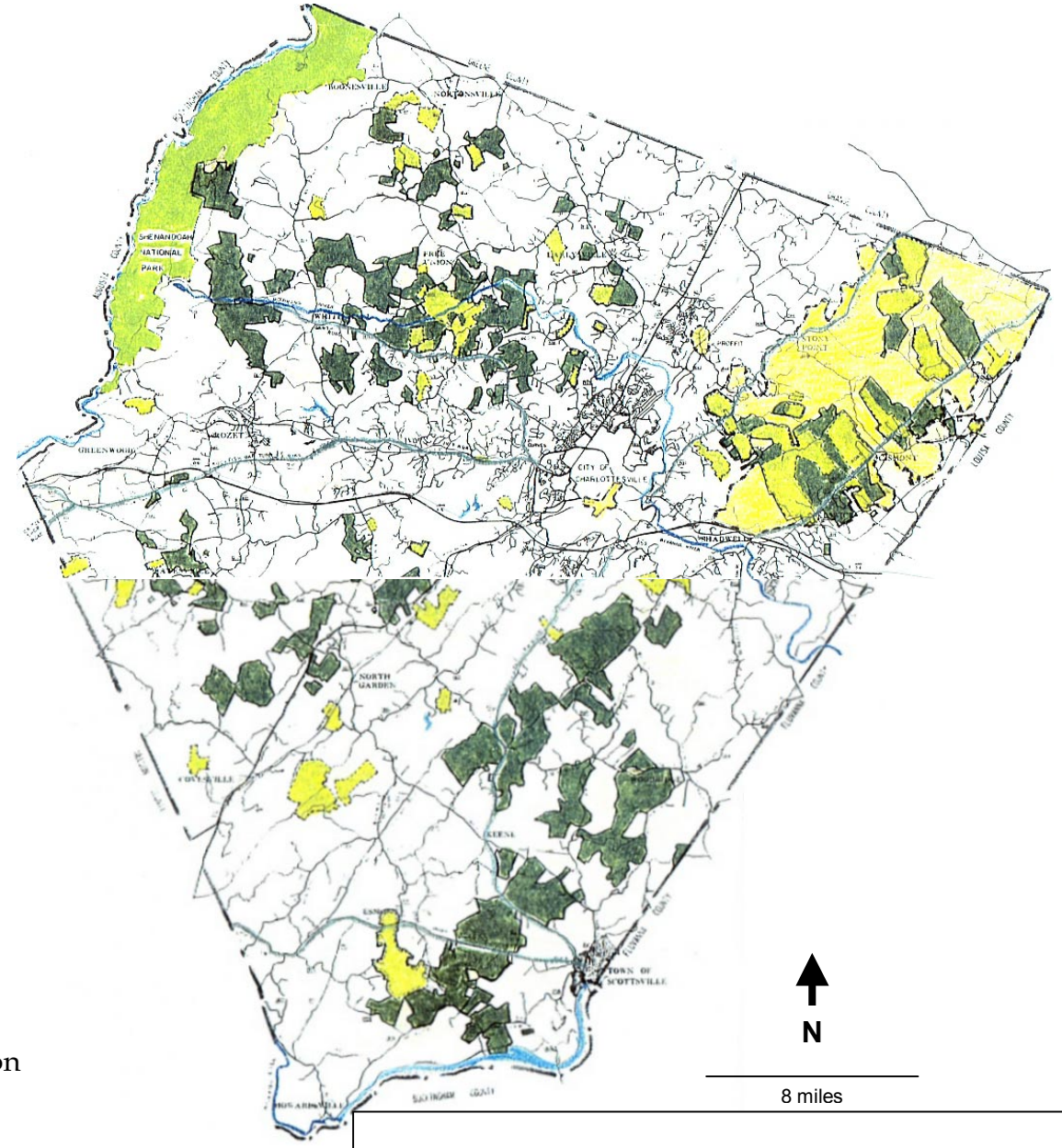
Chapter Two of the Comprehensive Plan, Natural Resources and Cultural Assets, contains additional resources which are not identified in the Open Space Plan. Among those resources are historical, mountain and scenic resources. Impact on any identified resource must be evaluated for compliance with the Comprehensive Plan. Many historical features within the County, while not having National or State designation, are of significant local importance.

Boyd Tavern, shown above, is an example of a structure with significant local importance.

Agricultural/Forestal Districts and land in Conservation Districts should also be considered Avoidance Areas. In reference to Agricultural/Forestal Districts, the Comprehensive Plan states, in part, "Albemarle County agrees, when possible, to protect those lands from intrusive land uses which threaten the continued agricultural or forestry use of those lands 'for the production of food and other agricultural and forestal products,' and 'as valued natural and ecological resources which provide essential open space for clean air sheds, watershed protection, wildlife habitat, as well as for aesthetic purposes.' (§15.2-4301 Virginia Code)."

The map on this page shows the location of Avoidance Areas, which include State Scenic Highways, Scenic Rivers, Virginia By Ways, National Forests, Historic Districts, Agricultural/Forestal Districts and Conservation Easements.

Avoidance Areas may be modified as Agricultural/Forestal Districts and Conservation Easements are established or amended.



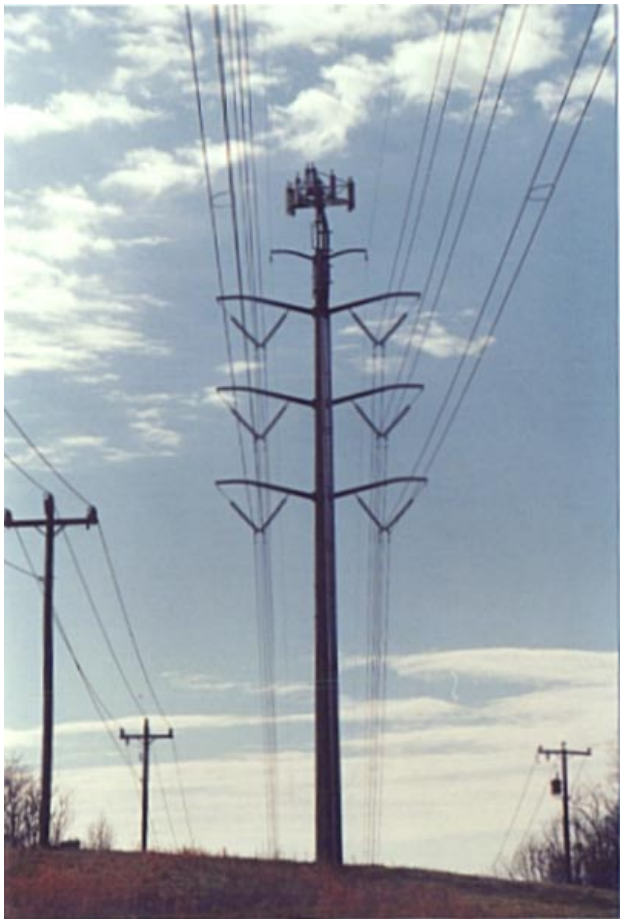
Map courtesy of the Piedmont Environmental Council

The built environment of Albemarle County contains many potential Opportunity Sites, or man-made sites for personal wireless service facilities such as rooftops and utility poles.

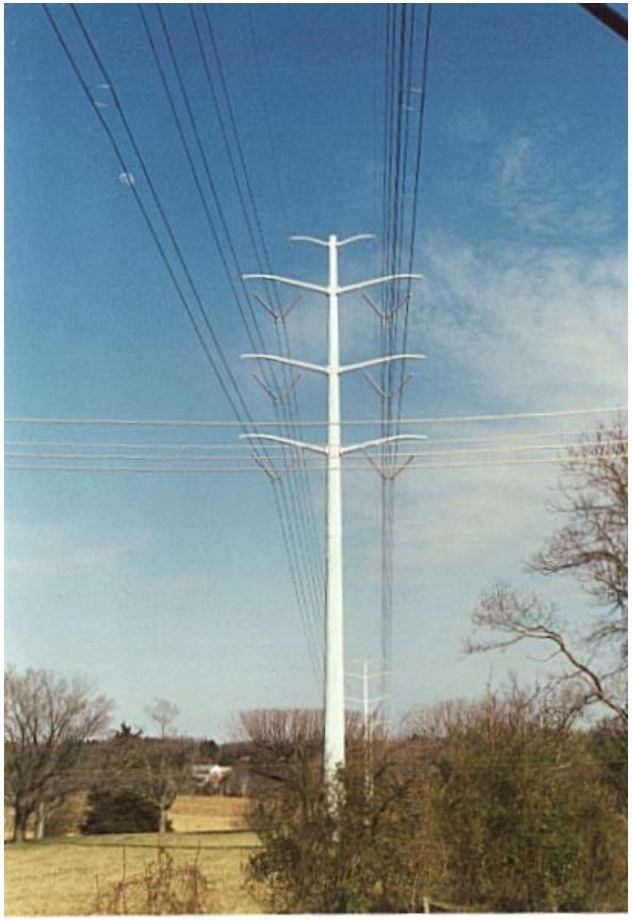
Opportunity Sites include those locations where existing structures provide siting for Personal Wireless Service Facilities. The placement, construction and/or modification of personal wireless service facilities within an Opportunity Site is encouraged.

Above is an example of an Opportunity Site. A personal wireless service facility is located in the steeple of the St. Paul Church in Ivy.

Electric transmission towers are another type of Opportunity Site.

