BEDFORD COUNTY, VIRGINIA

STRATEGIC PLAN
FOR
COMMERCIAL WIRELESS
TELECOMMUNICATIONS FACILITIES
2012 UPDATE

PREPARED BY:

THE ATLANTIC GROUP
OF COMPANIES

ADOPTED
JANUARY 14, 2013

BOARD OF SUPERVISORS
BEDFORD COUNTY, VIRGINIA

Executive Summary

The Strategic Plan for Commercial Wireless Communications Facilities is the 2012 updated document that is designed to help shape the deployment of Commercial Wireless Facilities within the boundary of Bedford County, Virginia. The original effort of 2002 addressed many of the concerns of the public at that time. This 2012 Plan is an updated Plan that addresses new technology and the rapid deployment of wireless Broadband services.

The evolution of wireless services from First Generation or 1-G to Fourth Generation or 4-G and the innovation of newer service delivery equipment, phone technology, PDA devices such as iPods and iPads have revolutionized the practical applications for efficient living.

When the original Plan of 2002 was approved, the discussion was how or when the "intersection" of your television, cell phone and personal computer would merge together. This was accomplished during the 3-G deployment of 2006 to 2009. As 2012 is upon us, the "revolution" of speed and bandwidth are the issues.

Today, in Bedford County, 75%+ of the citizens have a cell phone or PDA. This means people are un-plugged and mobile. Education, entertainment, commerce and research are upon the citizens of Bedford.

Bedford is also the testing laboratory to a wireless research facility located in the New London Business and Technology Park. This facility known as CAER or Center for Advanced Engineering and Research is a facility that wireless antennas and equipment can be tested in a Research and Development area (pictured above).

In summary, there are two major changes recommended to the 2002 Strategic Plan. **One** is to pre-determine 11 towers for areas un-served at the present time.

The **second** is for strategic placement of smaller towers so that wireless broadband can be deployed.

Both of these changes will parallel the Goals and Objectives set out in this Plan update.

George N. Condyles, IV

President & COO

The Atlantic Group of Companies, Inc.

RESERVED RIGHTS

ACKNOWLEDGMENTS

The Atlantic Group of Companies would like to thank those individuals who contributed in the preparation of this document. We would especially like to acknowledge the following County officials and staff for their contributions.

Board of Supervisors

Bill Thomasson - District 1
Curry W. Martin - District 2
Roger W. Cheek - District 3
John Sharp - District 4
Steve Arrington - District 5
Annie Pollard - District 6
Tammy F. Parker - District 7

Planning Commission

Lewis Huff - District 1
Jeff Burdett - District 2
Steve Wilkerson - District 3
Fredric R. Fralick - District 4
Tommy Scott - District 5
Derrick Noell - District 6
Jerry Craig - District 7

Frank J. Rogers
Interim County Administrator

Timothy L. Wilson
Director of Community Development

Mary Zirkle, AICP
Chief of Planning

Jordan S. Mitchell
Planner

G. Carl Boggess
County Attorney

Carl J. Levandoski
GIS Coordinator

Former County Officials

Supervisor Dale Wheeler - District 1
Supervisor Charles Neudorfer - District 2
Supervisor Gary Lowry - District 7
Commissioner Rick Crockett - District 1
Commissioner Lynn Barnes - District 2
Commissioner Steve Stevick - District 5
Commissioner Curtis Stephens - District 7

Glossary

Abandonment. The condition in which a wireless telecommunication facility, or part thereof, ceases to be utilized for its intended purpose for a significant period of time.

Above Ground Level (AGL). Used to reference the height of a structure or other facilities located on a structure as measured from the base the structure.

Above Mean Sea Level (AMSL). Equal to the sum of the ground elevation (GE) and the above ground level (AGL) of a structure or other facilities located on the structure.

Alternative Antenna Support Structure. Any structure designed primarily for other purposes that can be utilized to support antennas including but not limited to buildings, transmission towers, church steeples, light poles, water storage tanks, smokestacks, and silos.

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. Any exterior electronic device used for the transmission or reception of radio frequency signals designed for telephonic, radio, satellite or television communications.

Antenna Support Structure. Any structure designed primarily for the purpose of supporting one or more antennas including but not limited to self-supporting lattice, guyed and monopole towers.

Applications. The embedded program of a wireless device that performs a task or function upon the touch of a user of a PDA to activate. Example: Home Security lighting active by ones cell phone using 4G technology.

Backhaul. A method for relaying signal from one wireless facility to another and from the wireless facility to a common carrier. Methods of backhaul include microwave relay and wire line.

Bandwidth. The range of frequencies that a radio transmission occupies. The necessary bandwidth is the amount of spectrum required to transmit the signal without distortion or loss of information.

Balloon Test. A technique utilizing a balloon to demonstrate the height of a proposed antenna support structure.

Broadband. A descriptive term for evolving digital technologies that provide consumers integrated access to voice, high-speed data service, video-demand services, and interactive delivery services.

Camouflage. Any technique used to blend a wireless telecommunications facility with the surrounding environment.

Cellular. Often used to describe all wireless phones regardless of the technology that they use. Cellular and PCS phones use cellular technology.

Co-location (Collocation). The shared use of an antenna support structure by two or more

wireless service providers or other entities that operate antennas.
Conceal. 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.

Corridor Overlay District. Section 30-77 of Article III of the Bedford County Code establishes a corridor overlay district that regulates the development along particular transportation corridors.

Design. Factors contributing to the overall appearance of a wireless telecommunications facility including color, texture, material, shape and dimension.

Digital. Converts voice messages to a series of ones and zeros thus producing a more efficient use of the spectrum compared with analog messaging. Digital is not synonymous with PCS since Cellular can also be digital.

Enhanced Specialized Mobile Radio (ESMR). Private land mobile radio with telephone services. Nextel is the only wireless service offering this technology.

Federal Aviation Administration (FAA). An agency of the federal government authorized to regulate all activities affecting air navigation.

Federal Communications Commission (FCC). An agency of the federal government authorized to regulate all intrastate, interstate and international communications via wire, wireless, satellite and cable.

Fall Zone. An area within a radius equal to the height of the antenna support structure within which there is a potential hazard from falling debris or collapsing material. A fall zone is distinct from a setback.

Guy Tower. A lattice or monopole type structure which is supported vertically by "guy" wires, which attached to anchor points surrounding the structure.

Height. When referring to an antenna support structure, the distance measured from ground level at the base of the structure to the highest point on the structure including antennas, lightning rods or other appurtenances.

Landline. Traditional wired phone service.

Land Mobile Radio. A public or private radio service providing two-way communication, paging, and radio signaling on land.

Lattice Tower. Type of self-supporting tower design consisting of three or four legs and cross-bracing.

LTE- Long Term Evolution - 4G cellular technology standard competing with WiMAX.

MiFi- Mobile hotspot integrating Wi-Fi and mobile/cellular broadband

Monopole. A hollow or solid, cylindrical self-supporting structure, which is made of steel, wood or concrete.

PDA- Personal Digital Assistant

Point-Multi-Point- Communications system for voice and data from a fixed group of antennas and transceivers that deliver large or wide spectrums of data for “last mile” linkage to a facility such as a business or home. Known as “Spread Spectrum”.

Point of Presence. The physical location where an antenna is being operated.

Personal Communication Services. A broad range of wireless voice and data communications systems, typically incorporating digital technology, operating in the 1900 MHz frequency band.

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

Radio Frequency Engineer. An individual or firm with documented expertise in radio frequency propagation and engineering.

Radio Propagation. The physical principle of the emission of radio waves.

Radio Propagation Analysis. Based upon sophisticated mathematical principles, used to predict level- of-service (coverage) for a geographical area to include on-street, in-building, and in-vehicle coverage.

Satellite. A radio relay station that orbits the earth. A complete satellite communications system also includes earth stations that communicate with each other via satellite. Satellites are used to transmit telephone, television and data signals originated by common carriers, broadcasters and distributors of cable television program material.

Specialized Mobile Radio. A form of data transmission, dispatch or two-way communication, differentiated from enhanced specialized mobile radio (ESMR) and personal communication service (PCS) in that calls are not "handed-off" between cells.

Spectrum. The range of electromagnetic radio frequencies used in the transmission of voice, sound, data, and television.

Stealth Structure. Any structure designed to conceal or disguise antenna support structures and antennas including but not limited to tree poles, flag poles, silos and "lookout" towers.

Structural Engineer. An individual or firm licensed to practice structural engineering by the Commonwealth of Virginia.

Subscriber- A party or customer that purchases and/or uses a service provided by provider or carrier of a specific voice and/or data service.

Telephony. The science of transmitting voice over a telecommunications network.

Tower Development Company. An entity that builds antenna support structures for the sole purpose of leasing space to wireless service providers.

VOICE- Ability to hear analog voice signaling at its basic level of clarity transported by an analog or digital signal medium.

VoIP-Voice Over Internet Protocol - Delivering voice calls over internet data networks.

Wi-Fi-Wireless Fidelity - High frequency local area network. Consumer friendly name for IEEE 802.11 standards.

WiMAX-Worldwide Interoperability for Microwave Access - A wireless telecommunications technology for providing high speed data over long distances.

Wireless Service Provider. Any entity licensed by the FCC to provide wireless telecommunications services.

Wireless Communications Facility (WCF). All infrastructure and equipment including but not limited to antenna support structures, antennas, transmission cables, equipment shelters, equipment cabinets, utility pedestals, ground systems, fencing, signage and other ancillary equipment associated with the transmission or reception of wireless communications.

Classifications:

a. **Class 1** : Height Equal or less than 40' AGL
b. **Class 2** : Height Greater than 40' but equal or less than 80'
c. **Class 3** : Height Greater than 80' but equal or less than 120'
d. **Class 4**: Height Greater than 120' but equal or less than 200

Acronyms

AGL - Above Ground Level
AMSL - Above Mean Sea Level
BTA - Basic Trading Area
CFR - Code of Federal Regulations
CMRS - Commercial Mobile Radio Services
CO - Corridor Overlay
COW - Communication on Wheels
EA - Environmental Assessment
EIS - Environmental Impact Statement
EMF - Electromagnetic Field
ESMR - Enhanced Specialized Mobile Radio
FAA - Federal Aviation Administration
FAR - Federal Aviation Regulations
FCC - Federal Communications Commission
FONSI - Finding of No Significant Impact
GHz - Gigahertz
GIS - Geographic Information System
GSM - Global Standard for Mobile Communication
KHz - Kilohertz
MHz - Megahertz
MSA - Metropolitan Serving Area
MTA - Major Trading Area
MTSO - Mobile Telephone Switching Office
MW - Microwave
NAD - North American Datum
NEPA - National Environmental Policy Act of 1969
NHPA - National Historic Preservation Act of 1966
NIER - Non-Ionizing Electromagnetic Radiation
PCS - Personal Communications Service
PDA - Personal Digital Assistant
POP - Point of Presence
PSAP - Public Safety Answering Point
PSTN - Public Switched Telephone Network
RF - Radio Frequency
RFR - Radio Frequency Radiation
RSA - Rural Service Area
RX - Receive
SHPO - State Historic Preservation Office
SMR - Specialized Mobile Radio
TX - Transmit
UHF - Ultra-high Frequency
VHF - Very High Frequency
WCF - Wireless Communication Facility
WCO - Wireless Communication Overlay
WTB- Wireless Telecommunications Bureau

TABLE OF CONTENTS Page

Exhibits: (Charts, Diagrams, Maps, Tables)

I. Narrative

The challenge facing most localities is to enact regulations that comply with the requirements of the Communications Act of 1996, while at the same time adequately address community concerns and technology growth. The County recognizes that only through comprehensive guidelines and policies in the form of a commercial wireless telecommunications facilities plan can legitimate concerns and needs of the community and industry be addressed in a rational and balanced fashion.

This plan represents a comprehensive review and analysis of the existing infrastructure capable of supporting antennas and wireless service coverage being provided. Future development requirements are assessed with respect to County goals and the potential impact on the natural, scenic, environmental, historic, cultural, and recreational resources of the County.

The existing infrastructure throughout the County is extensive and can meet some of the future needs through a process termed 'co-location". Through the utilization of existing structures, the number of new towers that would be needed is greatly reduced. In areas where inadequate coverage or capacity exists, applications for new towers would be considered on a case-by-case basis. Proposals to develop wireless facilities near residential communities and other sensitive areas require special scrutiny.

The exact future number of additional installations for each provider licensed to operate in the County is unknown. Because of Wireless Broadband and the need to serve PDA's inside homes and buildings, it is important to get antennas close to the PDA device. Some carriers have very mature networks, consisting of numerous sites. Several providers have less than ten (10) sites. It is anticipated, however, that as the number of customers of each provider increases and use of their radio frequencies increases within a particular geographic service area, there may be the need to place antennas closer together, through the development of new sites, to maximize system capacity. Sites designed to add capacity can generally be of a lower height since the objective is not to expand coverage but to accommodate 4G coverage within an established coverage area. This means the geographic area may have adequate voice service; however, wireless broadband will require more sites to deliver this service.

Since the 2002 Plan, many of the Wireless Carriers have merged. AT&T/Devon/Cingular, Verizon and Alltel, Sprint/Nextel etc have joined networks to better serve the customers.

This plan seeks to balance community concerns with commercial service objectives. Communication towers have been deployed extensively throughout the County. As new sites are proposed, co-location represents the obvious solution as it can meet carrier objectives while minimizing the impact upon the community. Employing camouflage and concealment techniques and limiting the height of structures will also greatly mitigate the adverse visual impacts generally associated with communication towers.

a. Goals and Objectives (2002 and beyond)

It is the County's vision that basic wireless telecommunication services are available to all those who want it, through a telecommunications infrastructure that is developed based upon legitimate need and implemented in a way that is sensitive to community concerns.

Article III, Section 30-78 of the Bedford County Code (Zoning Ordinance) establishes the Wireless Communication Overlay (WCO) District, which regulates the siting of wireless communication facilities (WCFs). Article IV, Section 30-87-3 establishes general use and design for WCFs.

Goals

Seven goals are set forth in the WCO District that relate this vision. They are:

Goal 1. Protect residential areas and land uses from potential adverse impacts of WCFs.

Goal 2. Encourage the location of WCFs in non-residential areas.

Goal 3. Encourage users of WCFs to locate them, to the extent possible, in areas where the adverse impact on the County is minimal.

Goal 4. Encourage users of WCFs 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.

Goal 5. Enhance the ability of the providers of telecommunication services to provide such services to the County quickly, effectively, efficiently and unobtrusively.

Goal 6. Consider the public health and safety of WCFs.

Goal 7. Avoid potential damage to adjacent properties from tower failure through the engineering and careful sitting of WCF structures.

Several of the goals identified above intend the same outcome. It is therefore recommended that the goals be redefined and consolidated. Expanding on the goals set above, there are also a set of objectives that are recommended to achieve the County's vision.

Objectives

There are several objectives that accompany the goals in a parallel fashion. They are:

Objective 1. Encourage new technology to have wire and wireless coverage for all "applications" within Bedford County for the public.

Objective 2. All homes and business have access to Broadband services wire and wireless for business, education and entertainment applications.

Objective 3. Encourage telemedicine on wireless applications for citizens of Bedford.

Objective 4. Integrate technology into scenic landscapes so that the natural beauty and quality of life is not compromised.

b. Summary of Natural, Historic and Community Resources

Bedford County is an exceptional place. The mountains, forests, lakes, streams, vast stretches of agricultural land, and numerous historical sites are tangible assets that make the County an appealing place to live, work and visit, while contributing directly and indirectly to Bedford's economy. The County is comprised of population of over 60,000 and a landmass of 764 square miles, geographically situated between the metropolitan areas of Roanoke and Lynchburg. The County's economy consists of a diverse mix of commerce, industry and agriculture. The County also features numerous tourist and recreational attractions that contribute to its economy.

Natural Resources

- **Appalachian Trail** - Scenic historic hiking trail traversing the ridge of the Blue Ridge Mountains along the northwest border of the County.

- **Blue Ridge Parkway** - Nationally renowned scenic highway extending 470 miles through the Blue Ridge Mountains a portion of which traverses the northwest border of the County.

- **Washington/Jefferson National Forest** - United States national forest located in the northwest region of the County.

- **Peaks of Otter** - Peaks of Otter is a mountain lodge and retreat open to the public, located along the Blue Ridge Parkway.

- **Smith Mountain Lake** - 23,000-acre lake with approximately 500 miles of shoreline that is popular for boating and fishing. Much of the lake's shoreline has been developed into residential and vacation home sites.

- **Smith Mountain Lake State Park** - 1,506-acre park with 16 miles of shoreline with a 500-foot public beach.

Historic Resources

The Virginia Landmarks Register is a registry of the Commonwealth's significant historic, architectural and archeological resources. The National Historic Preservation Act of 1966 (NHPA) expanded the National Register of Historic Places to included properties of state and local as well as national significance.

The following properties in Bedford County are listed in the ***Virginia Landmarks Register*** and the ***National Register of Historic Places:***

Bellevue – Forest
Brook Hill Farm – Forest
Cifax Rural Historic District – Cifax
Elk Hill – Forest
Fancy Farm – Kelso
Hope Dawn – Boonsboro
Locust Level – Montvale
Mount Airy – near Campbell County
New London Academy – New London
Otterburn – Bedford
Old Rectory – Forest
Poplar Forest – Forest
Rothsay – Forest
St. Stephen's Episcopal Church – Forest
Three Otters – Bedford
Woodbourne – Forest

In addition, Poplar Forest is a National Historic Landmark, a designation reserved for resources of special national significance. This designation is distinct from a National Register of Historic Places designation.

- **National D-Day Memorial and Museum** - Open to the public in 2001, this memorial honors fallen World War II veterans. Bedford was chosen as home for the memorial because it was the community sustaining the highest per capita loss during the Normandy Invasion of 1944.

- **Bedford City/County Museum** - Repository of local historic artifacts located in the City of Bedford.

Community Resources

Highway Transportation Facilities

Commercial wireless telecommunication facilities are typically placed near high-volume highway transportation corridors in order to serve the demand generated by highway travelers.

The following primary highways traverse the County: Routes 24, 43, 122, 221, 460 and 501.

Route 43 and a recently-recognized segment of Route 24 are designated as a ***Virginia Byway*** in the County although the Blue Ridge Parkway is nationally renowned for its scenic attributes. Several of the primary highways identified above are gateway corridors to visitors traveling from outside the County. As entrance corridors to the County, the aesthetic qualities of these corridors have an immediate impact on the impression visitors have of the County.

Air Transportation Facilities

Antenna support structures can pose potential hazards to safe air navigation. Several airports, airfields and landing strips are located in and surrounding the County. In addition to regional airports located in Roanoke and Lynchburg, the following are air facilities located in the County:

Name	Latitude	Longitude
Ivy Hill (Private) – Forest	37-23-40.4N	79-19-27W
Johnson Fox (Private) – Huddleston	37-14-.66N	79-35-1.68W
Lakeview (Private) – Smith Mountain Lake	37-9-35 N	79-39-16 W
Miller (Private) – Bedford	37-23-52.7 N	79-29-31.4W
New London – New London	37-16-18.12N	79-20-9.5W
Robinson (Private) – Thaxton	37-20-50.4N	79-33-.5W
Smith Mountain Lake – Smith Mountain Lake	37-6-29.7N	79-35-31.1W

II. Wireless Technology Evolution from 2002 to 2012

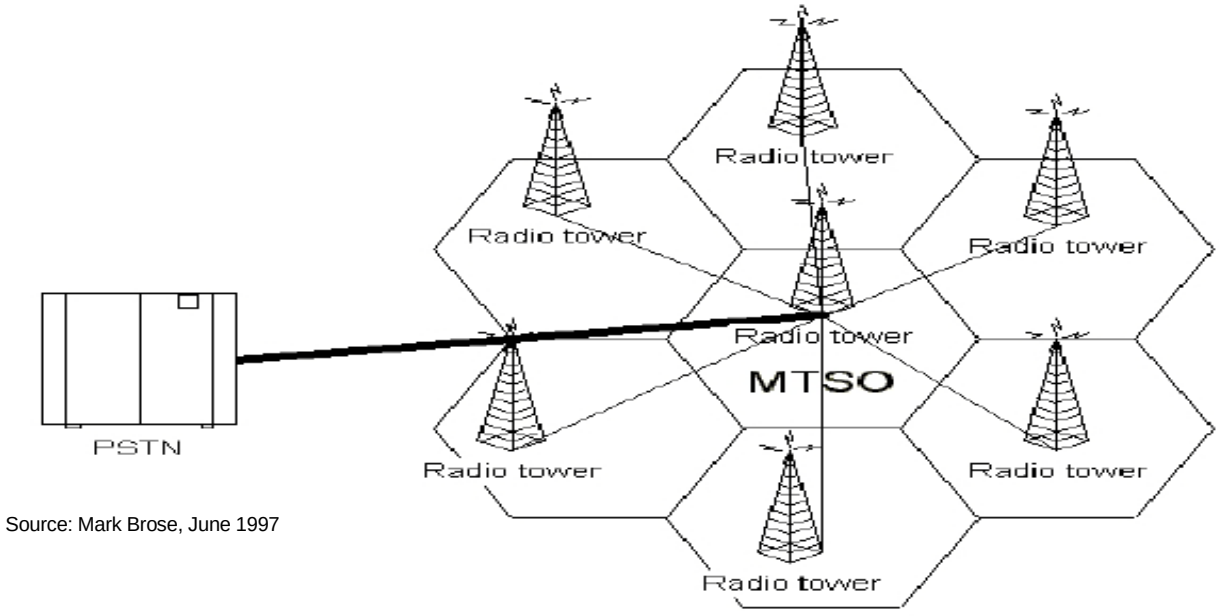
General Theory and Application

It is both appropriate and prudent that the development of policies governing the location, height, and design of wireless telecommunication facilities consider technical requirements. This section is designed to introduce the basic principles and concepts of wireless telecommunications.

Wireless Transmissions

The most common wireless device is a portable or hand-held phone, more commonly referred to as a ***cell phone***. This device receives and transmits radio signals from/to an antenna mounted on a tower or some other type of support structure. Wireless calls (transmissions) are transmitted through the air via radio waves at various frequencies. Cellular transmissions differ from television and radio transmissions in that cellular transmissions depend on a network of cell sites spread out over the service area whereas television and radio rely on one tower to provide service throughout a large region.

The area covered by an antenna set is commonly referred to as a ***cell***. The signal is routed to switching equipment that selects the channel and monitors the signal strength. In telephone applications, the signal normally is connected to the conventional or landline public telephone system (loop exchange carrier). If the communication device is moving, the signal is passed on to an antenna in an adjoining cell and the call continues uninterrupted. Exhibit 1. shows a typical honeycomb cell network configuration in which cell sites are linked to provide coverage over large geographical areas. The ***mobile telephone switching office (MTSO***) in the center cell is the central office for the entire cellular system and is linked to the public switched telephone network (PSTN), which allows calls to be made over landlines from/to mobile units.



Source: Mark Brose, June 1997

Exhibit 1

Wireless networks are engineered to locate antennas spaced just far enough apart to provide the coverage needed. Antennas spaced too closely will cause signal overlap and create interference problems. Antennas spaced too far apart will create "gaps" or "holes" in the coverage and will result in calls being "dropped" as a traveler moves beyond the range of the antenna handling the call. Each cell can handle a limited number of conversations at one time. When the signal traffic in a cell reaches capacity, additional cells are required to provide additional system capacity. The network described above represents a typical configuration for a single wireless service provider.

Service Providers – "Carriers"

Each service provider or "***Carrier***" operates a discrete network of sites, which operate at different frequencies and are developed based upon each carrier's unique service requirements. In addition to technical design requirements, the location and height of an antenna support structure is determined by other factors including underlying local zoning, the ability to secure a land lease, and public sentiment. In many cases the same site or structure may be utilized by multiple service providers; however the antennas and other equipment being used cannot be shared. The planning of cell networks is highly proprietary and collaboration among competitors in locating sites is a rarity, if it occurs at all.

Licensing

The FCC, through public auction, sells spectrum by geographical region. The federal government protects against interference problems from occurring by awarding exclusive use of separate, specific frequencies to each station in a region. Frequency is a finite, limited resource and is thus extremely valuable and coveted. The wireless telecommunication industry is limited to a small portion of radio spectrum bandwidth.

Cellular, SMR, ESMR, and GSM service occupies portions of the 800 MHz band of the electromagnetic spectrum. PCS encompasses two different services licensed by the FCC, which are delivered over two different frequency bands, as well as certain unlicensed services. The first is Narrowband PCS, to which 3 MHz has been allocated in the 900 MHz band of the electromagnetic spectrum. Narrowband PCS usually includes specialized services such as messaging and advanced paging. The other form of PCS is Broadband, to which a 140 MHz block in the 1850-1990 MHz band of the electromagnetic spectrum has been allocated.

CMRS licenses are sold by geographic regions identified as trading and serving areas. Frequencies in the A and B blocks of the PCS band are allocated in Major Trading Areas (MTA); frequencies in bands C, D, E, and F are assigned to Basic Trading Areas (BTA). Similarly, frequencies in the A and B blocks of the cellular bands are assigned to Metropolitan Serving Areas (MSA) and Rural Serving Areas (RSA).

Bedford County lies within the Richmond 23 MTA, Roanoke 85 BTA, and Virginia 4 RSA. Bedford County is not located within a MSA.

Wireless Network Evolution

There are several carriers of wireless services that serve Bedford County. Most of these are Land Mobile Radio or Cellular/PCS providers operating under FCC Radio License Requirements. They are Verizon, Cingular/AT&T, T-Mobile, US Cellular, and Sprint/Nextel. Bedford County is part of the Lynchburg Basic Trading Area license authorization.

Each of these providers has deployed a network of transceivers that have evolved over the last 20 years. These are classified by "***Generation".***

a. 1st Generation……Analog format Voice

Refers to communications systems, especially the ***Advanced Mobile Phone Service*** **(AMPS),** that divide a geographic region into sections, called cells. The purpose of this division is to make the most out of a limited number of transmission frequencies. Each connection, or conversation, requires its own dedicated frequency, and the total number of available frequencies is about 1,000. To support more than 1,000 simultaneous conversations, cellular systems allocate a set number of frequencies for each cell. Two cells can use the same frequency for different conversations so long as the cells are not adjacent to each other. The two other analog systems in operation in the United States are ***Extended Advanced Mobile Phone System*** **(EAMPS)**, that has currently replaced AMPS as the US standard. ***Narrowband AMPS*** is the third and existing cellular system in operation in the US. It has three times as many voice channels as EAMPS with no loss of signal quality.

All three systems have forty-two (42) control channels that are for setting up calls; the remaining channels are for voice conversations. All three systems are also analog systems. The systems are listed in chronological order and are backward compatible; that is, the infrastructure is designed so that older phones work on the newer systems.

This system was deployed to the Bedford area in the 1990's during a period of highway and city coverage as the objectives. The "Cell phone" of Choice was the "bag phone".

b. 2nd Generation……..Digital format Voice and low data package

Short for Personal Communications Service, the U.S. Federal Communications Commission (FCC) term used to describe a set of digital cellular technologies being deployed in the United States. **Personal Communications System (PCS)** includes **Code Division Multiple Access (CDMA), Global System Mobile Communication (GSM), and North American Time Division Multiple Access (TDMA)**, also called IS-136). Two of the most distinguishing features of PCS systems are that they operate at the 1900 MHz frequency range and that *they are completely digital.*

This system was deployed in the Bedford area in the late 1990s. This was first used by lower wattage "folding phones" that were approximately 1 watt in power. Phones had a small LCD screen so that limited digital "paging" could be a second use for the phone as well as voice service.

Service delivery was designed for an outdoor network with a minimum level of -104 dBm

c. 3rd Generation…….Digital format Voice and data/internet access

3rd Generation of Technology is a generation of standards for mobile phones and mobile telecommunication services fulfilling the ***International Mobile Telecommunications-2000 (IMT-2000)*** specifications by the International Telecommunication Union. Application services include wide-area wireless voice telephone, mobile Internet access, video calls and mobile TV, all in a mobile environment. Several telecommunications companies market wireless mobile Internet services as *3G*, indicating that the advertised service is provided over a 3G wireless network. Services advertised as 3G are required to meet IMT-2000 technical standards, including standards for reliability and speed (data transfer rates). To meet the IMT-2000 standards, a system is required to provide peak data rates of at least 200 kbit/s (about 0.2 Mbit/s). However, many services advertised as 3G provide higher speed than the minimum technical requirements for a 3G service. Recent 3G releases, often denoted 3.5G and 3.75G, also provide mobile broadband access of several Mbit/s to Smartphone's and mobile modems in laptop computers.

With the digitization of the network, the strategy of providing greater bandwidth and Personal Digital Assistant or PDA (Voice phones to Blackberry type of multiple use hand held devises) the placement of communications' towers with access for voice and data antennas to be able to uplink and downlink have become critical for this medium to compete with the wire based networks.

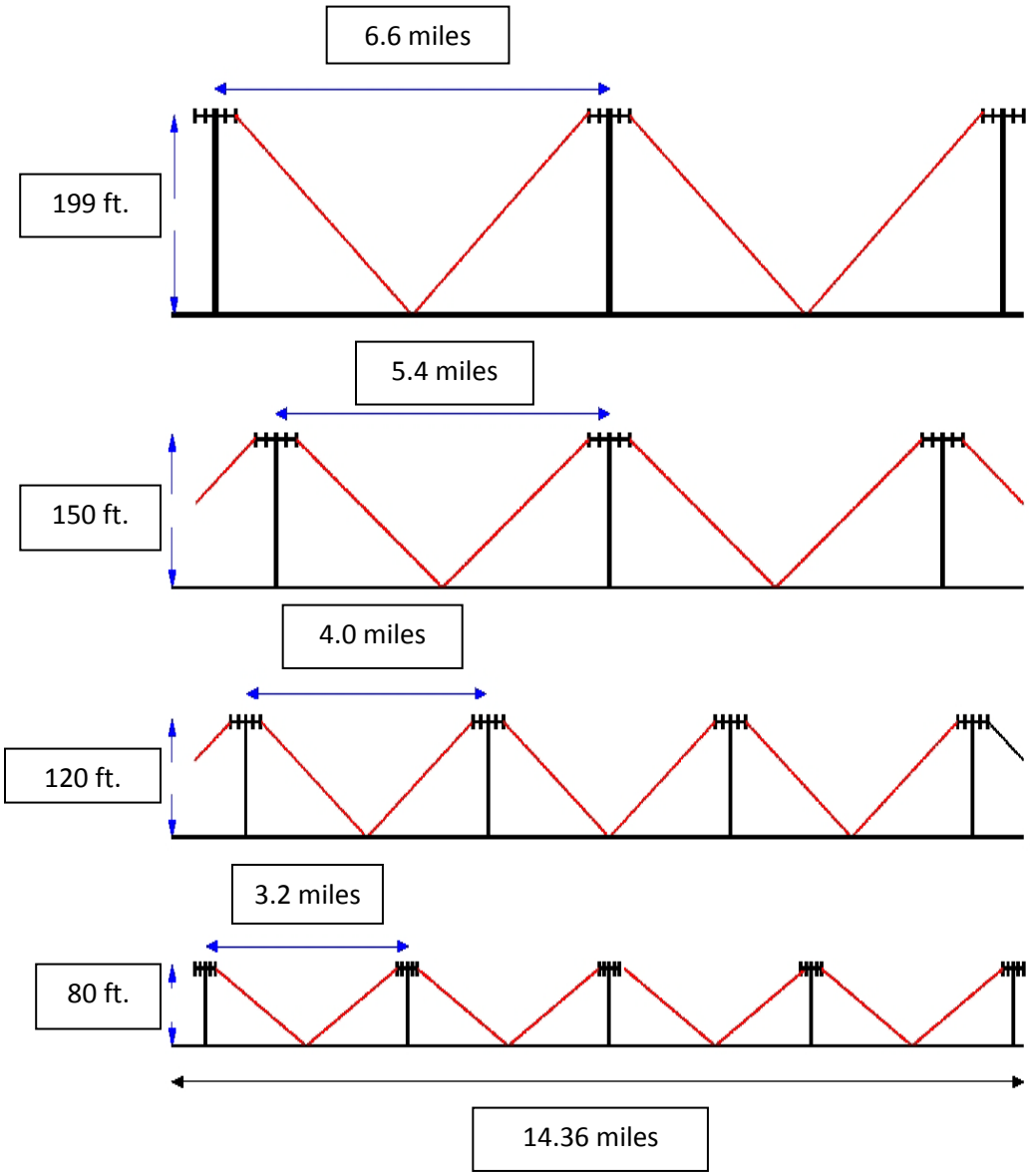
In a 3-G or PDA, the service required is -75 dBm inside a structure and outside would require a -89 dBm or greater signal strength. Since PDA devices use less than 0.3 watts of power and because signal strength is critical to the "uplink" and "downlink "of a mobile radio device, placement of an antenna near the required PDA is critical.