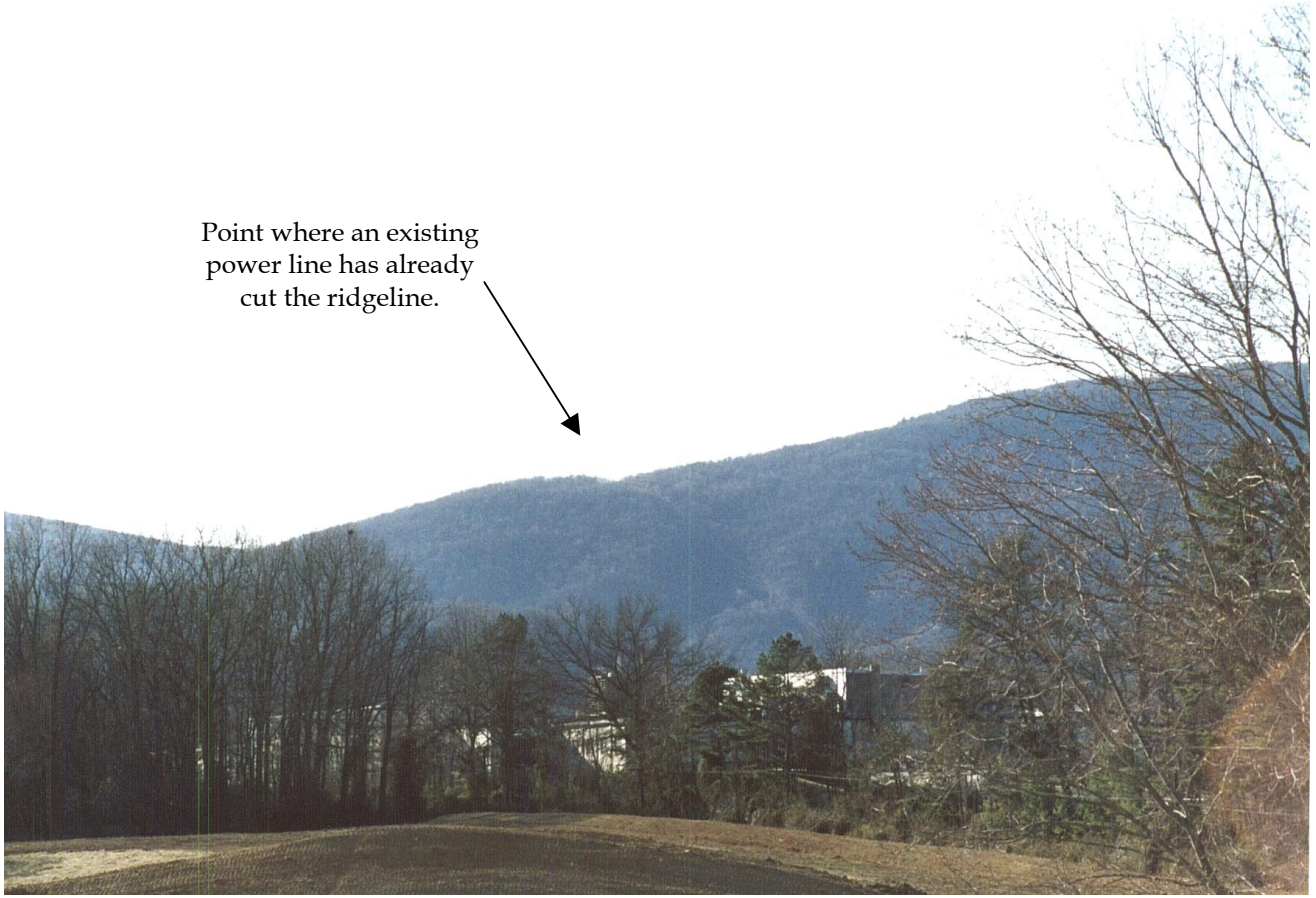


Pictured is an antenna array on top of a transmission tower along Barracks Road. While this represents use of an opportunity site, the resulting design has visibility impacts that could have been reduced or eliminated by using alternative types of equipment and mounting techniques. Attachment to existing structures should complement - not overwhelm - the structure.



There are many more opportunities on transmission towers in Albemarle County such as this example along Barracks Road.

Power line corridors and utility easements have cut up some ridgelines in Albemarle County.



If a personal wireless service facility must be located on a ridgeline, as well as in a Mountain Resource Area, then it should be placed on an available transmission tower (such as that seen here from Crozet) or a location consistent with the Mountain Section Guidelines. The Mountain Resource Area is a section of Albemarle County that is mapped in the Open Space and Critical Resources Plan.

Existing structures provide Opportunity Sites.

Structures that puncture low ridgelines are ideal platforms for personal wireless service facilities. An example is this Albemarle County Service Authority Water Tank in Crozet. The antennas can be located on the top or sides of the tank with the equipment cabinets hidden by the vegetation.

Buildings located on ridgelines may also be ideal platforms for personal wireless service facilities such as these structures in Ednam. The antennas could be mounted on the roof.

Siting

A personal wireless service facility need not be located only in an Opportunity Site if it is properly sited.

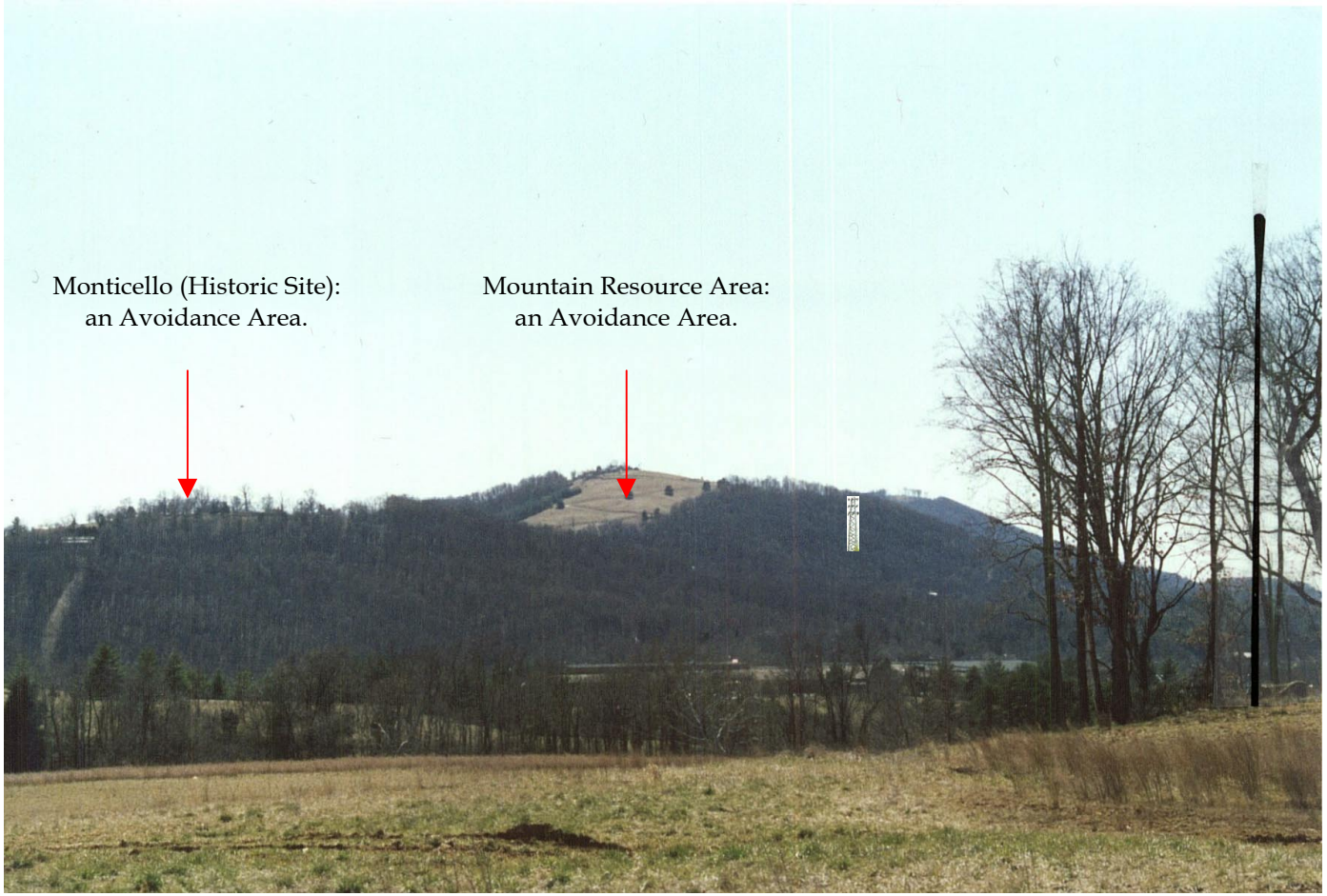
This monopole in Nix, although located on a high point of land, is virtually invisible because it is sited in the trees.

Careful siting may allow a facility to be located in multiple Avoidance Areas. The site shown below is located in a Mountain Resource area and within an Entrance Corridor Overlay District. This photo is taken from a scenic overlook on I-64. Use of an existing road reduced the amount of activity needed to construct the facility. The use of the mountain and trees as a backdrop for the top of the facility eliminates skylining of the facility. Use of a backdrop can significantly

reduce the visibility of the site as is evident below.