This deployment in Bedford began in 2002 to approximately 2012.

Signal Coverage and Tower Placement

As a general rule, other contributing factors remaining constant, the higher the placement of an antenna above ground level, the greater the coverage area. The estimated areas of coverage are representative of a rural setting with rolling terrain and a mix of wooded and open space areas. Conservative values for technical operating parameters were used. Comparatively speaking, coverage area will be reduced in more rugged and wooded environments and increased in flat open terrain. Exhibit 2 further demonstrates the relationship between tower height and coverage distance.

Exhibit 2.
Equivalent Tower Scale



Rule to Remember:

Height and distance are but only two pieces of data required to estimate coverage of service areas. Characteristics such as antenna "Gain", Transmission Line "Loss", Curvature of the earth, foliage, location of PDA, antenna patterns, antenna tilt, jumper line loss, Amplifiers, weather, etc are all part of the calculation of a coverage "prediction". In all there are 23 pieces of data that must be input to have a successful estimate on coverage.

d. 2002: Bedford County and Public Opinion

In 2001, Bedford County was inundated with many tower applications that the location, spacing and need were in question. The public, Board of Supervisors, Planning Commission and Staff had many questions that frankly were not being answered with a consistent voice from the applicants or cellular industry. The county hired a consultant, Atlantic Technology Consultants and with the staff, developed a survey for the public, business community, wireless community and cell phone users could answer to give opinions on the issues that meant the most to them. In addition, a community Meeting was held in each of the Voting Districts to receive direct feedback from the public.

For the original Wireless Plan, Atlantic Technology Consultants conducted a series of public informational meetings in Bedford County during a period of two weeks in late July and early August. The meetings were grouped according to the district; therefore, there was one meeting for each district, seven meetings altogether. At each meeting, the attendees were asked to fill out a brief, 16-question survey on topics such as cell phones, cell towers, and the growing need for telecommunications, in general. The results of the survey were rather informative; not only did the people of Bedford County respond to the given question, but also many of them told why they held those opinions.

No one from District 3 attended the meeting. Those who did not attend any of the meetings were given the opportunity to fill out a survey and mail it in; these responses appear in the "other" column of the tables.

Through these Community Meetings and Survey's taken, the public spoke and the results were used to shape the 2002 Strategic Plan for Commercial Wireless Telecommunications Facilities. The following are the responses from the "2002 Community Survey".

Results from "2002 Community Survey"

Question #1: Do you own a cell phone?

Answer:	Yes	No
District 1	10	1
District 2	7	1
District 4	8	5
District 5	16	6
District 6	5	1
District 7	21	4
(other)	18	1
Total:	85	19

Question #2: On average, how many calls do you place/receive per week on your cell phone?

Answer:	<1	1	2	3	4	5	10	15	25+
District 1		2			1	1			6
District 2	1					3	1		2
District 4	1			3		2		1	1
District 5	1	2	2	1	2	3	2		3
District 6				1		1	2		1
District 7	5		2		1		6	3	4
(other)			1	1	1		4	2	9
Total:	8	4	5	6	5	10	15	6	26

Question #3: You use cell phone mostly for: (Check all that apply.)

Answer:	Personal	Business	Emergencies	Other (Please Specify)
District 1	5	5	4	
District 2	7	4	5	
District 4	6	3	5	
District 5	12	8	9	
District 6	4	2	3	
District 7	16	11	9	1
(other)	17	13	9	
Total:	67	46	44	1

Question #4: Do you consider your cell phone more of a convenience or a necessity?
(1—more convenience, 5—more necessity)

Answer:	1	2	3	4	5
District 1			3		7
District 2	1	1	3	1	1
District 4	3		1	4	
District 5	8	5	1	2	1
District 6	1	1	1		1
District 7	6	3	5	5	2
(other)	1	2	6	3	6
Total:	20	12	20	15	18

Question #5: If you own a cell phone, how would you rate the quality of your cellular service (coverage) throughout the county? (1—poor, 5—excellent)

Answer:	1	2	3	4	5
District 1	2	4		4	
District 2		4	2	1	
District 4		2	1	3	2
District 5			4	7	2
District 6		2	1	1	
District 7	2	3	7	4	5
(other)	3	6	4	5	
Total:	7	21	19	25	9

Question #6: Are you particularly annoyed by the presence of cell towers? (1—minimal, 5—extreme)

Answer:	1	2	3	4	5
District 1	8	1		2	
District 2					
District 4		2	3	4	4
District 5	1		1	10	8
District 6	2		1	2	1
District 7	3	1	5	5	11
(other)	8	3			7
Total:	22	7	10	23	31

Question #7: If allowing taller towers meant fewer towers would be needed, would you be in favor of this approach?

Answer:	Yes	No	Both	Neither	Depends	No Opinion
District 1	7	2	1		1	
District 2						
District 4	1	10		2		2
District 5	2	12			1	
District 6	2	4				
District 7	7	16			1	1
(other)	8	5			4	2
Total:	27	49	1	2	7	5

Question #8: What should be the maximum allowable height for a tower? (height in feet)

Answer:	75'	100'	150'	199'	250'	300'+	Other	No Opinion
District 1	2			7				2
District 2	1	1	1	2		1	2	
District 4	2	5		2				4
District 5	2	2	1				8	3
District 6	1	3	1	1				
District 7	8	3	2	1		1	8	2
(other)	1	3	1	1	1	2	4	5
Total:	17	17	6	14	1	4	22	16

Question #9: To what extent do you consider blinking lights on towers to be a visual nuisance? (1—minimal, 5—maximum)

Answer:	1	2	3	4	5
District 1	5	3		1	2
District 2	2	2	2	1	1
District 4		1	4		8
District 5	1		1	5	12
District 6	1		1	3	1
District 7	4		3	5	13
(other)	8	5	2	1	3
Total:	21	11	13	16	40

Question #10: Should short poles (less than 80' in height) be permitted as a "by-right" use?

Answer:	Yes	No	Possibly	No Opinion
District 1	4	5	1	1
District 2	1	5	2	
District 4	1	12		
District 5	1	12		
District 6		6		
District 7	6	19		
(other)	6	6	4	1
Total:	19	65	7	2

Question #11: Do you feel that the use of "stealth" techniques (silo, tree, flagpole) is effective in concealing antenna support structures?

Answer:	Yes	No	Possibly	Not sure
District 1	9	1	1	
District 2	6	1	1	
District 4	11		2	
District 5	14	1	4	
District 6	6			
District 7	20	1	4	
(other)	9	2	6	1
Total:	75	6	18	1

Question #12: What type of tower is the least conspicuous?

Answer:	Monopole	Guyed	Lattice	Depends on location	Other
District 1	2		1	9	
District 2	2	1		5	
District 4	7			5	2-none
District 5	6			16	1-low camouflaged
District 6				6	
District 7	9		1	14	1-stealth
(other)	2	1		13	1-none
Total:	28	2	2	68	5

Question #13: Are balloon tests effective in demonstrating visual impact associated with a proposed tower?

Answer:	Yes	No	Maybe	What is a balloon test?	Pass
District 1	9	2			
District 2	2	6			
District 4	6	5	1		1
District 5	5	6			
District 6	1	4	1		
District 7	13	7	3		
(other)	8	3	1	3	2
Total:	44	33	6	3	3

Question #14: Should cell towers be permitted on public properties, including school properties?

Answer:	Yes	No	Possibly	Depends	Pass
District 1	9	1	1		
District 2	6		2		
District 4	6	2	3		2
District 5	5	10	6		
District 6	5	1			
District 7	7	6	11		
(other)	8	3	5	3	
Total:	46	23	28	3	2

Question #15: Should tower developers be required to hold a community information meeting as part of the special us permit application process?

Answer:	Yes	No	Possibly
District 1	5	5	1
District 2	4	1	3
District 4	10	3	
District 5	20	1	
District 6	4		12
District 7	22	2	1
(other)	12	2	4
Total:	77	14	21

Question #16: Are there specific locations in the county where the towers should not be allowed? Please identify.

Most everyone in the seven different districts said “yes” to this question, listing various historic and tourist sites, memorials, parks, and other scenic locations, as places where towers should not be erected. The following sites were mentioned most frequently:

D-Day Memorial

Peaks of Otter

Poplar Forest

Blue Ridge Parkway

Memorial Cemetery

State Park

Others were concerned with high visibility areas, open fields, residential areas, scenic corridor overlays, and mountain ranges. Boonsboro, Eagle Eyrie, and school property were of some concern to the public as well.

Top Ten Responses from 2002 Community Survey

1. 58% of respondents own cell phones
2. 25% make more than 25 cell calls a week.
3. 55% use cell phones for personal use.
4. 50% consider the cell phone a necessity.
5. 60%+ rate their cell service as poor.
6. 60%+ of respondents are annoyed with cell towers.
7. 72% of respondents did not approve of taller towers.
8. 67% wanted tower less than 199'.
9. 50%+ do not want tower lighting.
10. 68% desire to have monopole towers.

III. Current Status of Wire and Wireless Coverage

The Communications Evolution to "Revolution"

Wire Based Networks

Communications also has become a continuing process of evolution. The demands for voice and the establishment of data requirements for the County have been unparalleled in Virginia. The center of communications for Bedford County begin in the City of Bedford and expand to the boundaries of the County. The major telephone service provider is Verizon. This company is the Incumbent Loop Exchange Carrier or ILEC. Verizon serves approximately 95% of the geographical area of the County, with CenturyLink also the ILEC with a smaller geographical area of 5%.

The evolution of the telephone service in Bedford County is not unique to many counties in Virginia. As the deregulation of wire-based telephone service has been the order of the day for the last 30 years, many counties are served with a major Loop Exchange Carrier such as Verizon. Verizon offers broadband products and services for residential, business and educational facilities. These range from simple DSL (Digital Subscriber Loop) to advanced speeds on Fiber Optic Loops.

In addition, the County Cable Franchise known as Comcast (d.b.a. Xfinity) provides voice, data and entertainment in a countywide distribution plan. Xfinity also competes for business as well as residential subscribers.

As the Virginia State Corporation Commission (SCC) and the Federal Communications Commission (FCC) at the state and federal levels respectively, the philosophy of "market driven" networks that provide excellent service and are cost driven to the consumer, it is common now for there to be several wire-based broadband carriers.

In the case of Bedford County, the majority of the County is served by an Incumbent Loop Exchange Carrier (ILEC) or cable provider. However, in two distinct areas (two in the northern tier (Big Island) and 1 in the south-eastern tier (Huddleston/east)) there is a large and open gap in broadband and wireless coverage.

In Virginia, the SCC has deemed broadband as a "non-regulated" service thus not requiring the term of Universal Service to all who seek. In the gap areas of the County served by Verizon, the geographic areas are served with basic voice service known as "POTS" or "Plain Old Telephone Service" that cannot be used with any success with the subscription of broadband. The cable distribution, electronics, distance from the Central Office and low subscriber count makes the area "non-competitive" for the typical deployment plan of a Incumbent Loop Exchange Carrier.
The goal of the wire-based carriers is to provide less copper distribution facilities, but increase wireless networks.

The "Revolution" ….Broadband: What is it?

Simply put broadband is a data distribution network that receives and transmits data streams through a binary number sequence at speeds faster than sound with the ability to produce

ranges of data “bundles” that are larger than a minimal noise signal over a medium such as copper, fiber optics or air.

With demand for service to provide large bundles of data, full motion video, and quality sound, providers of these services must continue to evolve their network to meet market demand. Once a service achieves a specific speed and volume of data, the customers ask: “What more speed and volume can I have?” With this being the case, carriers always have the challenge of meeting this demand.

What is the Basic Speed and data package that I can operate?

Residential service seems to be the “basic” level of service that users measure against for a “yard stick” of speed and efficiency. See Exhibit 3.

The basic **DSL (Digital Subscriber Loop)** service ranges from a downlink or download of 5.56 Mega Bits per second (MBS) and an upload or uplink of 3.62 MBPS.

An individual occasional user can operate this basic service.

This is the minimal level in which all is measured as of 2012.

As you can see in the chart below, the evolution of remote dialing into an internet server has evolved from the old days of 14.4 kbps of the 1990s.

In the early 2000s, satellite dish entertainment service providers such as HughesNet, DirecTV, Dish Network, etc, expanded their offerings to provide downlink service at 3 to 5 Mbps with a uplink over a POTS telephone line with speeds up to 56kbps. While this service is becoming better with deployment of more satellites, it would be mostly a first resort for most users of the internet. Downlink of full motion video is excellent; however uplink is dependent on weather, satellite alignment and field strength leaving a potential service gap.

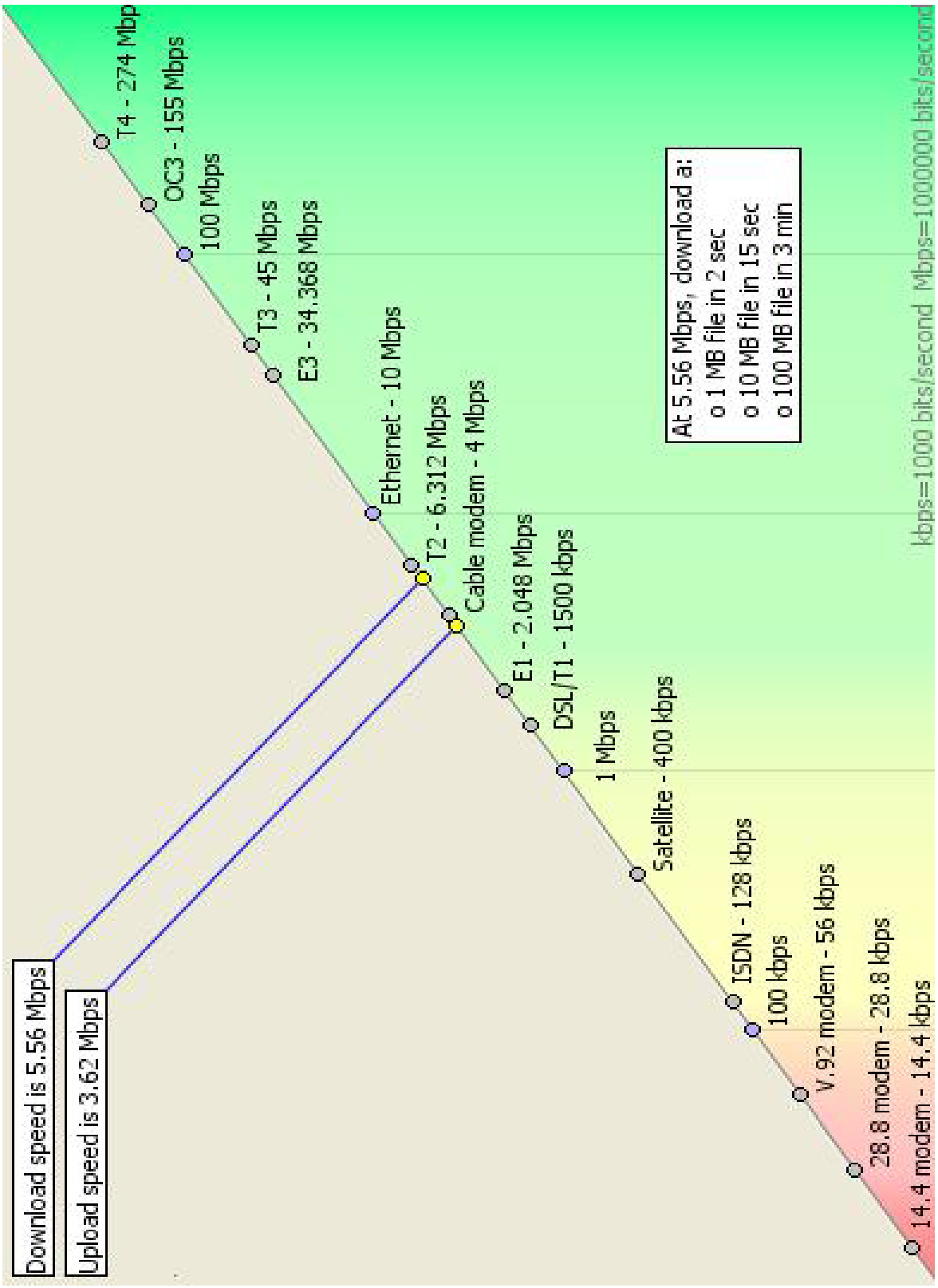


Exhibit 3. Service Delivery Speeds

a. Estimated Wireless Carrier 3-G Coverage and Propagation Analysis

The following service providers currently in 2012 have the following estimated coverage in Bedford County. They are:

Verizon/ALLTEL

AT&T/Triton/Devon/Cingular

Sprint/Nextel

nTelos

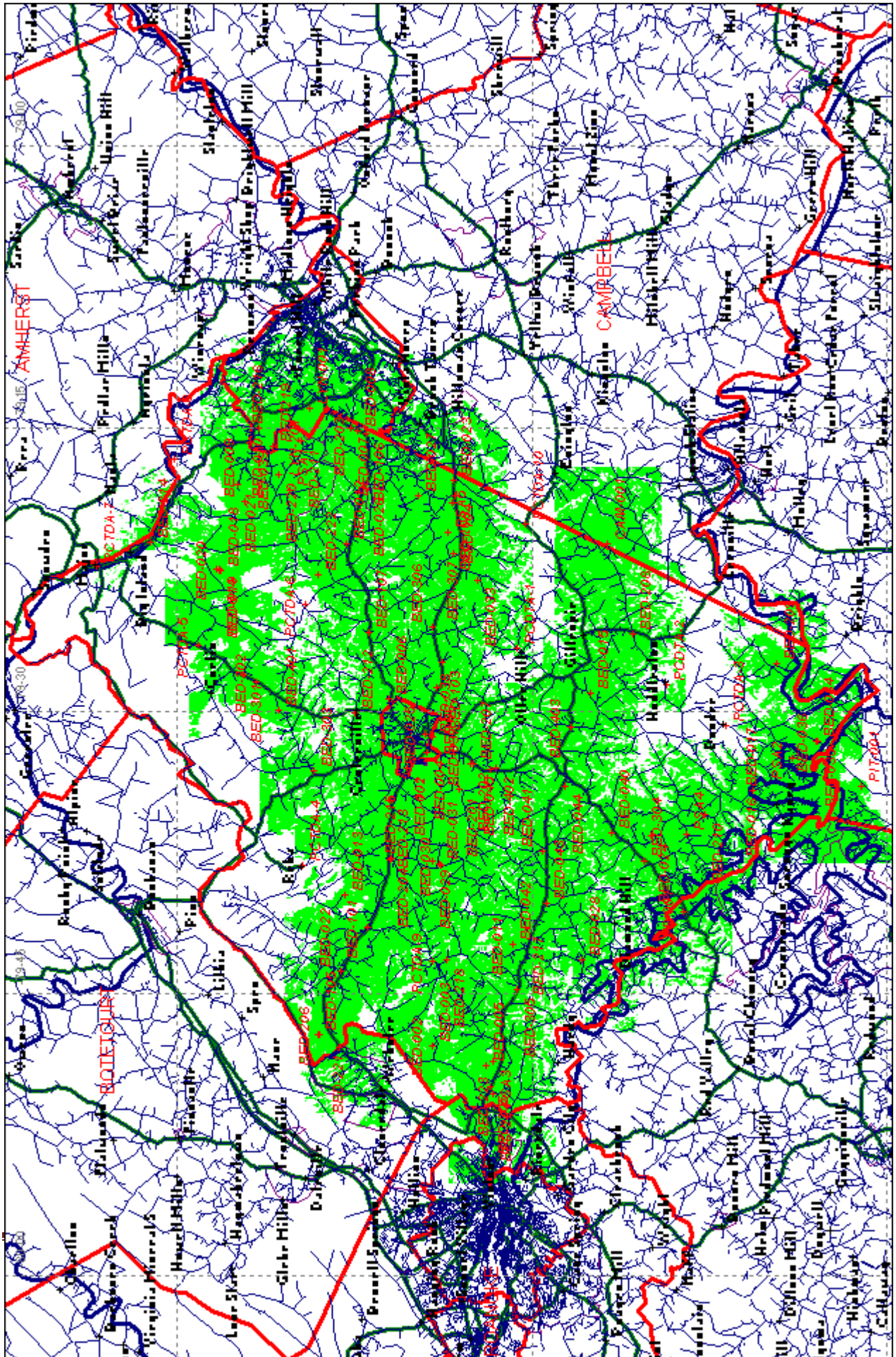
US Cellular

Exhibit 4. Estimated Carrier Service Coverage

Service Provider	Coverage Percentage (>-89dBm) Voice Service	Coverage Percentage (>-89dBm) 3G	Coverage Percentage (<-89dBm) 4G-Broadband
Verizon/Alltel	85%	70%	25%
AT&T/Triton/Devon/Cingular	75%	60%	20%
Sprint/Nextel	80%	65%	10%
nTelos	85%	55%	10%
U.S. Cell	75%	30%	5%

The coverage area presented in the following maps is based upon each service provider's physical point of presence (POP). A POP is defined as any site where antennas are operated. Service providers often establish joint billing agreements with competing providers in order to offer service in areas where they do not have a physical POP. Service providers typically prefer to establish their own proprietary network wherever they desire to provide service.

Exhibit 5.
Current Composite State of Wireless Coverage (-104 dBm.)



b. Inventory of Antenna Support Structures

A variety of support structures are being utilized in the County to mount antennas. This includes traditional self-support lattice towers, steel monopoles, and guyed towers. Additionally, antennas are mounted on power transmission towers, grain silos and wood poles. The following identification system was used to identify the structure type:

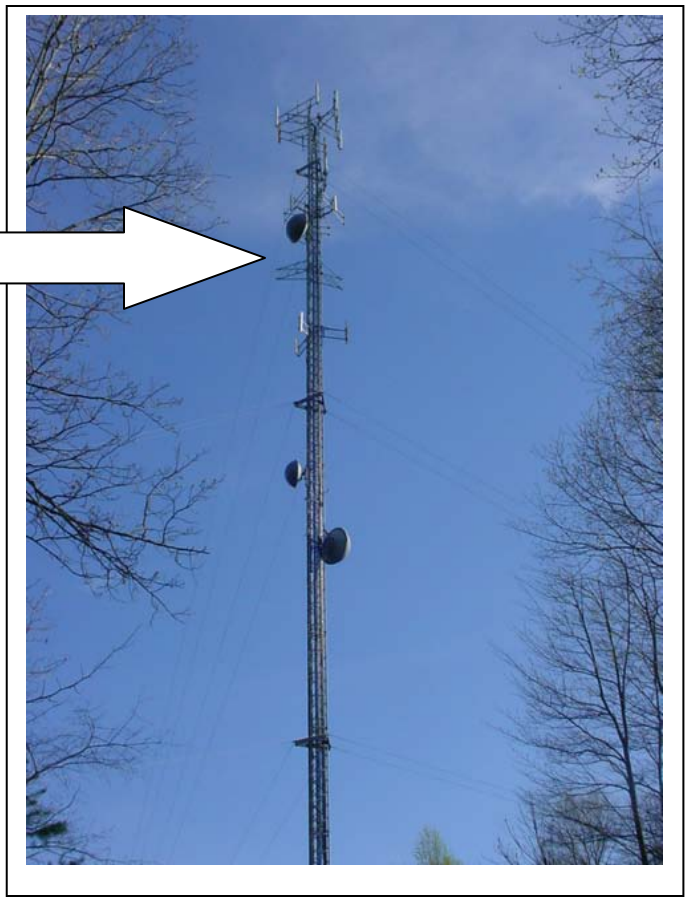
Exhibit 6. Site Inventory Key

Site	*Structure Type*
BED-0xx	Self-Support Lattice Tower, Steel Monopole or Guyed Tower
BED-1xx	Water Tank
BED-2xx	Power Transmission Tower/Pole
BED-3xx	Grain Silo
BED-4xx	Wood Pole

The map in Exhibit 8. identifies the location of antenna support structures in Bedford County either supporting or capable of supporting commercial antennas. Proposals that have received County zoning approval but have not yet been constructed are plotted. Additionally, antenna support structures located near the border in adjacent counties were also included. Structures are identified by site ID (e.g., BED-001). Exhibits 4a.-4f. show detail views of the site locations. Information regarding the owner, location, design, height, and ground elevation for each structure is presented in Exhibit 7 to illustrate what each Site Analysis / Inventory Sheet contains.

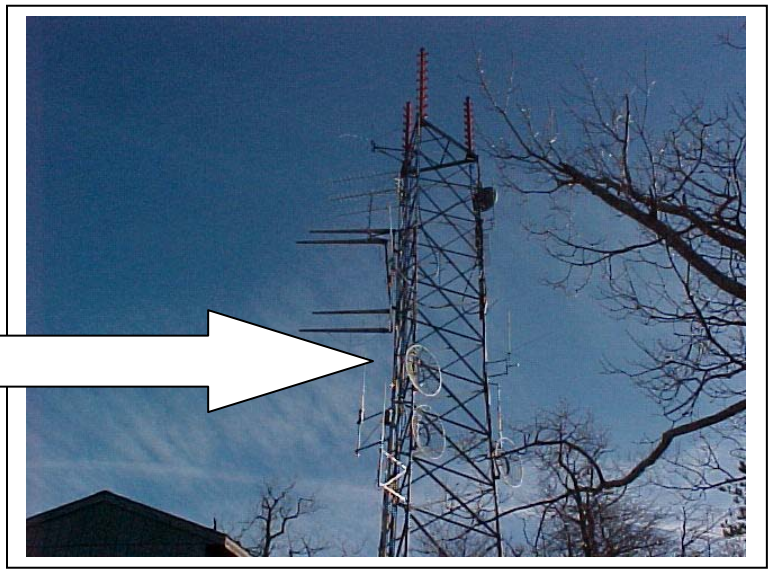
Examples of Self-Support Towers:
BED-0XX

Guyed Lattice Tower



Mono-pole Tower

Lattice Tower



Examples of Bedford Water Tanks for Co-location: BED-1XX

Grain Silo used For Co-location: BED-3XX

Wooden Pole Used For Co-location: BED-4XX

Exhibit 7.
Example Inventory Sheet of Individual Communications Structures

Site Analysis

Site ID: BED-006

Site Name: Rock Castle

County: Bedford

Address: 1086 Rock Castle Rd
City: Bedford
State: Virginia
Zip: 24523

Tower Site Owner/Mgr:
Crown Communications

Owner/Mgr Tower Site ID: 800841

FCC #: N/A
FAA#: N/A

Latitude: 37-21-05 N
Longitude: 79-29-19 W

Ground Elevation (G.E.): 926'
Above Ground Level (AGL): 194'
Above Mean Sea Level (AMSL): 1120'

Tower Type: Monopole

Constructed:

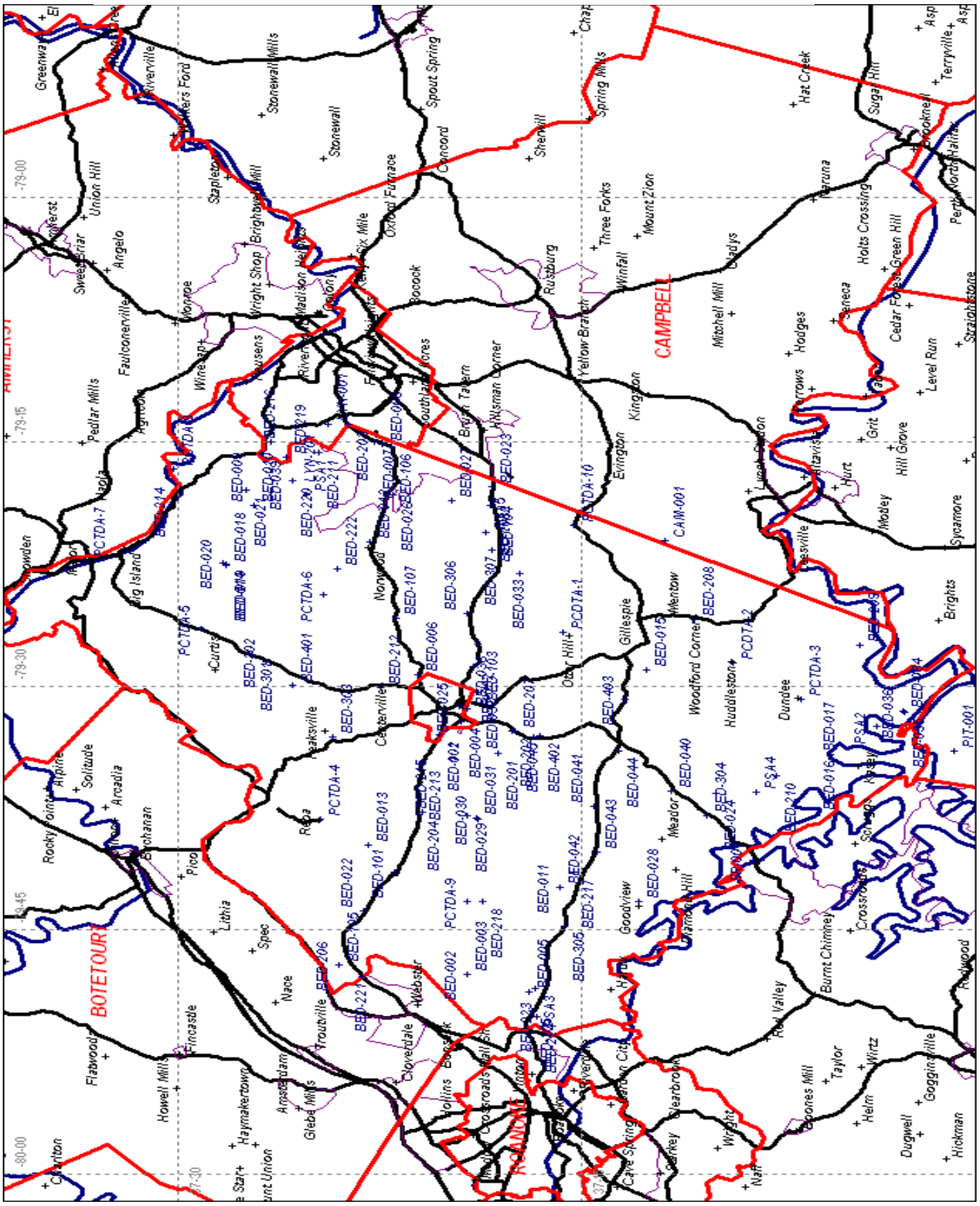
Collocations:

Triton PCS	Panel	193'
Nextel	Panel	180'
NTelos	Panel	167'
US Cell	Panel	147'

Atlanta Technology Consultants, Inc.
Ashland, Virginia

Page 13 of 299

Exhibit 8.
Location of current Wireless Communications Facilities



c. Results from 2012 Community Survey

The Staff and consultant developed the 2012 citizen survey using the 2002 Community Survey and updated the survey to reflect the technology of 2012. The following is a tally of the results from the survey advertised in the local newspaper and placed on the County's government web site.