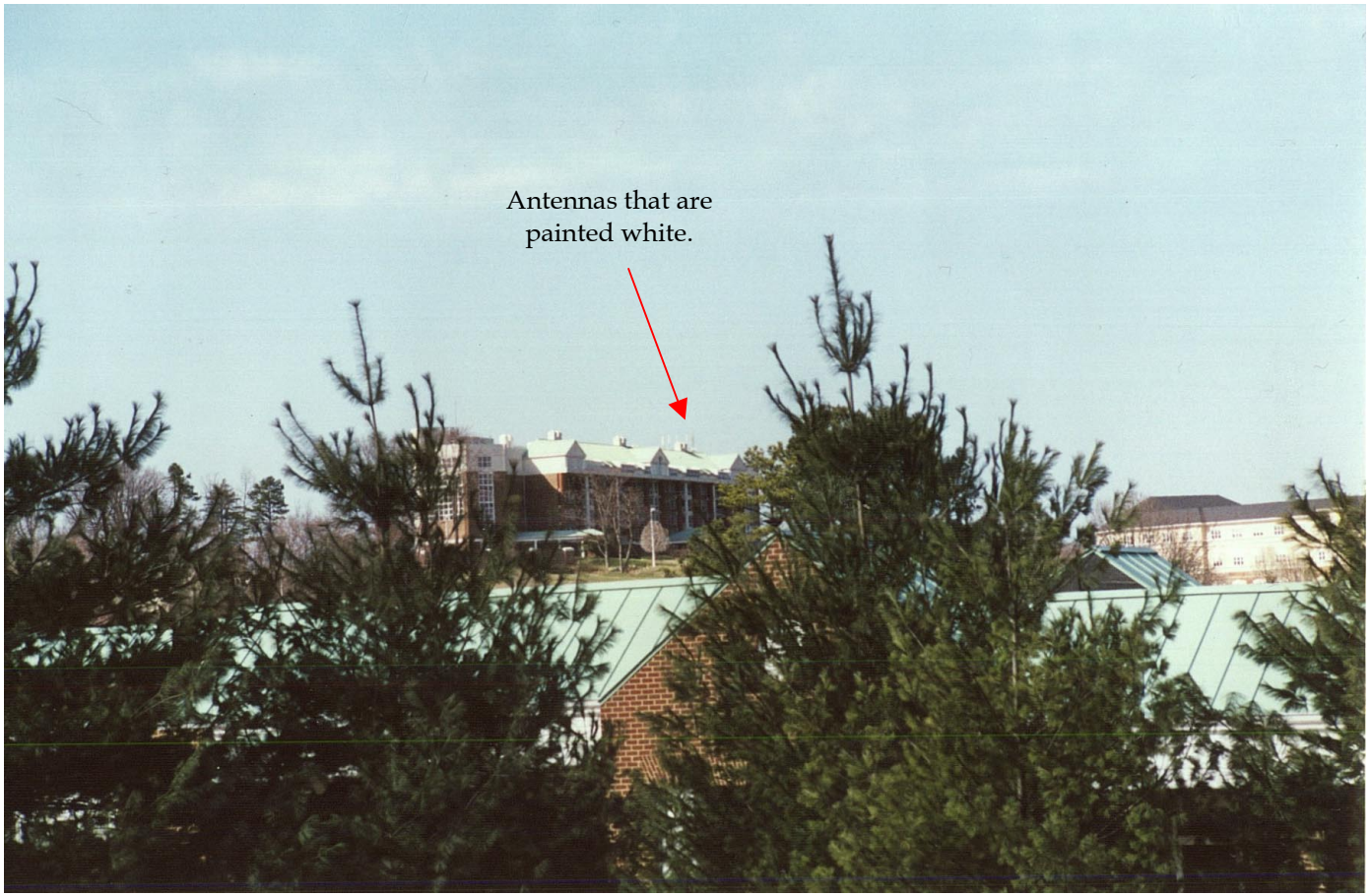
The antennas on this facility comply with the design guidelines on page 50. This further reduces the visibility of the site.

Wooded areas may be considered to be Opportunity Sites. However, wooded areas may also be within Avoidance Areas, which may reduce the appropriateness of such an Opportunity Site.



A viewer may detect the photosimulated lattice tower on Brown's Mountain; however, the photosimulated monopole in the trees in the right foreground takes advantage of an Opportunity Site with limited impact. Facilities within wooded areas should be the same color as the trees. This photosimulation uses black to increase visibility.

Roof-mounts are personal wireless service facilities mounted on the roof of a structure. When the facilities are kept in scale and color with the roof, their visibility is reduced.



Two carriers are located on this roof in University Village. From a distance, the facilities are barely visible.

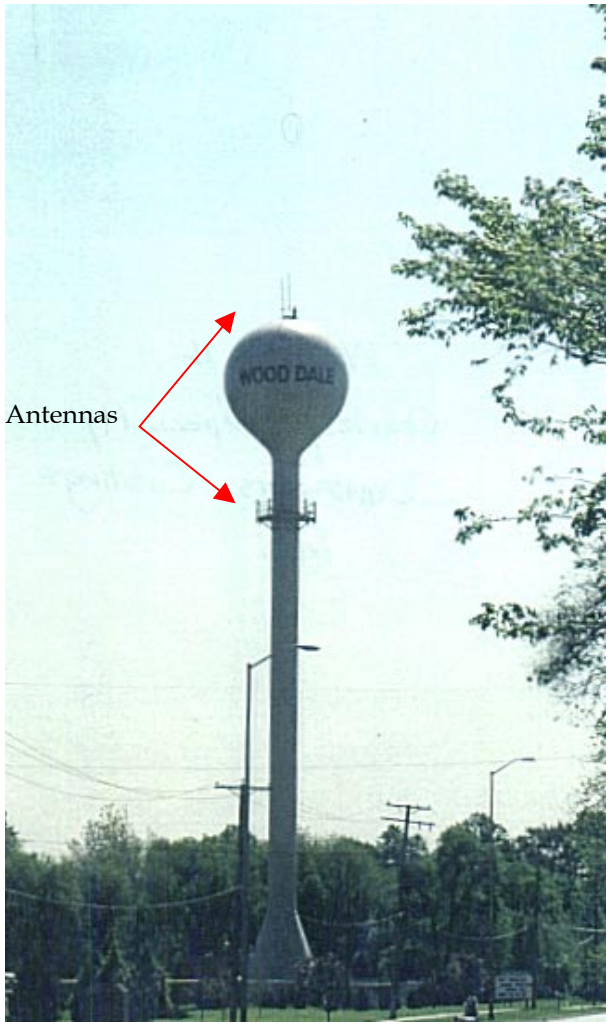
Siting a personal wireless service facility on a roof is not always a good idea.

This personal wireless service facility in Florida looks like a monopole, but it isn't. Guy wires hold up the lattice mount. It is a guyed tower on the roof of a hospital.

This building under construction may be ill-suited for an ordinary personal wireless service facility. However, if the facility is properly designed to reduce visibility it may be a candidate for at least one roof mounted facility.

As discussed in the next chapter on Design, this building in Pantops has simple and unbroken lines. Such a building is ill-suited for ordinary roof mounts. Camouflage, concealment or disguise may be required.

Water tanks are considered Opportunity Sites.



This co-location on a water tank in Illinois has antennas on the top and on the side. The side of the tank is better from a visibility perspective. (Photo courtesy of Specialty Constructors Coatings, Inc.)

The Albemarle County Service Authority water tank in Crozet may be more suitable for side-mounted antennas rather than whips or panels placed on the top.

The most important guideline for siting personal wireless service facilities in Albemarle County is visibility.

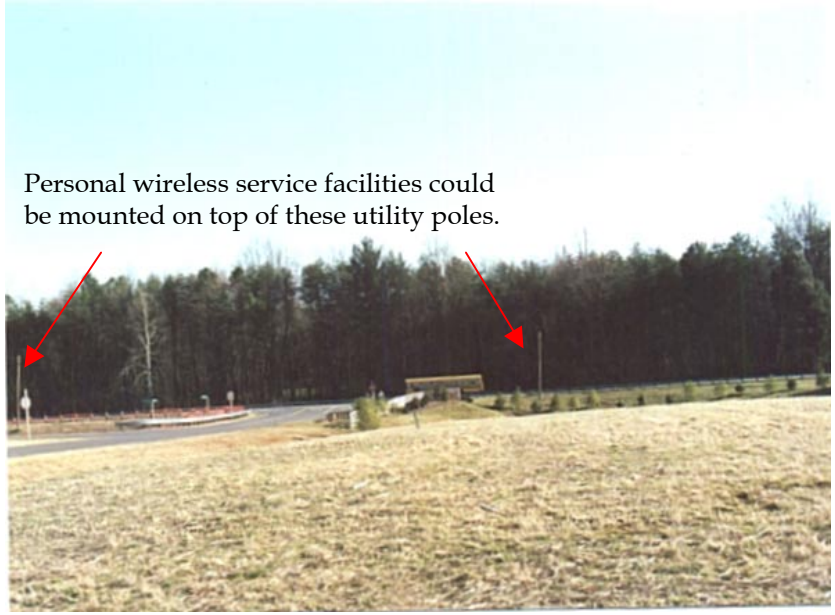
- The definition of a well-sited personal wireless service facility is that it would be virtually invisible to most viewers. Such a facility would be an improvement over a facility that is in the open and very visible.
- A poorly-sited personal wireless service facility is one that has visual impact.
- The degree to which a personal wireless service facility can be made invisible or the degree to which it has visual impact is often the most important standard by which it can be evaluated.

Visibility is objective because visibility can be measured. Aesthetics is not suggested as a standard and should not be used to evaluate personal wireless service facilities. Aesthetics is subjective and cannot be measured uniformly amongst all viewers.

Utility poles are considered Opportunity Sites.

Question:

How can personal wireless service facilities be placed in an open field, residential environment like this area in Crozet?