Question # 1: *What Voting District do you reside in?*

Answer:	Response
District 1	10
District 2	26
District 3	29
District 4	21
District 5	26
District 6	13
District 7	26
Unsure	84
Total:	235

Question # 2: *What age range do you fit into?*

Answer:	Less than 18	18-24 year olds	25-29 year olds	30-36 year olds	37-45 year olds	46-52 year olds	53-65 year olds
District 1	1	1	2		2		3
District 2		1	1	2	4	6	6
District 3		2	3	3	7	3	9
District 4				3	4	1	8
District 5			1	1	6	6	10
District 6		1			3	3	5
District 7			1	3	5	7	8
Unsure	1	2	11	14	16	20	17
Total:	2	7	19	26	47	46	66

Question # 3: *Do you own a cellular phone, personal digital assistant (PDA) or laptop computer?*

Answer:	Yes	No
District 1	9	
District 2	26	
District 3	29	
District 4	18	3
District 5	25	1
District 6	13	
District 7	25	1
Unsure	81	1
Total:	226	6

Question # 4: *On average, how often do you make or receive calls, e-mails and access the internet per week on your cellular phone, PDA or laptop computer?*

Answer:	0	1	2	3	4	5	10	15	25+
District 1		1					1	1	6
District 2		1			1		1	3	20
District 3		2						1	26
District 4						1	3	2	15
District 5					1		3	2	20
District 6							1	2	10
District 7							1	2	23
Unsure	1			2		1	1	5	73
Total:	1	4	0	2	2	2	11	18	193

Question # 5: *Do you consider your cellular phone, PDA or Laptop computer more of a convenience or necessity?*

Answer:	Convenience	Necessity	No Opinion	N/A
District 1	3	6		
District 2	5	21		
District 3	3	26		
District 4	3	18		
District 5	2	24		
District 6		13		
District 7	3	23		
Unsure	9	74		
Total:	28	205	0	0

Question # 6: *If you own a cellular phone, PDA or laptop computer, how would you rate the quality of your cellular service (coverage) where you live?*

Answer:	No Coverage	Poor	Average	Above	Excellent
District 1		3	6		
District 2		11	10	3	2
District 3	2	12	10	3	1
District 4		7	11	2	1
District 5	2	11	10	3	
District 6		7	5	1	
District 7		6	12	7	1
Unsure	1	30	31	15	6
Total:	5	88	95	34	11

Question # 7: *Do you have "High Speed" internet where you live?*

Answer:	Yes	No
District 1	2	7
District 2	10	16
District 3	10	19
District 4	17	3
District 5	11	14
District 6	6	7
District 7	18	8
Unsure	50	31
Total:	124	105

Question # 8: *Does your school or your child's school require internet access at home?*

Answer:	No	Yes	N/A
District 1	1	3	6
District 2		7	19
District 3		6	22
District 4		7	13
District 5	3	8	14
District 6		4	9
District 7	6	8	12
Unsure	5	30	47
Total:	15	73	142

Question # 9: *Have you considered working or running a business from your residence?*

Answer:	No	Yes	Currently Doing It
District 1	2	6	1
District 2	11	12	3
District 3	13	11	5
District 4	8	9	3
District 5	11	9	5
District 6	5	7	1
District 7	16	6	4
Unsure	32	42	8
Total:	98	102	30

Question # 10: *Do you have "High Speed" internet where you work?*

Answer:	Yes	No
District 1	8	1
District 2	19	6
District 3	26	2
District 4	16	
District 5	19	5
District 6	9	3
District 7	20	3
Unsure	67	13
Total:	184	33

Question # 11: *Does your work or business require internet access at home?*

Answer:	Yes	No	N/A
District 1	5	4	
District 2	11	7	8
District 3	8	18	3
District 4	10	5	5
District 5	16	7	2
District 6	4	4	5
District 7	10	12	3
Unsure	40	28	14
Total:	104	85	40

Question # 12: *I use the internet mostly for:*

Answer:	Personal Use	Business Use	Educational Use	Emergencies	Other (Please Specify)
District 1	4	2	3		
District 2	14	8	2		1
District 3	15	11			2
District 4	14	6			
District 5	12	9			4
District 6	7	4	2		
District 7	15	7	1		2
Unsure	55	15	7		3
Total:	136	62	15	0	12

Question # 13: *Would you prefer a "wireless" internet service to a "wired" internet service?*

Answer:	Yes	No	Possibly	No Opinion
District 1	7		2	
District 2	15	5	4	2
District 3	19	3	7	
District 4	12		5	3
District 5	18	2	2	3
District 6	6	3	3	1
District 7	16	2	7	1
Unsure	47	9	20	6
Total:	140	24	50	16

Question # 14: *Have you cancelled your land line phone and just operate on a cellular phone?*

Answer:	Yes	No
District 1	4	5
District 2	5	21
District 3	9	20
District 4	3	17
District 5	5	20
District 6	6	6
District 7	8	18
Unsure	43	39
Total:	83	146

Question # 15: *I use my cellular phone mostly for:*

Answer:	Personal Use	Business Use	Emergencies	Other (Please Specify)
District 1	7	2		
District 2	15	8	1	1
District 3	15	10	1	2
District 4	15	4		1
District 5	15	4	1	4
District 6	9	4		
District 7	17	8		1
Unsure	52	19	4	2
Total:	146	59	7	11

Question # 16: *Do you notice cellular towers?*

Answer:	Yes	No
District 1	5	4
District 2	22	4
District 3	16	13
District 4	11	9
District 5	15	10
District 6	10	3
District 7	16	10
Unsure	43	39
Total:	138	92

Question # 17: *If you notice cellular towers, do you find them to be unsightly?*

Answer:	Yes	No	N/A
District 1	1	6	2
District 2	6	17	3
District 3	1	23	5
District 4	1	16	3
District 5	3	17	4
District 6	4	9	
District 7	4	20	2
Unsure	7	58	17
Total:	27	166	36

Question # 18: *If allowing taller cellular towers meant fewer towers would be needed, would you be in favor of this approach?*

Answer:	Yes	No	Depends (Please Explain)	No Opinion
District 1	9			
District 2	18	4	1	3
District 3	23	1	5	
District 4	16	2	1	1
District 5	20	1	2	2
District 6	9	3		1
District 7	17	3	4	2
Unsure	61	4	10	6
Total:	173	18	23	15

Question # 19: *What should be the maximum allowable height for a cellular tower?*

Answer:	60 feet	80 feet (Current Policy)	100 feet	150 feet	199 feet	200+ feet	Other (Please Specify)	No Opinion
District 1			2	3		1	1	2
District 2		6	3	1	2	6	2	6
District 3	1		2	3	1	15	1	6
District 4			2	5	2	4	3	4
District 5		1	2	5		8	4	5
District 6	2	1		2		5		3
District 7		4	3	3	1	5	1	9
Unsure	1	2	6	15	1	15	4	3
Total:	4	14	20	37	7	59	16	7

Question # 20: *Do you have any other ideas on how we can improve the County Wireless Plan or any other general comments?*

106 county citizens responded to this question with suggestions and ideas on how to improve the County Wireless Plan. The following themes were identified in the responses:

- Rural areas of the county lack adequate cellular and internet service.
- Lack of high speed internet available in rural areas hinders home business operations.
- The absence of wireless technology is hindering economic development and business growth.
- Fears that Bedford County is behind other localities in providing both high speed internet and cellular service to its citizens.
- Taller towers are needed to provide better service to the entire County.

Several conclusions can be drawn from the survey results. Cellular phones and high speed internet have become a necessity for respondents. Schools are now requiring internet access at respondent's homes in addition to employers. An overwhelming majority of respondents are in favor of taller towers than our current wireless plan permits. Respondents are noticing cellular towers and not finding them to be visual nuisance as they did when developing the current Wireless Plan. There is significant support for taller towers and providing better cellular and internet coverage throughout Bedford County. The results of the survey represent the opinions of only those that responded and should not be construed to represent the opinions of all County residents.

Top Ten Responses from 2012 Community Survey

1. 97.4% own and use a cell phone or PDA
2. 80%+ make over 25 calls or internet links per week.
3. 88% say a PDA or Cell phone is a necessity.
4. 80.1% say their coverage is poor to non-existent where the live.
5. 45.6% say they do not have high speed internet in the home.
6. 84.8% have high speed internet at work or school.
7. 60.9% would rather have wireless internet.
8. 72.5% say they do not find cell towers unsightly.
9. 75.5% say they would prefer taller cell towers as opposed to more short ones.
10. 36% say they like towers less than 200' and 30.8% had no opinion.

IV. Marketplace of the future

a. Future Wireless Technology (The future is now!!)

"4G" - 4th Generation

Long Term Evolution Digital format Voice with Broadband data speeds and Bandwidth.

4th Generation of Technology is the fourth generation of cellular wireless standards. It is a successor to the 3G and 2G families of standards. In 2009, the ITU-R organization specified the ***IMT-Advanced (International Mobile Telecommunications Advanced)*** requirements for 4G standards, setting peak speed requirements for 4G service at 100 Mbit/s for high mobility communication (such as from trains and cars) and 1 Gbit/s for low mobility communication (such as pedestrians and stationary users).

The world's first publicly available ***Long Term Evolution or "LTE"*** service was opened in the two Scandinavian capitals Stockholm (Ericsson and Nokia Siemens Networks systems) and Oslo (a Huawei system) on 14 December 2009.

One of the key technologies for 4G and beyond is called ***Open Wireless Architecture*** (OWA), supporting multiple wireless air interfaces in an open architecture platform.

A 4G system is expected to provide a comprehensive and secure ***all-IP based mobile broadband*** solution to laptop computer wireless modems, Smart-phones, and other mobile devices. Facilities such as ultra-broadband Internet access, IP telephony, gaming services, and streamed multimedia may be provided to users.

b. Applications of New Technology

i. Residential

The residential or home technology consumers' desire for data products and applications has exploded over the last 2 years. Many home owners have installed hardware for instance in energy management. This system regulates the heating, ventilation and air conditioning for the home in an attempt to reduce energy consumption and to better the home environment. Now there are applications that a cellular user on his PDA can have an application that he can go to his PDA hit a button and set the temperature of his home without physically touching the thermostat in the house. This is one of many applications that have been innovated. The public seeks applications that are controlled remotely.

ii. Education

One of the largest growing industries in the United States is the “On-Line” Education sector. Many public and private universities as well as trade schools and certification associations have all on-line applications. For the local Bedford resident, many middle and high school teachers assign schoolwork to be assisted with on-line research. Out of survey respondents who answered survey question 8, “Does your school or your child’s school require internet access at home?” with a Yes or No versus Not Applicable, 82.9% said that access is required for school.

The Commonwealth of Virginia has what is known as “SOL’s” or Standard of Learning levels of testing and certifications of the schools. It is extremely important that each student have as much practice as possible to pass this exam.

iii. Commerce

Retail:

On-Line shopping has become the new retail industry for America and the world. On-line shopping sites such as eBay, Amazon, and any retail store now have all of their inventory on-line so that they may drop-ship merchandise to anywhere in the world. What is interesting now is that there are cellular applications, where you can scan the merchandise at a store, and the pricing of the same item can appear on your phone of the nearest competitors pricing. If your pricing is lower, then typically the store will match the lowest price say within 5 miles of his store to make a retail sale.

In summary, applications have revolutionized the retail industry.

Financial:

Banking and investing have also become served by on-line convenience. Most if not all investment portfolios can be viewed on-line and trades made. In addition, PDA applications for on-line banking have become the norm with all Banks providing these services.

iv. Medicine

A new field is called Tele-medicine. This is basically the ability for a patient to research healthcare treatment, physicians, personal health history, diagnosis and medicines to make the patient educated as to his or her treatment. It has been proven many times that the more a patient is educated the better he will respond to doctor’s advice and care.

In addition to this aspect, hospitals and health care facilities use on-line applications within their industry for surgery, video conferencing and exchange of information and ideas for patient treatment.

v. Communications

The communications industry has exploded in various new sectors. From hardware retail sales to service delivery of Voice Over Internet Protocol services, the communications service and content industry has exploded, for example the evolution of music distribution and sales. In the past an artist would record an album of music and the album would be distributed to retail stores for sale. The buyer would purchase the album and bring it home and place it on a stereo and enjoy the music. Now, artists develop one song, apply it to the web-site download platform, and the buyer downloads to equipment that can be programmed to play in any order and then enjoy the song when he or she would like to hear. All of these and more functions are performed over the communications network for wireless services.

c. Propagation Map of Theoretical Coverage (-74dBm)

Most 4-G data systems work inside of a structure to a transmission rate of -74dBm in signal power. Looking at the products and services, all of the wireless providers will be looking for the most robust signal strength that will allow down-link and up-link of data transmission. The level of service for indoor coverage will be in the vicinity of -74dBm or stronger. Exhibits 9 and 10 illustrate estimated coverage in the northern and southern portions of the county as currently forecasted.