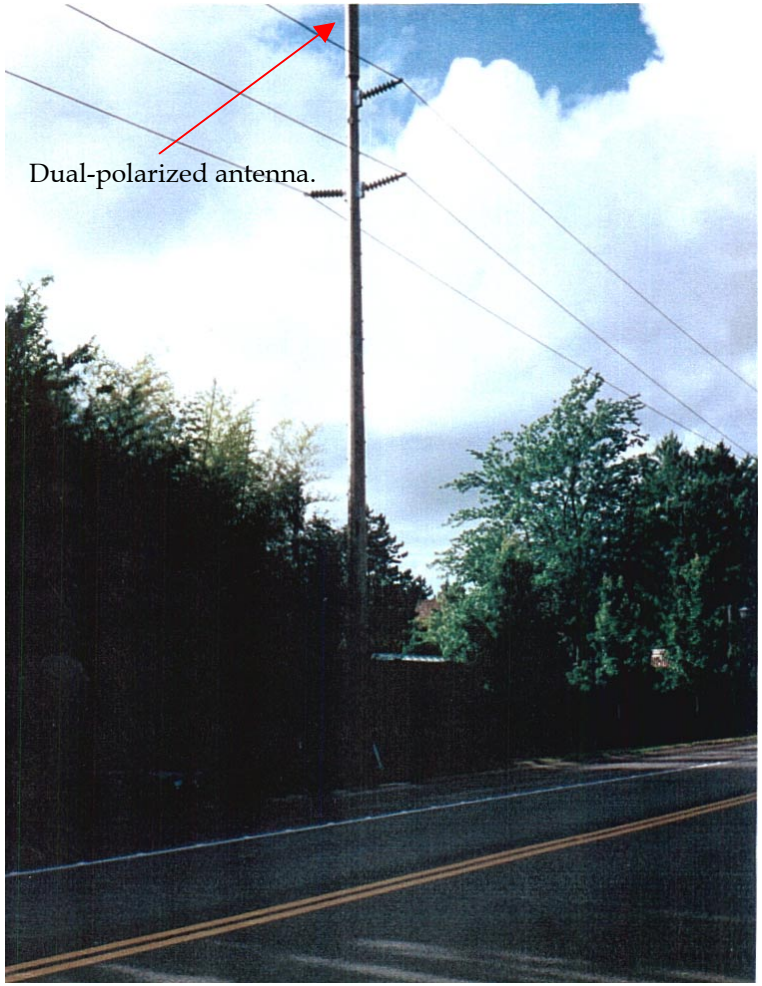


Answer:

The personal wireless service facility could be placed in the wooded area across the intersection shown in the photograph at left.

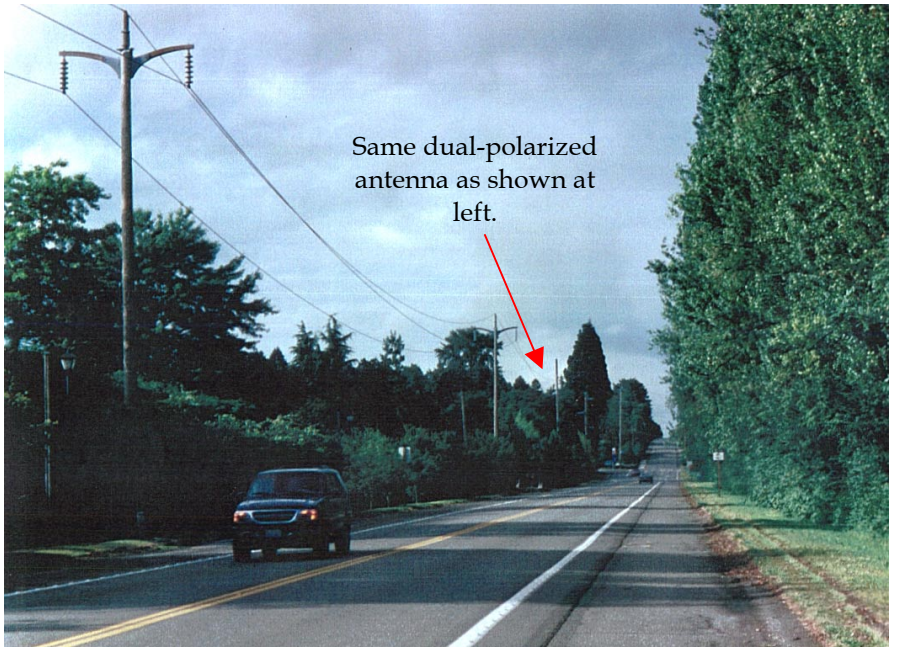
Even better would be to place personal wireless service facilities on utility poles already found in the right-of-way.

Personal wireless service facilities can be placed on utility poles in rights-of-way. The use of dual-polarized (polarization diversity) technology is available to both Cellular and PCS carriers.



Personal wireless service facilities on utility poles in rights-of-way are almost invisible. This photograph is from Clyde Hill, Washington, courtesy of Kirk Wines.

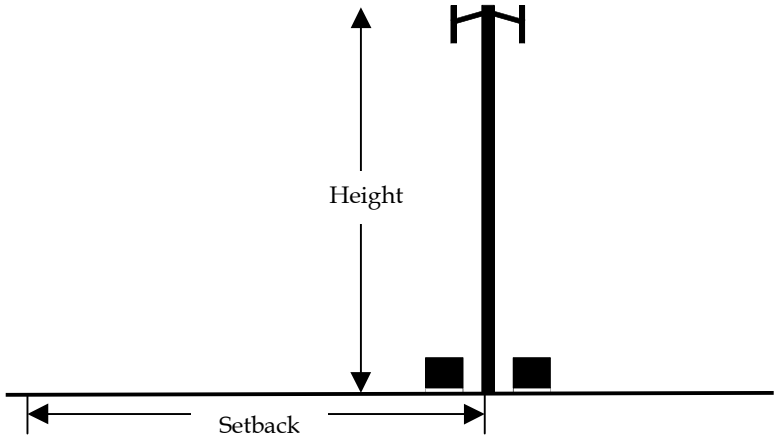
As can be seen in these photographs the use of existing utility corridors may require replacement of the existing utility poles.

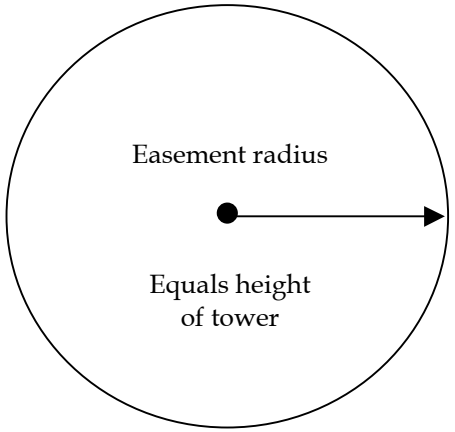


Installing a personal wireless service facility on a utility pole may require that the pole be changed from wood to steel. This photograph is from Clyde Hill, Washington, courtesy of Kirk Wines.

Method For Addressing Setbacks Due To Height

Provisions in the Zoning Ordinance require structures to be set back from the property line a distance equal to the height of the structure unless a modification is granted by the Planning Commission. The siting of facilities should not create a hazard to adjacent property or cause the over-development of property that results in an undue intrusion onto adjacent property. In order to protect property abutting personal wireless service facilities, this Personal Wireless Service Facilities Policy recommends that an easement be obtained on all property extending in all directions from the facility for a distance equal to the height. This easement will acknowledge that the tower or its components may fall within the easement area. (It is noted that failure of towers is extremely rare.) This easement will also allow for the falling of debris, particularly ice, and equipment used during maintenance, installation and updating of the equipment. If an easement is not obtained, a modification request for setback must be reviewed by the Planning Commission.



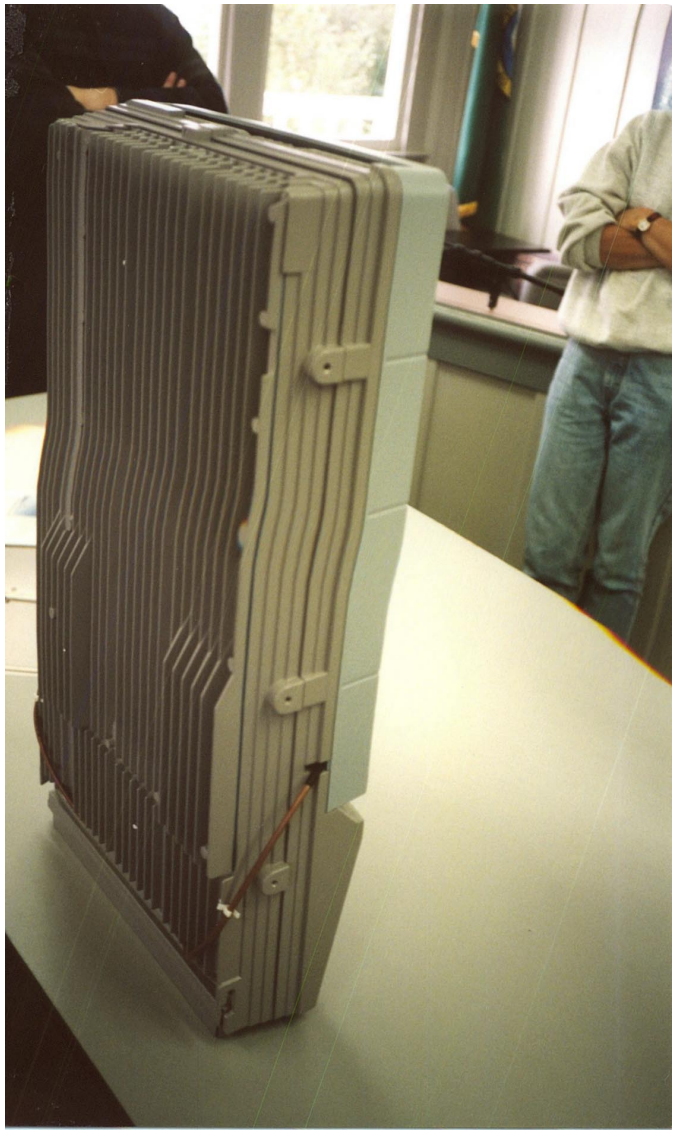


Method for Addressing Setbacks Due To The Zoning District Requirements

The Zoning Ordinance requires minimum setbacks from property lines for all types of structures. It is recommended that the Zoning Ordinance be amended to allow the Planning Commission to modify the setbacks from the property lines. Currently, only the Board of Zoning Appeals can reduce the required yard setbacks upon a finding that application of the setback would create an undue hardship, a hardship not shared by other properties zoned similarly and that the variance would not create a substantial detriment to adjacent property. These criteria limit the Board of Zoning Appeals' ability to approve variances. Also, the criteria do not allow board members to consider benefits which may be achieved by reducing the minimum setback. By allowing the Planning Commission to modify the setback, it may be possible to achieve improved siting of personal wireless service facilities.