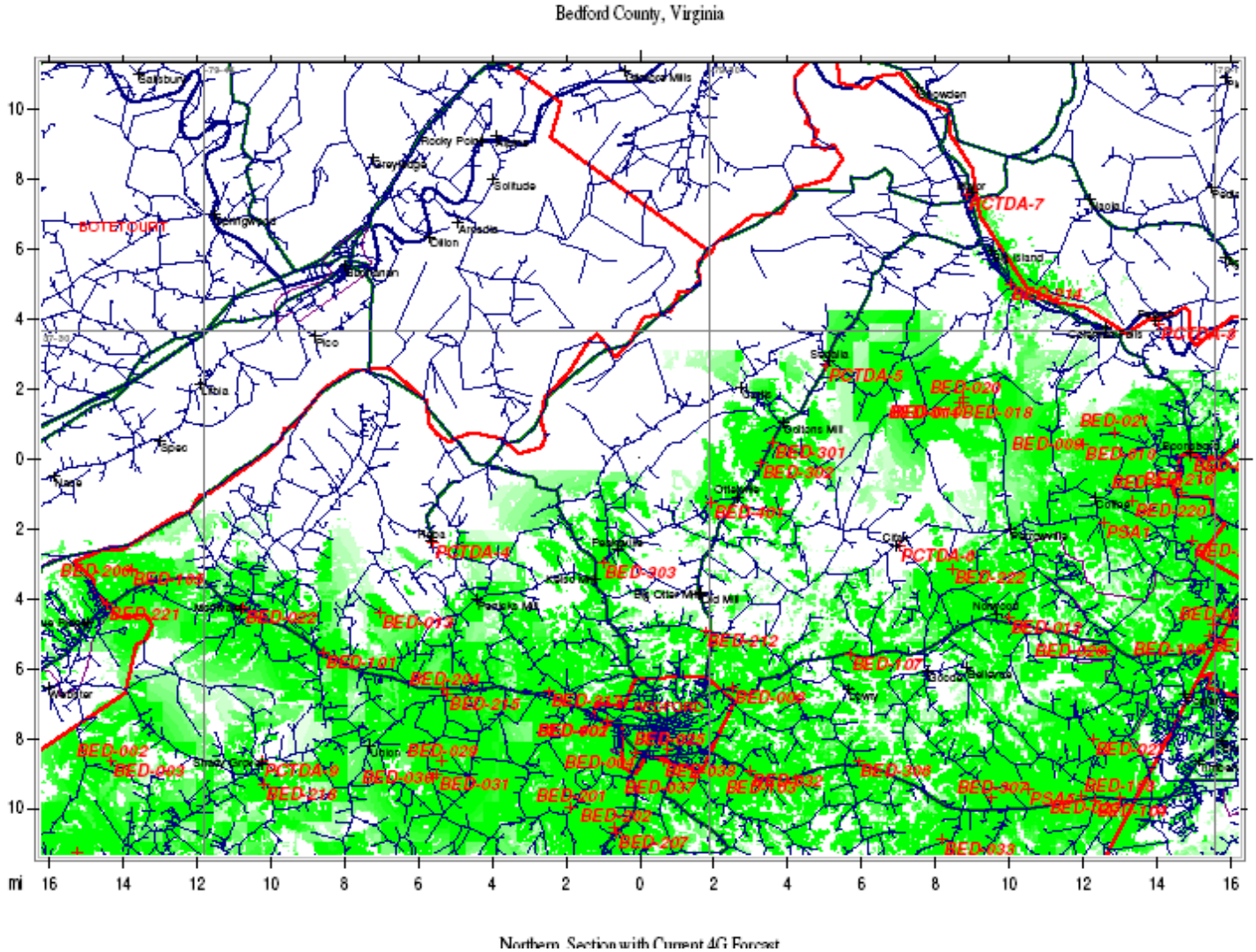


Exhibit 9. Northern Section of County
Estimated 4-G Coverage

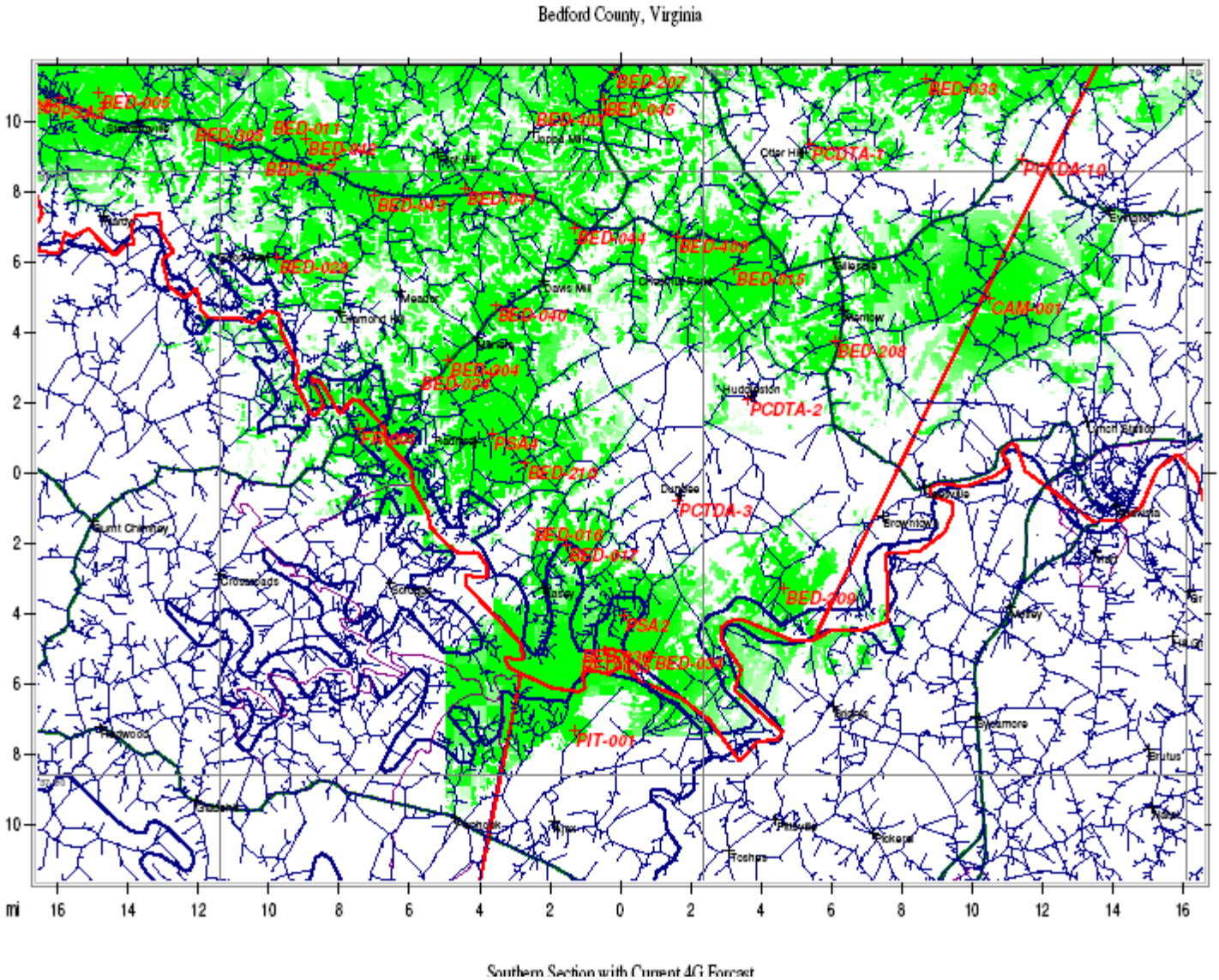


Exhibit 10. Southern Section of County
Estimated 4-G Coverage

i. Need Assessment for future Communication Tower Structures

The total number of ***points of presence (POP)*** that would need to be established on a carrier-by-carrier basis to provide complete countywide coverage was estimated. For example, the nTelos wireless network provides coverage to approximately a third of the County. To provide complete countywide coverage, nTelos would need to establish approximately (14) POPs at an above ground level (AGL) of a 199 feet; **or**, (23) POPs at an AGL of 150 feet; **or**, (36) POPs at an AGL of 120 feet; **or**, (57) POPs at an AGL of 80 feet; **or**, some combination thereof. A POP can be established either through the use of an existing structure or the development of a new structure. Based upon the existing inventory of built towers and other elevated structures, co- location will not be able to accommodate all future requests.

The results in Exhibit 11 represent an estimate of the minimum POP requirements for each service provider, independent of the requirements of other providers. The coverage map for each service provider is presented with a breakdown of the estimated minimum POP requirements in Exhibit 11. The table shows the minimum points of presence (POP) at various AGLs needed to provide countywide coverage based on existing coverage. Based upon a separation of 10 feet between antenna arrays, the lowest antenna position on a 150-foot structure would be located at a height above ground level of approximately 100 feet. Zoning, site availability, and topography, among other factors were not considered.

Exhibit 11.
Table of estimated additional number of POP to provide complete countywide coverage

Service Provider	199 Ft.	150 Ft.	120 Ft.	80 Ft.
Verizon/Alltel	***25***	***43***	***75***	***102***
AT&T/Devon/Triton PCS	***32***	***50***	***82***	***126***
Nextel/Sprint	***35***	***52***	***68***	***130***
nTelos	***14***	***23***	***36***	***57***
U.S. Cellular	***5***	***8***	***11***	***19***

Network development strategies can be subcategorized into three basic approaches:

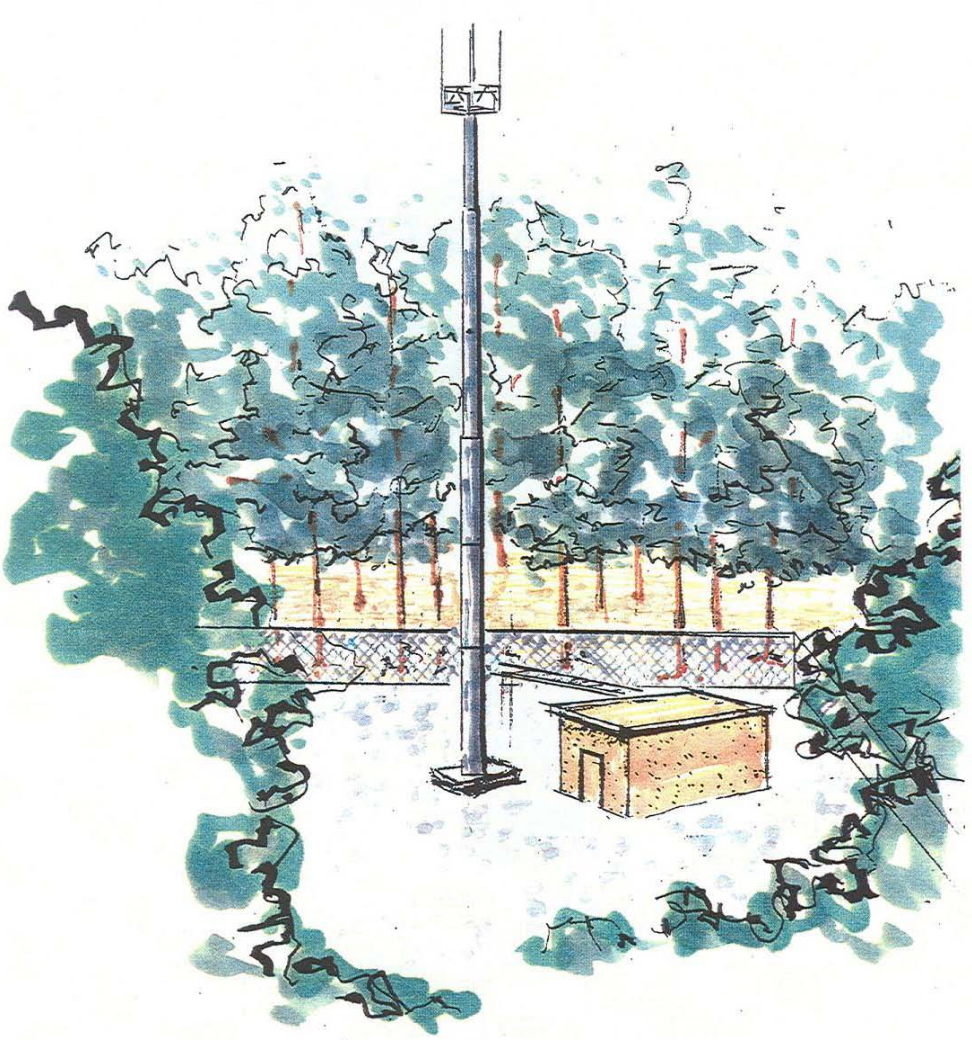
1) High-rise Network development

2) Low-rise Network development

3) Mixed Network development

High-rise Network development is a multi- tenant approach utilizing tall structures, which are capable of supporting a minimum of six (6) service providers. The advantage to this approach is that it minimizes the total number of new structures that would otherwise be required. The ***Low-rise development*** approach utilizes short, slender structures (mini/micro cells), 80-foot or less in height, which are typically capable of supporting only one (1) service provider. The advantage to this approach is its low visual impact. The ***Mixed network development approach*** utilizes a combination of tall and short structures, offering the greatest flexibility in achieving coverage and visual impact objectives.

If a ***multi-tenant approach*** were utilized to accommodate all licensed service providers such that complete coverage was realized throughout Bedford County, given the existing infrastructure, approximately 20 new structures would be required, discounting all other limiting factors. Likewise, approximately 300 mini/micro cell structures would be required to provide similar coverage. Using a combination of multi- tenant and mini/micro cell structures, approximately 10 multi-tenant and 250 mini/micro cell structures would be required under one of many potential design scenarios. These figures are not a prediction of future development rather simply represent an estimate of the minimum infrastructure requirements that would be needed in order for each service provider desiring to provide complete coverage throughout the County the opportunity to do so. The cost to deploy a low-rise network is approximately three to four times that of a network comprised of tall multi-tenant structures, thus explaining the industry's aversion to the use of low-rise structures.



TYPICAL 80' MONOPOLE TOWER WITHIN WOODED AREA TO MINIMIZE VISUAL IMPACT

V. Wireless Communications Facility Classifications

Match Technology to the WCF

For wireless broadband to effectively work in the future, the service provider must place the antenna within close proximity to the PDA.

To do this especially in residential areas, it will require engineering and sensitivity to the community wants and desires. In saying this, it also must be recognized by the community that telecommuting, distance learning and home based business are the norm of today's society. The "middle" ground could be 40-foot wooden poles placed strategically in the rear or behind at home. Roof top mounting of antennas would also be an option.

Because of the different type of antennas, Wireless Communications Facilities or WCF's could come in 4 Classes:

CLASS	HEIGHT	DELIVERY SERVICE
CLASS 1	Less than or equal to 40' AGL	DAS – PMP
CLASS 2	Greater than 40' but less than or equal to 80' AGL	LTE –DAS – PMP
CLASS 3	Greater than 80' but less than or equal to 120' AGL	LTE-DAS-PMP- MW
CLASS 4	Greater than or equal to 120' but less than or equal to 200' AGL	LTE – DAS – PMP –MW

Exhibit 12.

Four Classes of WCF Towers

The four classes of WCF towers are present in Bedford County as shown in the following photographs.

Class 1: 40’ AGL (Exhibit 13a)

Class 2: 80’ AGL (Exhibit 13b)

Class 3: 120’ AGL (Exhibit 13c)

Class 4: 199’ AGL (Exhibit 13d)

a. Siting and Design Criteria

Siting and design are distinct terms used to describe the location and appearance of wireless telecommunication facilities. Siting refers to the specific location where a facility is placed; design refers to the physical architectural features, including dimension, which comprise the design of the facility.

Wireless telecommunication facilities sited in high-visibility locations, such as open fields, ridge tops, and residential neighborhoods, are generally opposed. For example, towers located on ridge tops appear more prominent due to the "silhouette effect" created by the darker structure viewed against the light sky backdrop (Exhibit 14). Structures located down-slope from ridge tops tend to blend with the darker natural background features.

Facilities sited within a stand of trees are more discrete due to vegetative screening and thus make better sites. The mini/micro cell in Exhibit 15 is well sited within the existing tree buffer. Only the top quarter of the structure is visible from the adjacent highway.

Exhibit 14.

Design refers to the overall appearance of the facility including dimension, color, texture, screening and landscaping. Certain design elements can help mitigate adverse visual impacts associated with tower sites. In Exhibit 15, antennas are flush mounted on a slender wood pole. This installation could be made even more discrete if antennas were painted to match the pole.

Exhibit 15.

Numerous design techniques exist to disguise or conceal wireless telecommunication facilities. However, in order to be effective, the particular technique employed must be of the proper scale and be in harmony with its setting. Techniques used to hide or blend the view of towers and related equipment are frequently referred to as "stealth". Despite their effectiveness, stealth techniques are not commonly used. Industry sources cite costs and technical limitations as factors limiting more widespread use. This section describes several techniques that are most applicable for use in the County, but is by no means a comprehensive review of the wide variety of design techniques being employed to make wireless telecommunication facilities appear less intrusive.

Communications Flagpole

Antennas and cables can be concealed within the cylinder of flagpole-like structures with certain limitations. The advantages of a communications flagpole are that they are very well adapted to a variety of settings, and depending upon their height, can support multiple carriers. Exhibit 16 shows an effective application of a stealth communications flagpole in a commercial retail environment.

Exhibit 16.

Communications Silo

In a rural or agricultural setting, an option for concealing an antenna support structure can be found in the development of a stealth communications silo. The silo seen in Exhibit 17 conceals the antennas and support structure which is installed within. The top portion of the structure is made of materials that allow radio frequency emissions to pass. When juxtaposed to a barn or an existing silo, a communications silo is an extremely effective technique. One of the advantages of this approach is that antennas and base station equipment, normally housed in shelters or outdoor cabinets, can be installed in the base of the silo. In addition, multiple carriers can be accommodated. The height of communication silos should be in scale with surrounding farm structures.

Another effective technique is to mount antennas to the exterior of an existing silo. Exhibit 18 shows panel antennas mounted to the exterior of a grain silo.

Exhibit 17.

Exhibit 18.

Communications Tree Pole

Another technique, which is best suited to wooded environments, is found in stealth tree poles. Exhibit 19 shows a stealth tree pole extending above the tree line. This installation is well blended and is barely distinguishable from the surrounding foliage. It is important to note that there is a considerable range in the level of realism and that any installation utilizing this design technique should be reviewed prior to approval. Installations, like the one shown in the figure below, is in scale with the surrounding trees, uses a realistic number of branches, and uses rubberized "tree bark" for added texture and dimension, are particularly convincing. Stealth tree poles are capable of supporting multiple carriers; however, in order to be able to transmit, antennas must extend above the tree line.

Exhibit 19.

Water Storage Tanks

Practically any above-ground structure can be adapted to support antennas. Water storage tanks make excellent antenna support structures. In Exhibit 20 antennas are concealed behind a RF transparent shroud mounted on the top of a water storage tank.

Exhibit 20.

Power Mounts

Utilization of existing high-power transmission towers, which are often very similar in design to structures designed to support communications equipment, are easily adapted. The advantage to this approach is that addition of antennas and cables blend well with the attached structure and often go unnoticed by the casual observer. Most utilities and electric cooperatives permit this type of use; however they require that the installation and maintenance of equipment on the structure be performed by power company workers out of obvious concern for safety. Depending upon the type of transmission tower, antennas can either be attached directly to the structure, or as shown in Exhibit 21, be installed on an independent support structure constructed within the structural framework of the transmission tower. This particular design is referred to as a Fort Worth Tower. The Fort Worth Tower can be extended above the transmission tower to accommodate multiple antenna arrays.

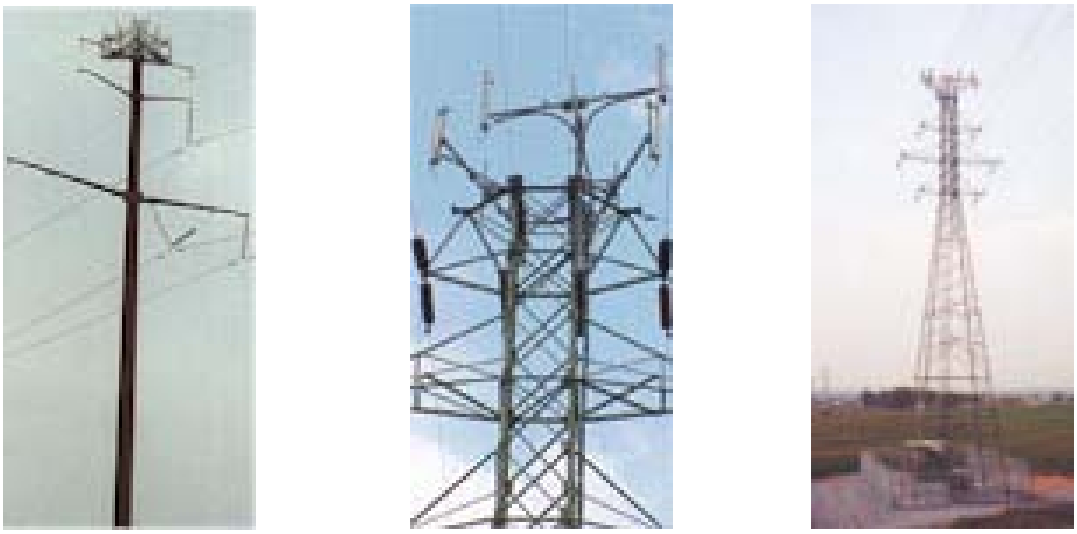


Exhibit 21.

Exhibit 22.

Other Design Techniques

Other examples of stealth techniques have taken the form and appearance of church steeples, bell towers, windmills and forest ranger lookout towers (Exhibit 22). Base station equipment is traditionally housed in prefabricated equipment shelters or in weatherproof equipment cabinets. Similarly, there are many different techniques for concealing base station equipment. Shelters are manufactured of metal, concrete, brick, or fiberglass. Shelters made of natural materials and earth tones tend to blend in with surroundings. Other techniques that have been effectively employed include vegetative landscaping, board fencing, and earthen berms. Base station equipment can also be concealed within an existing building that may be nearby or in an underground vault. The possibilities for concealing wireless telecommunications facilities are limited only by one's creativity.

VI. New WCF Telecommunication Goals & Action Strategies

a. Goals (Revised)

Goal 1.
Provide guidance for facility location for hosting or implementation of new technologies.

Goal 2.
Provide clear guidance concerning the type and visual presence of Wireless Communications Facilities to ensure service delivery but also to provide the least impact to the community.

Goal 3.
Provide flexibility in the placement of antennas and WCF's in populated areas so that residential structures can reap the new technology.

b. Strategies

The existing service gaps are either caused by topography or by lack of subscribers. Many areas of the county do not have any service. As the identification of these areas has been noted, the 4-G service of wireless broadband will require the close proximity of the antenna to the PDA, with proximity being key. The antenna will be required to have penetration to the structure or the wireless hotspot will not work effectively. Because of the remoteness of many of the existing towers, it will require tower placement of a WCF to be horizontally and vertically closer to the home or office. Because of this, shorter towers can accommodate this requirement.

Since the 1980's and the 1-G deployments, towers have shrunk in height and have become more dense in locations because of the digital uplink and downlink required for a two-way transmission.

There are two ways to fill in the gaps and provide bandwidth to meet the subscriber demand. Pre-determine where existing tall towers are to be placed in major service gaps, and then allow shorter towers to be placed in minor or smaller service gaps.

This Plan proposes both the location of 199' towers in major service gap areas and then the placement of shorter towers in locations to fill in the smaller gaps as follows:

i. Pre-determined Tall Towers located in Non-served areas at 199' AGL.

Due to the lack of coverage in a larger geographical area of the county, it is necessary to plan for the wireless expansion for future growth and demand.

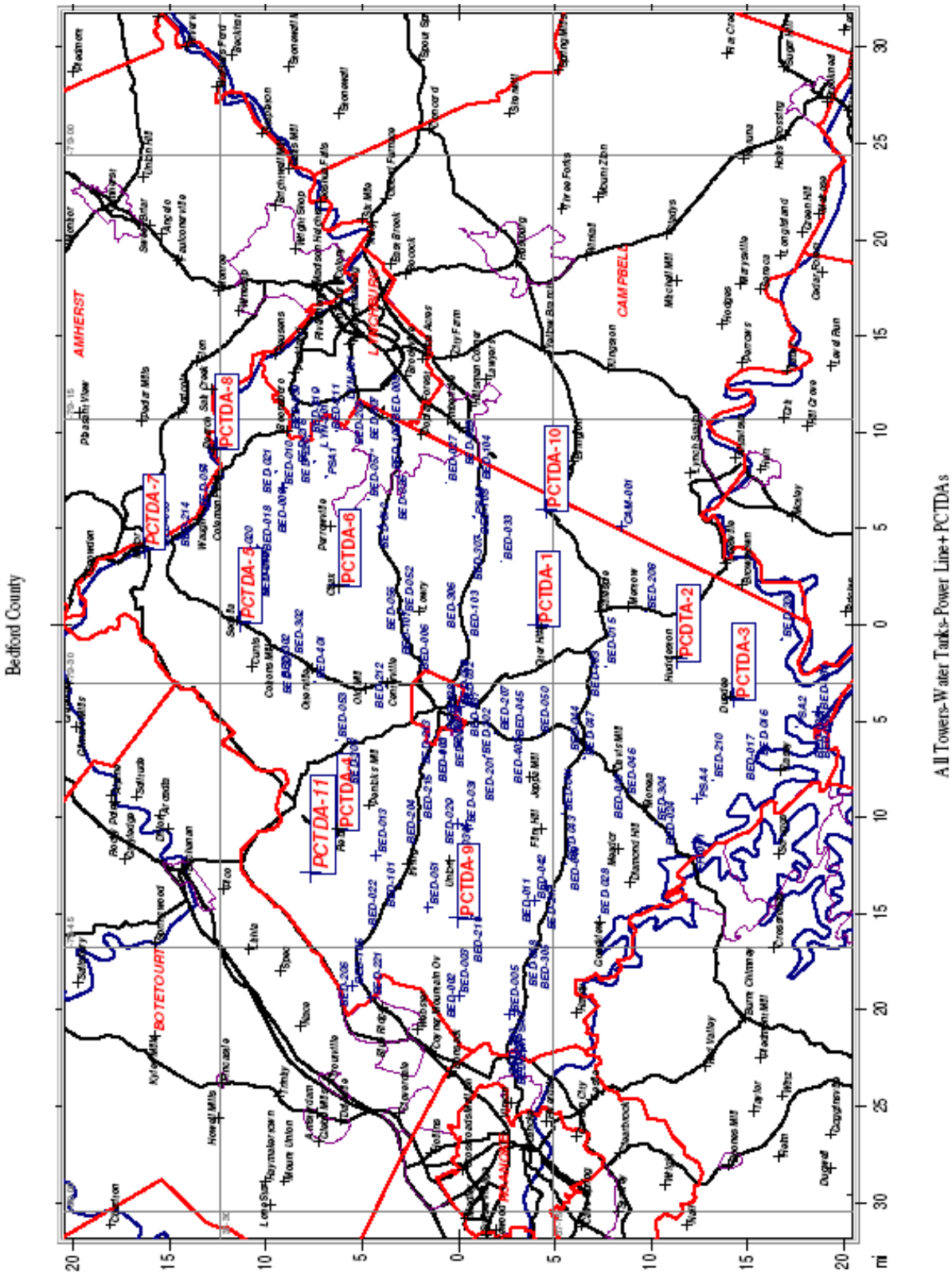
The county will require at some point in the future the provisioning for towers. These locations are known as *Permitted Commercial Tower Development Areas or PCTDA.* ***These designated locations are centers to a circle that has a radius of 2 miles. These are development areas not specific locations.*** This study has determined that the existing infrastructure in the western, northern and central areas of the county along the Rt. 460, Rt. 122, Rt. 24, and Rt. 221 areas have adequate towers with open "slots" for co-location of existing towers.

The locations that are following are not exact locations with specific properties for construction, but are locations of communities that could provide a potential site. Exhibit 23 lists these 11 sites by area and relative geographic points. Exhibit 24 is a map of these 11 potential site areas.

Exhibit 23. Permitted Commercial Tower Development Areas

Eastern	PCTDA -1	Otter Hill	37-15-39.4 N	79-26-40.6 W
Southeastern	PCTDA-2	Huddleston	37-09-20.0 N	79-28-36.8 W
Southeastern	PCTDA-3	Dundee	37-06-48.7 N	79-30-48.0 W
Western	PCTDA-4	Reba	37-24-42.0 N	79-38-12.2 W
Northern	PCTDA-5	Sedalia	37-29-07.1 N	79-26-30.9 W
Northeastern	PCTDA-6	Cifax	37-24-37.2 N	79-24-22.0 W
Northern	PCTDA-7	Major	37-33-26.8 N	79-22-19.8 W
Northeastern	PCTDA- 8	Peach	37-30-10.1 N	79-16-38.1 W
Southwestern	PCTDA -9	Shady Grove	37-19-14.1 N	79-43-16..3 W
Eastern	PCTDA-10	County Line	37-15-17.3 N	79-20-06.1W
Northwest	PCTDA-11	Montvale	37-25-54.6 N	79-40-45.0W

Exhibit 24. Location of PCTDAs



ii. Filling in Small Gaps in Coverage to Match Technology to the WCF

As stated previously, for wireless broadband to work in the future effectively, the service provider must place the antenna within close proximity to the PDA.

To do this especially in residential areas, it will require engineering and sensitivity to the community wants and desires. In say this, it also must be recognized by the community that telecommuting, distance learning and home based business are the norm of today's society. In say this, the "middle" ground could be forty (40) foot wooden poles placed strategically in the rear or behind at home. Roof top mounting of antennas would also be an option.

Because of the different type of antennas, Wireless Communications Facilities or WCF's could come in 4 Classes:

Exhibit 25. Four classes of Wireless Communications Facilities

CLASS	HEIGHT	DELIVERY SERVICE
CLASS 1	Less than or equal to 40' AGL	DAS – PMP
CLASS 2	Greater than 40' but less than or equal to 80' AGL	LTE –DAS – PMP
CLASS 3	Greater than 80' but less than or equal to 120' AGL	LTE-DAS-PMP- MW
CLASS 4	Greater than or equal to 120' but less than or equal to 200' AGL	LTE – DAS – PMP –MW

VII. Recommendations

1. Investigate eleven (11) PCTDA conceptual sites shown in this plan. These sites will be part of the answer to large wireless service network gaps.

   The criteria for these towers are restricted to:

   a. Must be within 2 miles of generalized location of latitude and longitude.

   b. May be 199' AGL but not taller

   c. Must not be required to be illuminated at night.

   d. Must be mono-pole structure

   e. Must provide for Public Safety Antenna co-locations.

   f. Must provide space for non-profit broadband deployment co-locations.

   g. All PCTDA Towers to be subject to Special Use Permit (SUP) review and approval by the Board of Supervisors and follow the existing process.

2. Develop the short tower "Fill In" solution criteria related to the four classes of towers in this plan. These towers are intended to fill-in smaller gaps to the overall network for all wireless services.

   These tower location and approval process would be related to:

   a. Class 1 (40' AGL) and Class 2 (80' AGL) may be allowed in Residential zoning districts

   b. Class 3 (120' AGL) and Class 4 (199' AGL) may be allowed in zoning districts where currently allowed (non-residential).

   c. Class 1 (40' AGL) towers to be of wood construction.

   d. Class 1 (40' AGL) and Class 2 (80' AGL) to be subject to a process of administrative review and approval by the zoning administrator (Zoning Permit versus Special Use Permit) in accordance with adopted plans and zoning regulations.

   e. Class 3 (120' AGL) and Class 4 (199' AGL) to continue to be subject to Special Use Permit review and approval by the Board of Supervisors. The possibility of Class 3 towers being permitted by administrative review and approval in limited circumstances, subject to additional review and permitting criteria, or both, should not be excluded from future consideration.

VIII. Implementation

Given the need for towers in achieving technology in daily life for citizens and businesses, the intent of the Wireless Plan is to set a policy for the towers. The plan reflects the desire to have the towers appropriately meet criteria for visibility and coverage objectives at the specific location. It is also important to have a review process that is straightforward and effective in meeting the time constraints of end users and applicants while protecting the public interest.

As this plan is a policy document, the focus is not on defining specific methods for review but to provide guidance in siting and design. In order to implement the recommendations in this plan, it is necessary to update the regulations in the Bedford County Zoning Ordinance. This ordinance currently governs wireless communication facilities in two sections, Article III as a zoning district overlay, and Article IV with the Use and Design Standards. The Zoning Ordinance should be updated to reflect any change in process implementation.

The current process for review and approval of new towers is through the Special Use Permit process. Co-locations of new antenna and related structures are done administratively through the site plan process. The recommended process is to develop a two-tier review for towers based on height.

Administrative Review

The Administrative Review process is designed to speed approval of applications that are low-impact in their nature and are preferable or at least conform with County policies regulating their use. Co-location or the shared use of an existing structure, extension of an existing structure to accommodate co-location, low-rise development, or any installation incorporating stealth techniques generally constitutes low- impact and are typically non-controversial and are considered under Administrative Review.

Under the Administrative Review process, the Zoning Administrator would be responsible for making the land use determinations. The application process will allow certain design elements or other site plan modifications to be incorporated into the design proposal as a condition of approval. Though the majority of applications received under the Administrative Review process are low-impact and would thus be viewed favorably, Administrative Review does not constitute a guarantee of approval. Each proposal is unique and its merits should be evaluated against County policies and regulations.

Review and approval of Class 1 (40’ AGL) wooden poles and Class 2 (80’ AGL) could be done using this process. The administrative process could even be examined as a permitting possibility in limited and more controlled situations involving Class 3 (120’ AGL) towers.

Special Use Permit Review

The Special Use Permit Review process is reserved for higher-impact proposals. Applications proposing antenna support structures taller than 80 feet AGL, extensions to an existing structure in excess of ten (10) feet, or development of facilities in the Corridor Overlay District, and in scenic roadway corridors, deserve greater scrutiny and consideration of their potential impacts on highly valued County resources. All proposals not considered under the Administrative Review process would come under Special Use Permit Review. This is the current process and should continue for Class 3 and Class 4 towers.

Advance Information and Planning

Applicants are encouraged, but not required, to meet with County planning staff prior to filing to obtain preliminary feedback. Establishing a dialogue in advance may save time and effort on the part of both parties. The disclosure of all relevant information is crucial to an informed decision. To increase access to information, some local governments require service providers to submit "master plans" annually. In theory, this requirement gives local officials an opportunity to consider plans in advance rather than responding to a series of individual siting applications, which often appear not to relate to a network design. In reality, service providers are reluctant to reveal their network designs in the interest of maintaining a competitive edge. Also, deployment plans are subject to revision and thus may be outdated at the time that an application is received.

The provision of advance information should be available to citizens as well. It is recommended that service providers be encouraged to meet in advance with community groups to discuss their plans for siting in their neighborhoods. Informational meetings would provide citizens with an opportunity to ask questions and suggest modifications to plans. At the very least, written notification should be made to citizens in the vicinity of any wireless communication facility proposal.

Applicants are usually represented at public hearings by an entourage of engineers, managers and lawyers to defend and argue for approval of their applications. Many local governments and citizens can be skeptical of the information supplied by the applicant, and thus engage their own experts to review this information. Wireless telecommunication is highly specialized and technically advanced. As is currently done, it is recommended that the County retain their own technical experts to review applications for wireless communication facilities and provide independent expert advice and consultation.