Design

Once a personal wireless service facility is properly located and properly sited, it must still be well designed.

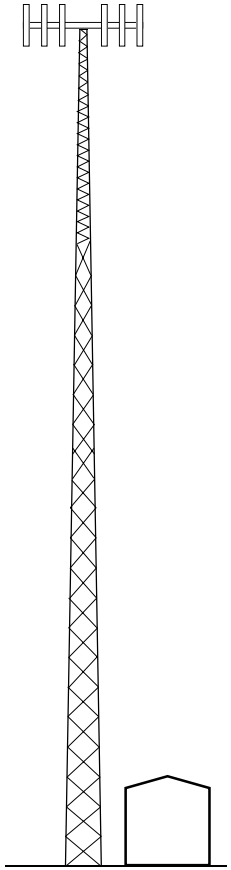


This is a microcell. It is well designed because it is small. It could be located anywhere and sited almost anywhere.

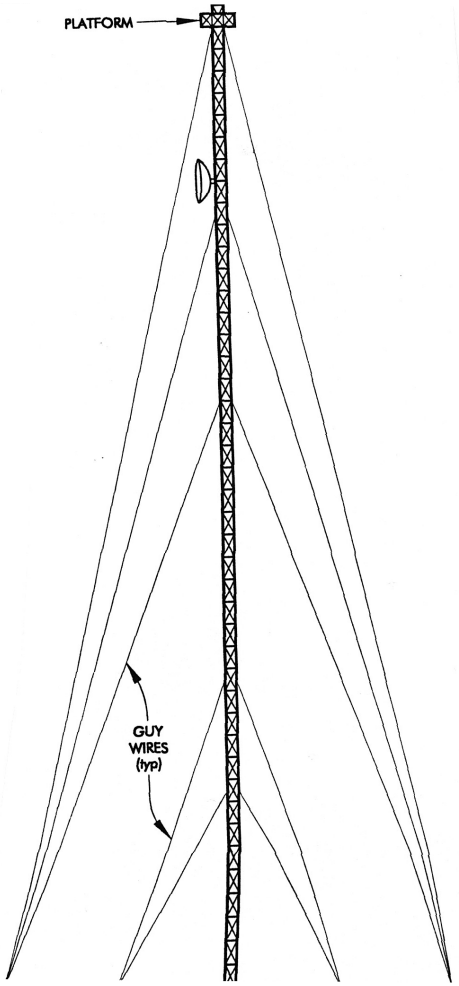
Carriers would need several microcells to do the same job as one tall tower.

This is a "treetop tower." This type of facility has been successfully located throughout Albemarle County. A typical treetop tower is designed so that no portion of the facility is more than 10 feet taller than the tallest tree within 25 feet. Typically, all trees within 200 feet must be retained except for those identified for removal during the initial review of the application. This type of facility, due to its limited visibility, has been successfully deployed in areas designated as Avoidance Areas.

Due to their high visibility, these are examples of facilities that generally do not meet the County's policy.



Lattice towers are capable of great height, but they are highly visible.

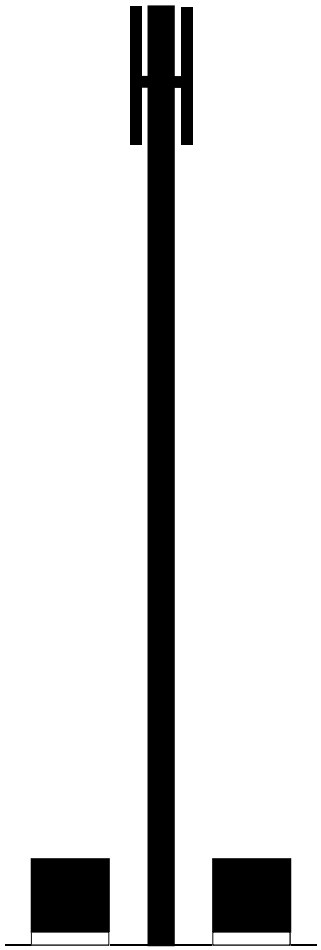


Guyed towers, capable of even greater heights, require large expanses of land for guy wire anchors.

Lattice towers may be acceptable if appropriately sited.

Guyed towers are commonly used in more remote locations where backhaul is not available. The dish on the guyed tower at right is to provide backhaul because wireline is not available to do so. The use of land based wirelines for backhaul is preferred.

Ground-mounted monopoles and masts are acceptable for personal wireless service facilities.



Monopole

Mast

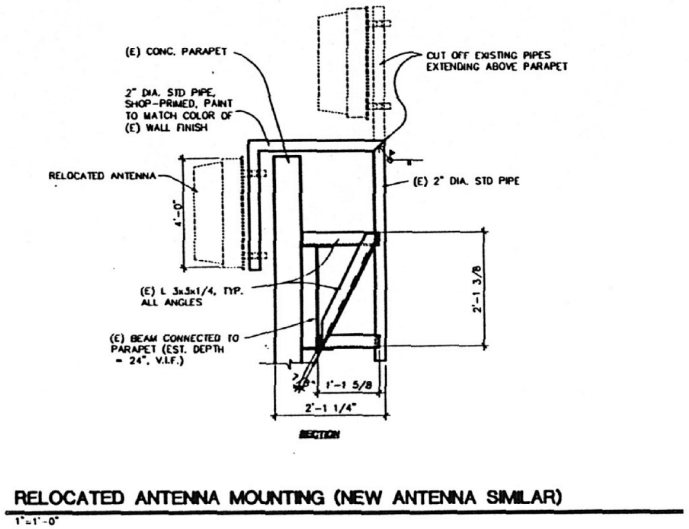
Monopoles are acceptable, particularly those where the antennas do not protrude far from the pole. Because monopoles are shorter than guyed towers or lattice towers, the wireless carriers will require more of them.

Masts are preferable, because they are shorter and more slender than monopoles and the dual-polarized antennas can be kept close to the pole (and the equipment can be buried). Because masts are shorter than monopoles, the wireless carriers will require more of them.

Both examples shown are for dual-polarized antennas, which are commercially available for both Cellular and PCS applications.

Roof-mounted personal wireless service facilities are acceptable.

Roof-mounted facilities do not need to project up. They can be flush-mounted on the parapet or flush-mounted on a penthouse as shown on this office building in Arizona.



RELOCATED ANTENNA MOUNTING (NEW ANTENNA SIMILAR)

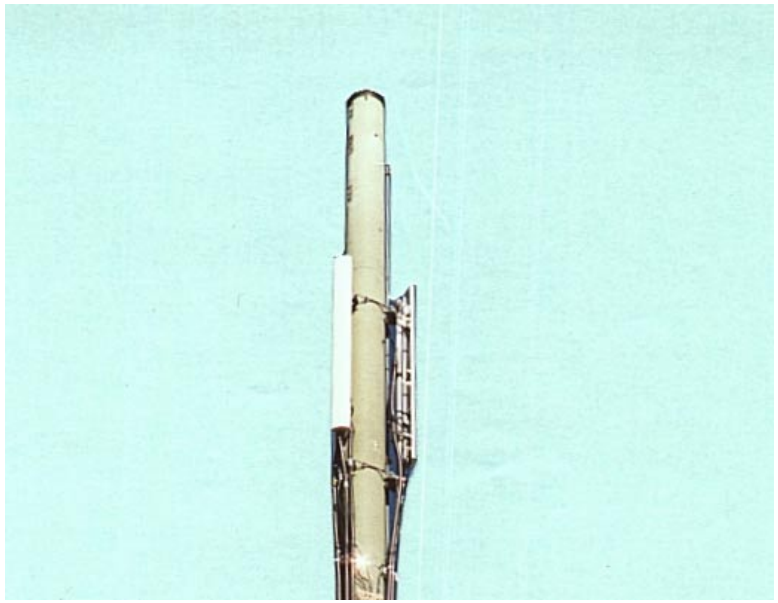
1"=1'-0"

Panel antennas should be located so that they do not peak above the roofline and should be positioned below the parapet, as shown in this drawing from GEZ Architects Engineers.

Antenna arrays are how the antennas are combined on a mount.

This antenna array on Barracks Road is sometimes called a "reindeer hat" or "top hat" array. These types of antennas can be found on transmission towers, lattice towers and monopoles.

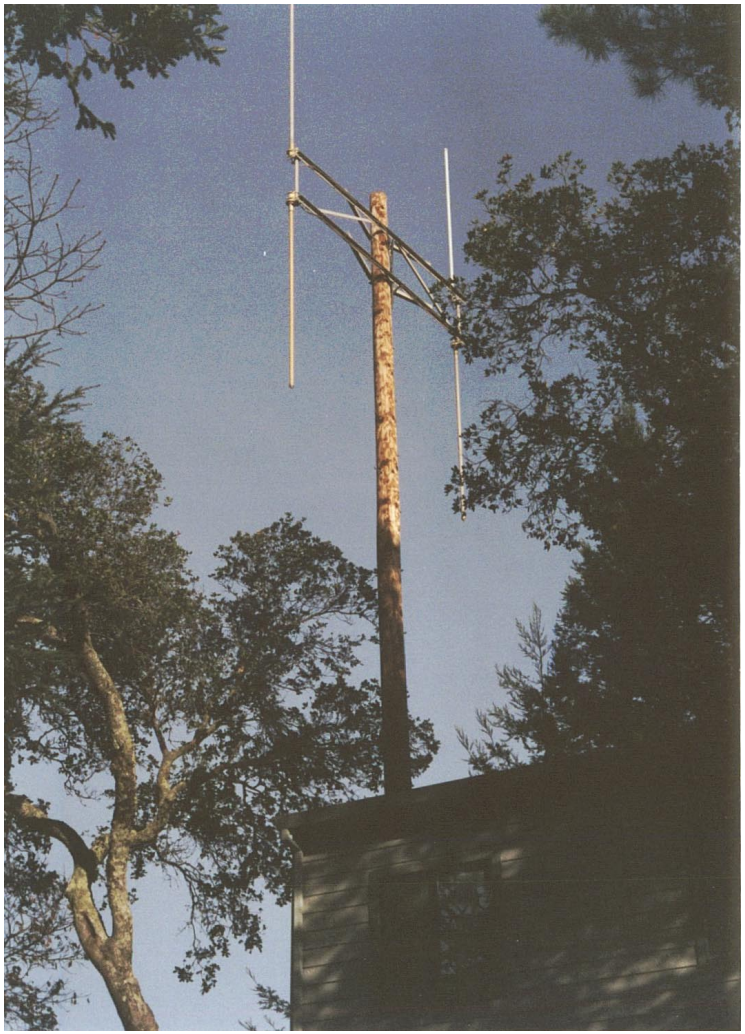
These antenna arrays are provided for "spatial diversity", but they are highly visible and are discouraged. These antenna arrays do not comply with the design guidelines contained on page 50.



This is a dual-polarized or cross-polarized antenna on 5th Street. It can provide for polarization diversity and can do everything that the "top hat" array can do. Dual polarization eliminates the need for "spatial diversity".

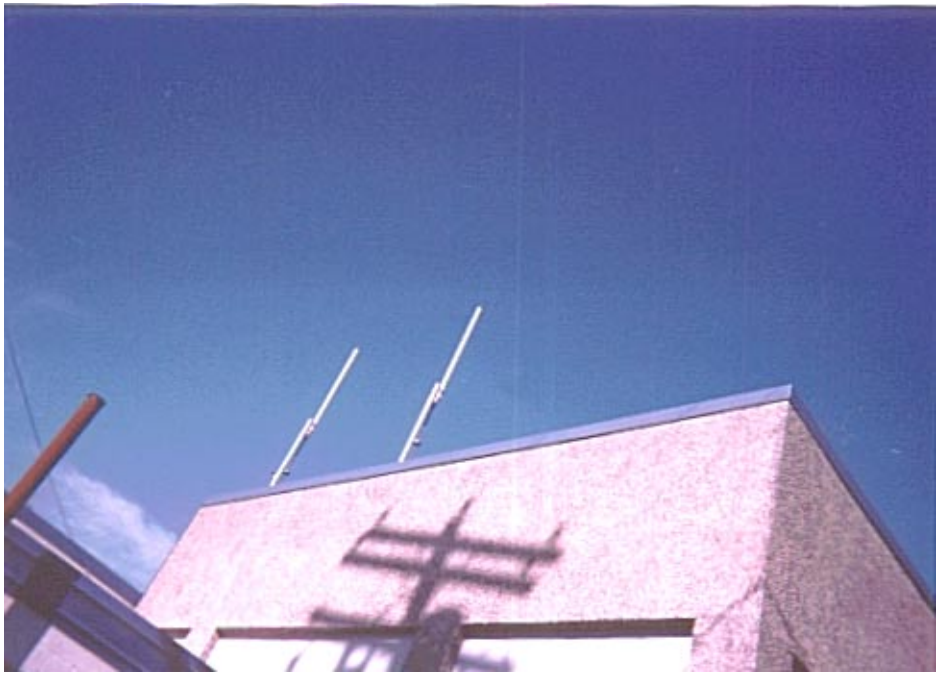
Dual-polarized antennas cannot be placed as high and, therefore, more sites will be required. However, they do comply with the design guidelines contained on page 50.

Whip or omnidirectional antennas are acceptable. These antennas have the least visual impact when they are placed at a distance. As a viewer moves closer to whip antennas, they become more visible and more intrusive.



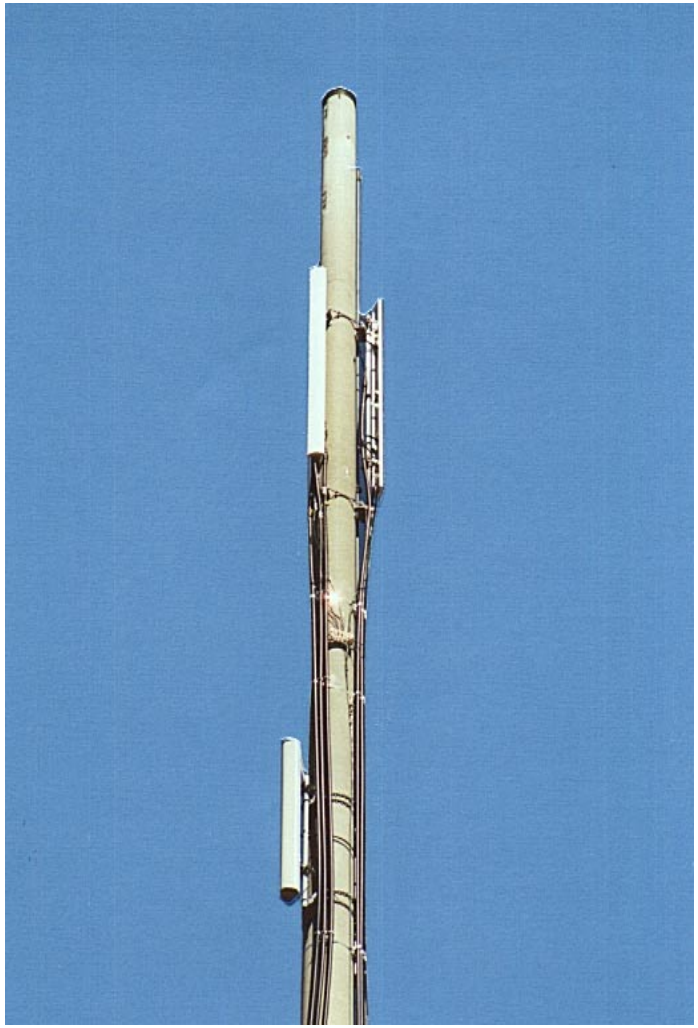
Two whip antennas at a Cellular site in California.

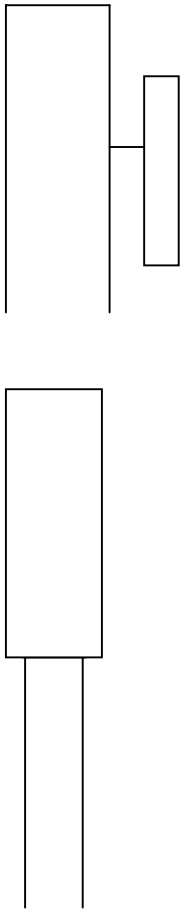
The antennas shown on the left do not meet the mounting guidelines contained on page 50.



PCS site in suburban Seattle, Washington.

Siting on utility poles requires guidelines. Shown below is polarization diversity, which allows the antenna to be close-mounted or flush against the pole. Both Cellular and PCS can use these dual-polarized antennas.





Protrusions from the face of the pole should be no greater than one-half the diameter of the pole itself and in no cases greater than 12 inches. The pole should be no wider than the minimum necessary to support the proposed equipment

If antennas are enclosed in a radome shield on top of the pole, the shield should have a maximum overhang of 4 inches. The pole should be no wider than the minimum necessary to support the proposed equipment.

Personal wireless service facilities are composed of antennas and equipment. The equipment is housed in equipment shelters, cabinets and areas that should be small and designed to blend with the surrounding environment or buried underground. The County recognizes that differences exist between Cellular Analog, Cellular Digital and PCS equipment. Each system should use the smallest equipment available and use sites and designs that minimize the equipment's impact.

Equipment cabinet

These two equipment shelters in Millbrae, California, on the crest of a hill are for cellular. They are disguised as garages. The equipment cabinet (at arrow) on a concrete slab in the foreground is for PCS.

PCS equipment shelters, cabinets and areas (including boxes, bollards, slabs, grille work and back-up power supply) should not displace more than a girth (height plus width plus depth) of ten times (in inches) the height of the mast of pole (in feet). A 50-foot mast or pole should not have an equipment area with a girth of over 500 inches. This photograph is an example of equipment on 5th Street.

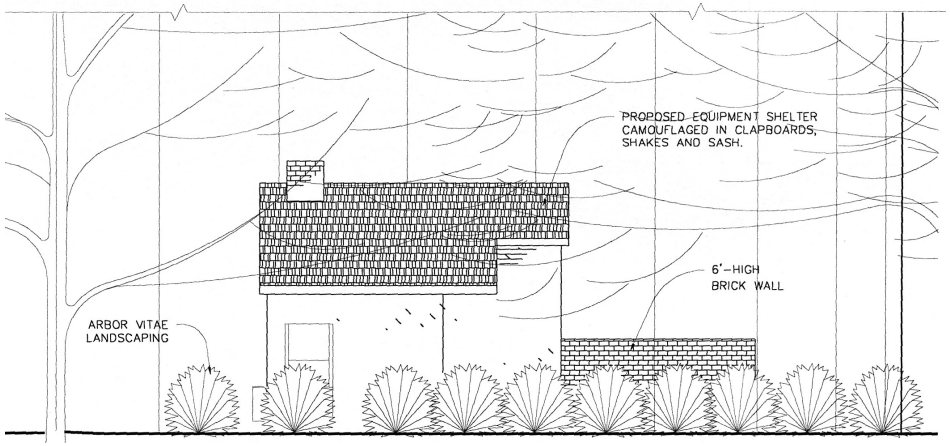
Equipment shelters, cabinets and maintenance areas are where most of the cost of a personal wireless service facility is

Equipment is often placed in small, pre-fabricated shelters or buildings. These two shelters for cellular facilities in Sonoma County, California must be air-conditioned. These types of facilities may not be acceptable in some locations due to visibility or other impacts on the adjacent areas.

These two PCS equipment cabinets in Gainesville, Florida are smaller and lighter than cellular shelters. They do not need air conditioning. While less visible than facilities for cellular facilities, their visibility may be inappropriate in or near Avoidance Areas.

When an equipment shelter can't be buried or placed in a vault, it can be landscaped and disguised as a mini-shed.