Site #	Owner	Site Name	Location	Type	FCC#	Latitude (DD)	Longitude (DD)	AGL	G.E.
BED-001	Commonwealth of Va.	State Police Alpha	Blue Ridge Ave	Lattice	N/A	37.33778	-79.55000	120	960
BED-002	American Tower Corp	Green Knob Mtn Alpha	Jeters Chapel Rd	Lattice	N/A	37.32056	-79.79583	100	2537
BED-003	Public Safety	Green Knob Mtn Bravo	7060 Jeters Chapel Rd	Lattice	N/A	37.32056	-79.79583	153	2537
BED-004	Charter Communications	Gladehill	425 Golden View Rd	Guyed	N/A	37.32444	-79.53667	116	1010
BED-005	U.S. Cellular	Turkey Ridge	Rt 1023	Monopole	1023804	37.28250	-79.81306	150	1681
BED-006	Crown Communication	Rock Castle	1086 Rock Castle Rd	Monopole	N/A	37.35139	-79.48861	194	926
BED-007	American Tower Corp/Alltel	Shiloh Church	106 Vista Centre Dr/US 221 N Graves Mills Exit	Monopole	1017526	37.37778	-79.25028	182	821
BED-008	Crown Communication	Grayson Wireless	306 Enterprise Dr	Monopole	1055135 (T)	37.37306	-79.25250	195	840
BED-009	Alltel/Verizon	Indered Farm Alpha	1865 Indered Farm Rd - Fleming MTN	Monopole	1024610	37.45278	-79.31500	110	2110
BED-010	U.S. Cellular	Indered Farm Bravo	1865 Indered Farm Rd - Fleming MTN	Monopole	1058225	37.45306	-79.31500	120	2110
BED-011	Nextel	Chamblissburg	6042 Saunders Road	Monopole	N/A	37.26333	-79.70583	80	1336
BED-012	Alltel	Bethany Church	1052 Ruby Hill Drive	Monopole	N/A	37.38083	-79.35194	80	932
BED-013	Crown Communication	Montvale JT	1656 Tapestry Rd - Jeep Trail	Lattice	1026926 (T)	37.38250	-79.66306	185'	2259'
BED-014	U.S. Cellular	No Business Mtn Delta	1763 Sweet Hollow Rd	Lattice	1002253	37.47028	-79.37611	290	2751
BED-015	U.S. Cellular	Dumpling Mtn	2081 Headens Bridge Rd	Lattice	1023805	37.20944	-79.48389	190	1100
BED-016	Saunders Volunteer Fire	Mariner's Landing	Deer Tail Dr	Lattice	N/A	37.09500	-79.57056	20	930
BED-017	M.L. Water & Sewer Co.	Mariner's Landing	Deer Tail Dr	Water Tank	N/A	37.09500	-79.57056	50'	930
BED-018	Trinity Broadcasting Network	No Business Mtn Alpha	1763 Sweet Hollow Rd	Guyed	N/A	37.47000	-79.37611	150	2749
BED-019	Capstar Radio Operating	No Business Mtn Bravo	1763 Sweet Hollow Rd / Big Island	Guyed	1216037	37.47056	-79.37472	200	2580
BED-020	Unknown	No Business Mtn Charlie	1763 Sweet Hollow Rd	Lattice	N/A	37.47222	-79.37389	198	2580
BED-021	Alltel	Boonsboro	Rocky Mountain Rd	Guyed	N/A	37.45806	-79.29972	120	970
BED-022	Montvale VFD	Montvale VFD	Int Goose Cr Valley Rd & Volunteer Rd	Lattice	N/A	37.38472	-79.73056	73	910
BED-023	American Tower Corp/Alltel	New London	12896 E Lynchburg Salem Trnpk	Monopole	1017539	37.30556	-79.29639	140	840
BED-024	American Tower Corp	Garcia	Garcia Dr	Monopole	N/A	37.16611	-79.61028	80	920
BED-025	U.S. Cellular	Bedford City	886 Helm St	Lattice	1023218	37.32556	-79.52028	185	1186
BED-026	Crown Communication	Perrowville	1445 Forest Rd	Monopole	N/A	37.36694	-79.30389	195	834
BED-027	U.S. Cellular	Forest Alpha	Rt 811	Guyed	1009122	37.33000	-79.31000	260	897
BED-028	N&W Railroad	Green Spring Church	Ace Lane	Lattice	N/A	37.21444	-79.72056	100	970
BED-029	Grant Broadcasing Sys.	Flat Top Mtn	Rt 689	Guyed	1026679	37.32083	-79.63250	830	1883

Exhibit 26.

BED-030	U.S. Cellular	Thaxton Mtn South	Rt 689	Guyed	1017000	37-18-50	79-38-12	300	1840
BED-031	WSET Inc	Thaxton Mtn North	Rt 689	Guyed	1016546	37-18-55	79-38-05	1160	1919
BED-032	Crown Communication	Farrington	1195 Farrington Lane	Monopole	1231750	37-19-01	79-28-47	195	892
BED-033	Crown Communication	Whorley Farm	1331 Colony Height Rd	Monopole	N/A	37-17-18	79-23-5	196	818
BED-034	Crown Communication	Smith Mtn Dam	3631 Silver Dollar Ln	Lattice	1016373 (T)	37-03-01	79-31-34	185	1569
BED-035	American Tower Corp	Smith Mtn Radio Tower	3631 Silver Dollar Ln	Lattice	N/A	37-02-57	79-31-38	88	1580
BED-036	Unknown	Smith Mtn Lookout Tower	3631 Silver Dollar Ln	Lattice	N/A	37-02-56	79-31-38	67	1625
BED-037	County of Bedford	Operations Center	1345 Falling Creek Rd	Lattice	N/A	37-18-50	79-30-24	185	933
BED-038	Alltel/Verizon	Wingfield Mtn	Near Existing Fire Tower/1089 Deer Ln	Lattice	1017540	37-19-14	79-31-22	64	1262
BED-039	Crown Communication	Boonesboro	6101 Boonesboro Rd	Monopole	N/A	37-26-54	79-15-42	148	912
BED-040	SBA Towers (TowerCo)	Davis Mill - Brown	12181 Moneta Road	Monopole	1249506	37-11-39	79-36-27	100	951
BED-041	Verizon Wireless	Staunton River HS	1293 Golden Eagle Drive	Monopole	N/A	37-14-33	79-37-24	120	1027
BED-042	SBA Towers (TowerCo)	Chamblissburg	6042 Saunders Road	Monopole	1249611	37-15-48	79-42-21	90	1336
BED-043	SBA Towers (TowerCo)	Mead Mountain	1230 Emmaus Church Road	Monopole	1256070	37-14-24	79-40-12	80	1093
BED-044	SBA Towers (TowerCo)	Body Camp	1242 Shades Branch Lane	Monopole	1256068	37-13-35	79-33-59	80	906
BED-045	SBA Towers (TowerCo)	Bunker Hill	Across from 4083 Moneta Drive	Monopole	1256069	37-16-47	79-33-6	80	1121
BED-046	Verizon Wireless	Moneta-Brown	12177 Moneta Road, Moneta	Monopole	N/A	37-11-39	79-36-26	100	950
BED-047	AT&T	Shades Branch	1356 Shades Branch Lane	Monopole	N/A	37-13-33	79-34-13	80	921
BED-048	AT&T	Stewartsville-Cawley	13226 Stewartsville Road	Monopole	N/A	37-16-7	79-45-59	80	1030
BED-049	AT&T	Meads Store	1144 Meadors Spur Road, Moneta	Monopole	N/A	37-14-16	79-39-19	78	990
BED-050	AT&T	Homeplace	Bowyers Loop, Bedford	Monopole	N/A	37-15-36	79-32-55	78	1042
BED-051	Bedford E-911	Porter Mountain	3575 Sandy Ford Rd, Blue Ridge	Lattice	N/A	37-20-36	79-42-43	160	2125
BED-052	Alltel	Goode	1172 Horseshoe Rd, Goode	Monopole		37-21-43	79-26-04	100	908
BED-053	CAER	CAER Tower	New London Bus. & Tech Ctr	Platform		37-18-6.3	79-20-21.1	120	880
BED-054	Verizon Wireless	Burton	7219 Lee Jackson Hwy, Big Island	Monopole		37-30-22	79-18-49	80	865
BED-055	Verizon Wireless	Bell Hill	12066 Lee Jackson Hwy, Big Island	Monopole		37-32-48	79-22-19	80	881
BED-056	Verizon Wireless	Goode	6979 Forest Rd, Goode	Monopole		37-21-54	79-25-50	90	874
BED-057*	AT&T (Denied)	Cotton Town	2940 Perrowville Rd, Forest	Monopole		37-23-19	79-19-34	160	887
BED-058	Verizon Wireless	Bedford	1089 Deer Lane, Bedford	Monopole		37-19-14	79-31-22	124	1273
BED-101	nTelos	Wilkerson Mill	Intersection of Rt 460/221 & Wilkerson Mill Rd	Pole	N/A	37-21-57	79-41-27	60	1098
BED-102	Commonwealth of Virginia	State Police Bravo	N. of Blue Ridge Ave-Rt 460 W of Bedford	Pole	N/A	37-20-16	79-33-00	70	960
BED-103	Crown	Abbott	3641 E Lynchburg - Salem Trnpk	Pole	N/A	37-18-49	79-27-24	80	825
BED-104	nTelos	Sheetz	Rt 460 & Rt 811	Pole	N/A	37-18-16	79-18-33	80	860
BED-105	Verizon	Boxley Quarry	Quarry Rd.	Pole	N/A	37-24-02	79-47-10	45	2059
BED-106	U.S. Cellular	Forest 2	Annjo Court	Pole	N/A	37-22-3	79-15-17	100	885

BED-107	U.S. Cellular	Big Otter	6979 Forest Rd.	Pole	N/A	37-21-55	79-25-49	80	880
BED-108	T-mobile (Devon)	New London	Route 460	Pole	N/A	37-18-22	79-18-56	80	859
BED-109	Conterra	Body Camp	1051 Elementary Way, Bedford	Pole	N/A	37-13-33	79-31-8	76	985
BED-110	Conterra	Boonsboro	1234 Eagle Circle, Lynchburg	Pole	N/A	37-27-11	79-15-41	111	925
BED-111	Conterra	Huddleston	1027 Huddleston Drive, Huddleston	Pole	N/A	37-9-49	79-28-21	80	791'
BED-201	AEP	Fantasyland	Rt. 746	Lattice	N/A	37-18-6	79-34-7	144	1020
BED-202	AEP	Ferguson Farms	4083 Moneta Rd.	Lattice	N/A	37-17-36	79-32-48	114	1010
BED-203	AEP	Southern Air	2655 Lakeside Dr.	Lattice	N/A	37-23-40	79-13-57	110	874
BED-204	AEP	Johnson School	Rt 460/221 & Johnson School Road	Lattice	N/A	37-21-02	79-37-52	140	970
BED-205	AEP	Beagle Club	Beagle Club Rd & Stewartsville Rd	Monopole	N/A	37-16-48	79-49-57	95	1040
BED-206	AEP	Boxley Quarry	Quarry road	Lattice	N/A	37-24-01	79-47-10	117	1975
BED-207	AEP	Bunker Hill	Rt 122	Lattice	N/A	37-17-28	79-32-46	196	1020
BED-208	SEC	Lone Gum	Smith Mtn Pkwy	Lattice	N/A	37-10-46	79-25-54	45	970
BED-209	AEP	Leesville Lake	Rt 834	Lattice	N/A	37-04-38	79-27-29	110	1040
BED-210	SEC	Whitehouse Substation	Rt 836	Lattice	N/A	37-07-44	79-35-31	50	1030
BED-211	AEP	Ivy Creek	115 Mill Acres Drive	Monopole	N/A	37-24-45	79-15-39	110	800
BED-212	AEP	Centerville Substation	Rt 644 Fancy Farm Road	Lattice	N/A	37-22-29	79-30-7		977
BED-213	AEP	Thaxton	N. of Rt 460--Adj to RR tracks	Lattice	N/A	37-20-59	79-34-46	147	1020
BED-214	AEP	Skimmer Station	Skimmer Station Trail - Big Island	Lattice	N/A	37-31-11	79-21-4		760
BED-215	AEP	Union Church	1485 Union Church Road	Lattice	N/A	37-20-56	79-37-47	140	1020
BED-216	AEP	Cheese Creek	5134 Boonesboro Rd	Lattice	N/A	37-26-33	79-15-00	110	840
BED-217	AEP	Chamblissburg	Dickerson Mill Rd.	Guyed	N/A	37-15-18	79-41-28	97	1150
BED-218	AEP	Shady Grove	Rt 616	Lattice	N/A	37-18-39	79-43-13	103	880
BED-219	AEP	Hawkins Mill	4762 Hawkins Mill Rd	Lattice	N/A	37-25-58	79-15-57	100	920
BED-220	AEP	Pipeline	Old Farm Rd	Lattice	N/A	37-25-45	79-17-25	100	920
BED-221	AEP	Boxley Quarry	W. of Rt 460 - Substation	Lattice	N/A	37-23-10	79-47-52		1350
BED-222	AEP	Norwood	1304 Heavens Dr.	Lattice	N/A	37-24-04	79-22-47	103	1303
BED-223	AEP	Chestnut Mtn	1389 Chestnut Dr	Monopole	N/A	37-16-25	79-50-54	134	1436
BED-224	AEP	Stewartsville	107 Timberline Trail	Monopole	N/A	37-16-39	79-50-17	104	1163
BED-301	Unknown	Coltons Mill	Intersection of 122 & Hurricane Drive	Silo	N/A	37-27-14	79-28-6	70	908
BED-302	Unknown	Otterville	Intersection of 122 & Craun Lane	Silo	N/A	37-26-42	79-28-29	70	927
BED-303	DeWitt	Peaksville	Near 43 at Jopling Road	Silo	N/A	37-24-14	79-33-9	70	935

BED-304	American Tower	Moneta	15177 Moneta Road	Monopole	N/A	37-10-18	79-37-56	80	965
BED-305	Unknown	Moles Farm	On 24 near Moles Farm Road	Silo	N/A	37-15-38	79-44-46	70	970
BED-306	James Arthur	Timberidge	4256 Timberidge Rd	Silo	N/A	37-19-14	79-25-34	60	820
BED-307	Janice Whorley DeMasters	Goode	1187 Goode Rd	Silo	N/A	37-18-19	79-21-37	80	893
BED-401	Unknown	Convenience Center	Rt. 643 - Jopling Road	Raw Land	N/A	37-25-43	79-29-55		984
BED-402	Unknown	Convenience Center	Intersection of Bunker Hill Lp & Joppa Mill Rd	Raw Land	N/A	37-16-31	79-33-03		1070
BED-403	Unknown	Convenience Center	Intersection of Rt 24 & Wilson Church Road	Raw Land	N/A	37-13-23	79-30-49		990
PSA1	Bedford County PSA	Altha Grove Tank	6861 Cottontown Road	Water Tank	N/A	37-25-14	79-18-16	43	1032
PSA2	Bedford County PSA	Mountain View Shores	Deerwood Drive	Water Tank	N/A	37-3-59	79-32-28	88	900
PSA3	Bedford County PSA	Stewartsville Tank	210 Cascade Drive	Water Tank	N/A	37-16-41	79-48-36	34	1301
PSA4	Bedford County PSA	Smith Mtn Lake Tank	1830 Radford Church Rd	Water Tank	N/A	37-8-28	79-36-33	182	1059
PSA5	Bedford County PSA	New London Tank	2112 Harvest Lane	Water Tank	N/A	37-18-33	79-20-32	163	913
CAM-001	Liberty University	Johnson Mtn	1050 Uphill Trail	Guyed	1020716	37-11-51	79-21-06	580	1335
FR - 001	U.S. Cellular	Smith Mtn Lake #1	Rt 122	Guyed	1016998	37-08-36	79-40-41	300	904
LYN-001	Hubbard's Advertising	Chapel Lane	309 Chapel Lane	Guyed	1016649	37-24-25	79-13-56	345	705
LYN-201	AEP	Blue Ridge Farms	Lynchburg Expressway - Transmission twr	Lattice	N/A	37-25-38	79-14-02	100	690
PIT-001	AEP	Smith Mtn Lake Dam	Rt 778 - On Smith MTN	Lattice	N/A	37-01-06	79-34-00	150	1470

Exhibit 27.