This equipment shelter in Clyde Hill, Washington, is almost totally below the ground. Photograph courtesy of Kirk Wines



This equipment shelter, to be built in New England, will be camouflaged as a New England Cottage with clapboards, shakes and sash.

Equipment generally should not be allowed within a side yard or rear yard. With careful siting, buried equipment may be appropriate within side yards or rear yards or in areas of high visibility.

A back-up diesel generator in suburban Seattle approved to go in the equipment shelter ended up in the side yard on a trailer.

When the equipment area is large, or exposed, it should be buried in an underground vault. This photograph is an example of a cellular equipment shelter near a freeway in California. Only the maintenance cabinet is above grade.

Access roads should be designed with care.

An access road to a personal wireless service facility site through open country in Sonoma County, California.

A power line swath that looks like an access road to a hilltop setting at Monticello. An access road should not cut a large swath through a wooded area.

Visibility

Personal wireless service facilities that are perfectly located can still be highly visible, although a poorly-located site will tend to be even more visible.

Personal wireless service facilities that are properly sited will almost always be less visible, but siting does not guarantee invisibility.

Personal wireless service facilities that are well-designed should ideally call less attention to themselves, but it is possible to design a site and still have it highly visible.

The personal wireless service facilities policy proposes a guideline of visibility so that each application for a personal wireless service facility can be measured by its ability to be seen.

The location, siting and design of a site with limited visibility has the least potential for impacts. In order to minimize visibility the backdrop of the facility must be considered. Facilities located on a ridge will be skylined and therefore will be visible. Facilities located with a backdrop of trees such as the facility shown below have limited visibility and therefore limited impacts.

One measure of visibility is enhancement.

This photosimulation of a site in New Hampshire shows a tri-location on a lattice tower that might be proposed anywhere in the Appalachian Mountains.

This is an example of what this Policy considers unacceptable.

This photosimulation shows a personal wireless service facility disguised as a flag pole (minus a flag) instead of a lattice tower. While this is not a perfect solution, it is better than the proposal above.

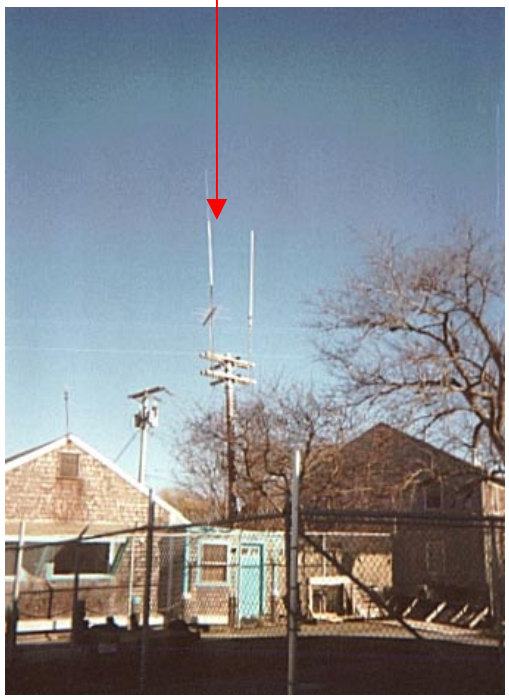
Because the flag pole is less visible than the lattice tower, it is considered an enhancement over the lattice tower.

Another measure of visibility is visual impact. Personal wireless service facility sites have visual impact more often than they enhance the surroundings. There are three measures of adverse visual impact:

Obtrusive. The personal wireless service facility overwhelms its surroundings as shown in this photograph from Gainesville, Florida.

Intrusive. The personal wireless service facility intrudes into its surroundings as shown in this photograph from Portsmouth, New Hampshire.

Incompatible. The personal wireless service facility is out of context with its surroundings as shown in this photograph from Hyannis, Massachusetts.



Mitigations

A personal wireless service facility that scores highly on the visibility scale need not be rejected. Visual impact can be mitigated in one of the following ways:

- Camouflage. This requires minimal changes to the host structure or the personal wireless service facility site's setting to accommodate the personal wireless service facility. Treetop towers are a form of camouflage.

- Concealment. The complete enclosure of a personal wireless service facility so it can't be seen is considered concealment.

- Disguise. Changing the appearance of a personal wireless service facility to appear to be something it isn't is considered disguise.

The most important rule in mitigating visual impact is to avoid creating even more visual impact through an attempted mitigation. For example, some rural communities use farm silos to house a personal wireless service facility. If the silo is already existing, it could be an excellent example of camouflage or concealment. If a new silo were built only as a disguise for mounting a personal wireless service facility, it would probably not be an acceptable solution in Albemarle County.

Reducing the height or bulk of a personal wireless service facility could be considered a mitigation. However, to achieve a true reduction in visibility, a substantial reduction in height and/or bulk would be necessary.

An example of disguise.

This is a single user personal wireless service facility disguised as an obelisk in Irvine, California.

If the obelisk were already there, this would be an example of concealment. To build such a structure, solely for the purpose of hiding a personal wireless service facility is an example of disguise.

The equipment is under the planting bed.

The total cost of this facility was approximately $1,000,000.

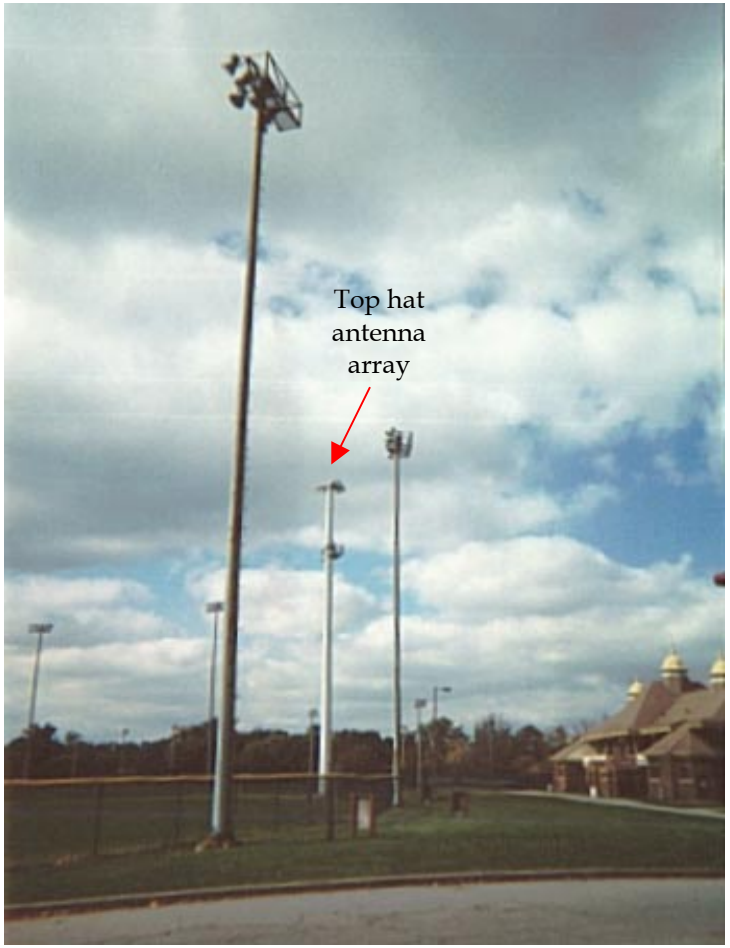
This type of disguise may go too far for Albemarle County.

Examples of camouflage. Camouflage requires forethought. The host structure should not be overwhelmed by the personal wireless service facility.

This personal wireless service facility is camouflaged as part of these signs on a highway in Arizona.

This omnidirectional antenna is part of a personal wireless service facility that is camouflaged as part of the GTE Headquarters in Irving, Texas. It could also be considered disguised as a flagpole, but it does not function as a flagpole.

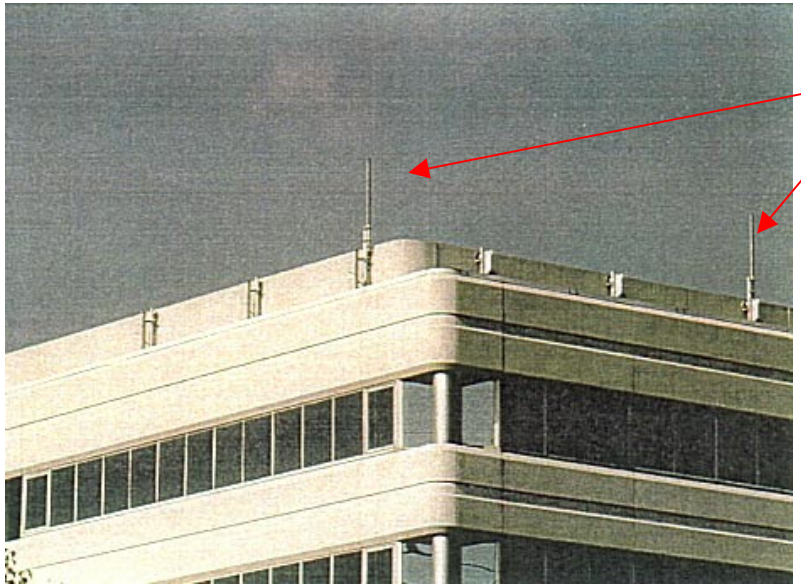
Below are unacceptable forms of camouflage. Antennas that are placed on light standards should emphasize the fact that it is a light standard. These are more like monopoles with the lights attached as an afterthought. Attachments to existing structures should not increase the height or bulk of the structure.



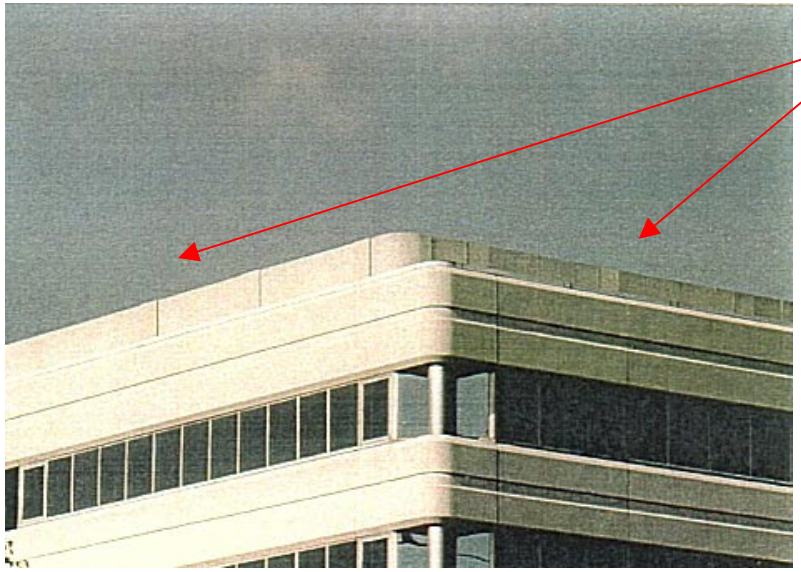
This is a "top hat" style personal wireless service facility on a stadium light in suburban Detroit.

This personal wireless service facility has two dual-polarized antennas with a single floodlight.

Camouflage is successful when the host structure is predominant as shown in these photographs.



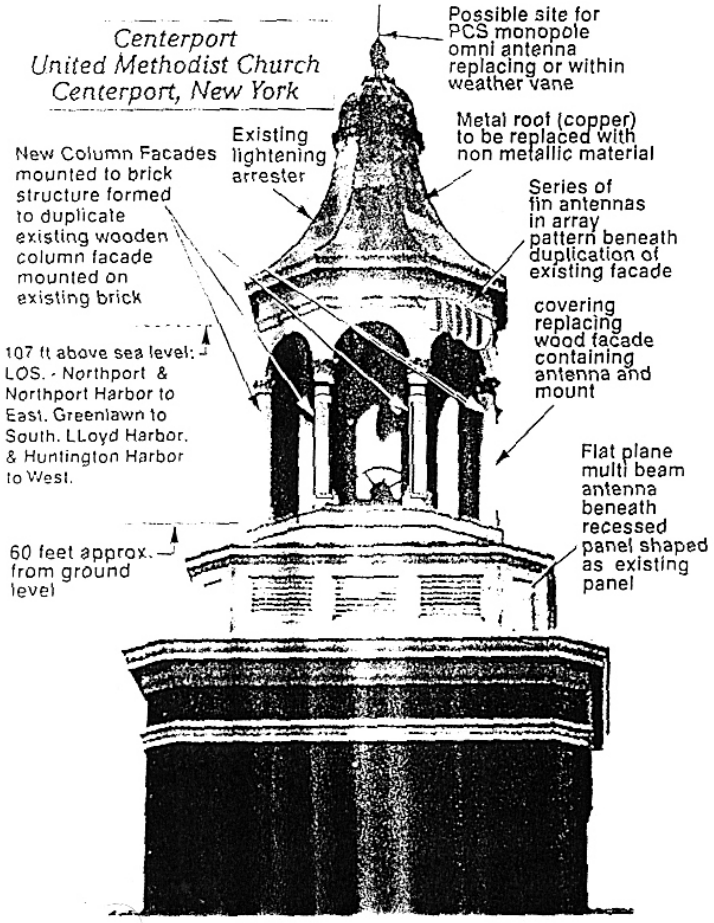
This photograph shows a conventional side-mounted personal wireless service facility on the parapet of an office building.



This photosimulation shows a "chameleon" personal wireless service facility on the same office building.

Both photographs courtesy of GEC-Marconi Hazeltine.

Concealing personal wireless service facilities on historic sites may be acceptable as long as the historic site is not threatened.



This is a proposed tri-location of personal wireless service facilities on a landmark church in Centerport, New York. Proposed design courtesy of GEC–Marconi Hazeltine.

Personal wireless service facilities can be concealed in existing structures. The cupola of this church houses a personal wireless service facility. The original wood slats were removed and replaced with signal-transparent material.

Example of how a concealed personal wireless service facility is constructed. (The height of the antenna shown in the photographs below is 30 feet above grade.)

Dual-polarized personal wireless service facility being installed on the second floor of a motel in Marin County, California

The same personal wireless service facility after it has been concealed behind a signal-transparent shield.

Regulatory Concepts for Applications

Tiered Approval System

Tier One - Personal Wireless Service Facilities located within existing structures.

Tier Two – Personal Wireless Service Facilities attached to an existing conforming structure or Personal Wireless Service Facilities attached to a new structure no more than 10 feet taller than the tallest tree within 25 feet of the proposed structure.

Tier Three - Personal Wireless Service Facilities attached to a structure other than described in Tier One or Tier Two.

Zoning Text Amendments would be required to implement these Regulatory Concepts and the review processes for each Tier.

Tiered Approval Process.

This Policy proposes three tiers of review based on the type of facility proposed.

During the review of any type of facility, staff should conduct a field visit and document existing conditions. Any conditions established during the approval process should be enforceable.

Tier One

Tier One facilities would require only the submission of an application for a building permit. Exterior renovations would be limited to the replacement of existing materials with new materials that do not interfere with radio wave propagation. New material should be substantially the same in appearance. If exterior renovations are required and the site is located within an Entrance Corridor Overlay District, a Certificate of Appropriateness will be required from the Architectural Review Board.

Tier Two

Tier Two facilities would require Planning Commission approval. Procedures for processing applications will need to be developed as part of the zoning text amendment establishing the applicable zoning regulations. At a minimum, the zoning text amendment should include the regulations that a Tier Two facility must satisfy and a procedure for notifying abutting property owners. The regulations would be consistent with this Policy. If the site were located within an Entrance Corridor Overlay District or an Agricultural Forestal District, the application also would be subject to review by the Architectural Review Board or the Agricultural/Forestal Advisory Committee, respectively. The Commission could receive input from any other committees or individuals during the review of an application.

The Planning Commission's action on an application would be ministerial, i.e., the Commission's review would be limited to whether the proposed facility complies with the zoning regulations adopted for Tier Two facilities. If the application was determined to be in compliance with all applicable regulations, the application would be approved and, with the issuance of the appropriate Building Permits, the facility could be constructed. An applicant whose application was denied could appeal that decision to the Board of Supervisors.

Tier Three

Tier Three facilities would require the submission of a special use permit application. The application would be subject to public hearings before the Planning Commission and the Board of Supervisors in the same manner as all other special use permit applications. The application would be reviewed for compliance with the provisions of the Personal Wireless Service Facilities Policy and Chapter 18, Section 31.2.4.1 of the Albemarle County Code.

Minimum Submittal Standards

MINIMUM SUBMITTAL STANDARDS FOR PERSONAL WIRELESS SERVICE FACILITIES (TIERS TWO AND THREE ONLY)

The following minimum information must be submitted with any application for a personal wireless service facility in order for it to be reviewed on schedule.

1. A completed application form.

2. Recorded plat or boundary survey of the property requested for a personal wireless service facility. If there is no recorded plat or boundary survey in existence, a copy of the legal description of the property and the deed book and page number shall be provided.

3. Ownership information shall be provided. Easement holders shall also be identified and, if necessary, a document acceptable to the County must be submitted containing the easement holder's written consent. In the event that the ownership of the property is in the name of any type of legal entity or organization including, but not limited to, the name of a corporation, partnership or association, or in the name of a trust, or a fictitious name, a document acceptable to the County must be submitted certifying that the person signing the special use permit application has the authority to do so.

4. If the applicant is a contract purchaser, a document acceptable to the County must be submitted containing the owner's written consent to the application.

5. If the applicant is the agent of the owner, a document acceptable to the County must be submitted that is evidence of the existence and scope of the agency.

6. Each applicant requesting approval of a personal wireless service facility shall submit a scaled plan and a scaled elevation view and other supporting drawings, calculations, and other documentation, signed and sealed by appropriate licensed professionals. The plans shall show the location and dimensions of all improvements, including information concerning topography, radio frequency coverage, tower height requirements, setbacks, drives, parking, fencing, landscaping and adjacent uses. The County may require other information to be submitted in order to assess compliance with the ordinance and personal wireless service facilities policy. Additionally,

applicant shall provide actual photographs of the site taken from the site toward the nearest residence and public road as well as from public roads or properties toward the site.

7. The height of all trees within 50 feet of the facility.

8. Maximum height above ground of the proposed facility. This shall also indicate the maximum height above sea level for the highest point of the facility.

9. Location of all residential structures and residential districts or rural area boundaries within 2000 feet of the proposed facility.

10. Written or graphic description of the nature of the uses on properties within 2000 feet of the proposed facility. This description shall include, but not be limited to, the nature and extent of tree coverage and foliage.

11. Surrounding topography within 2000 feet of the proposed facility. Such topographic information shall be at a scale of not less than 1 inch equals 100 feet and the contour interval shall not be greater than 10 feet.

12. Design of the facility, with particular reference to design characteristics that have the effect of reducing or eliminating visual obtrusiveness. The specific type of support structure shall be provided. Design, type, location, height and configuration of all antennas proposed shall be provided. Future antenna additions shall be noted as shall the design, type, location, height and configuration of all potential future antenna.

13. Proposed ingress and egress location and design.

14. Proximity to commercial or private airports.

15. Where site conditions permit the applicant shall conduct a balloon test within two weeks of application submittal. This test shall consist of raising balloons to a height equal to the proposed tower. The balloons should be of a color or material that provides maximum visibility. The applicant shall inform the Planning Department of the time of the balloon test at least two days before the test is to occur to allow staff to conduct field visits during the test.

Closing

Please remember that planning for Albemarle County is a work in progress. County officials and staff invite you to send your comments, ideas and suggestions for this Wireless Policy to:

Albemarle County Department of
Planning and Community Development
401 McIntire Road
Charlottesville, VA 22902-4596

Voice: (804) 296-5823
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