



**NEW YORK SMSA LIMITED PARTNERSHIP d/b/a  
VERIZON WIRELESS**

**KINGSTON TRAP ROCK SITE**

**122 LAUREL AVE  
FRANKLIN TOWNSHIP, NJ**

**RF ANALYSIS AND REPORT  
SEPTEMBER 10, 2019**

**Dominic C. Vilecco  
David K. Stern**

NJ Board of Professional Engineers  
Certificate of Authorization No. 24GA28156300

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## EXPERT WITNESS RF ANALYSIS AND REPORT

V-COMM, L.L.C. has been retained by NEW YORK SMSA LIMITED PARTNERSHIP d/b/a Verizon Wireless to provide expert analysis in association with its proposed wireless communications facility at the Treepole located at 122 Laurel Ave, Franklin Township, NJ.

### QUALIFICATIONS

V-COMM, L.L.C. is a telecommunications engineering firm primarily focused on providing engineering and related business services to network operators in the telecommunication industry as well as municipalities. V-COMM was founded in late 1995 with the intent of providing services to the emerging wireless and wired segments of the telecommunication industry. V-COMM's client base includes PCS operators, cellular, paging, ESMR and microwave operators, utility/telecommunications cooperatives, cable TV operators and Competitive Local Exchange Carriers (CLECs) and Local Governments. Services performed for these clients over the past twenty years include:

- Business and Strategic Planning
- Capital and Operational Expenditure Modeling
- Infrastructure Requests for Proposal (RFPs) and Analysis
- Infrastructure Contract Negotiation
- Technical and Financial Support in Obtaining Vendor and Equity Financing
- Interconnect Contract Negotiation
- RF Network Design, Implementation and Optimization
- Interconnect Network Design, Implementation and Optimization
- Telephony Signaling (SS-7) and Vertical Systems Design and Implementation
- Local Government Communication Systems
- Project Management of Network Implementation
- Expert Witness Zoning Testimony
- License Tender/Bid Technical Support

*(Please see Mr. Villecco's and Mr. Stern's resumes at the end of the report)*

### THE CARRIER:

NEW YORK SMSA LIMITED PARTNERSHIP d/b/a Verizon Wireless has the B-Band Cellular License (880-894 MHz) and is licensed by the FCC to provide service in the New York, NY—NJ/Nassau—Suffolk CMA for Cellular, which includes Somerset County, New Jersey. Further, CELLCO PARTNERSHIP d/b/a Verizon Wireless has the C-Band Personal Communications Service (PCS) Licenses (1975-1990 MHz), the F-Band Personal Communications Service (PCS) Licenses (1970-1975 MHz), the A Band and B Band Advanced Wireless Services (AWS) Licenses (2110-2130) and the 700 MHz Upper C-Band License (746-757 MHz) and is licensed by the FCC to provide service in the New York BTA for PCS, in the New York – North New Jersey—Long Island BEA and New York, NY—NJ/Nassau—Suffolk CMA for AWS, and in the Northeast REA for 700 MHz, which includes Somerset County, New Jersey.



## WIRELESS SYSTEMS

The FCC licenses a specific amount of Radio Frequency (RF) spectrum to each wireless carrier and stipulates that each carrier efficiently uses that spectrum to support its wireless customers. Traditionally, wireless carriers have achieved this efficiency by continuously reusing the allocated radio frequencies throughout their licensed service area. This is accomplished by building small radio base stations, or cell sites, in a particular pattern (also known as a grid). The application of the grid concept affords a wireless carrier the ability to effectively and efficiently plan the reuse of radio frequencies more easily. By following proper planning techniques (as originally defined by Bell Labs and further refined by the wireless industry), the same radio frequency can be reused at reasonably close intervals throughout the licensed area, without causing harmful interference. Noisy or dropped calls or the inability to originate a call are typical manifestations of harmful interference. When designing a wireless network, an RF Engineer starts with a theoretical grid pattern and applies it to the licensed area. Each licensed area has many variables that can affect the design and must be considered. These variables include terrain features, land use considerations, zoning ordinances, use of existing structures, traffic distribution and many others. In order to provide effective coverage while maintaining an efficient frequency reuse plan, the design engineer must perform a balancing test of all applicable variables. The primary variables that the engineer must take into consideration are the location and the overall height of the cell site. If a cell site is too high, it will have increased coverage, but cause interference throughout the rest of the wireless network thereby significantly affecting network efficiency. If a cell site is too low, it will provide ineffective coverage.

A proper wireless network design begins with strategically located cell sites. At each cell site there is a building, tower, water tank or other structure on which antennas are mounted. Typically, radio-transmitting equipment (base station) is located at the base of the structure. Radio signals leave the base station and travel through transmission lines to the antennas, or from fiber optic cable to the remote radio head (RRH) at the top of structure and then to the antennas. Radio signals are broadcast through the antennas and travel to the customer's wireless phone, completing a call. When a wireless customer places a call, the signal is received by the antennas and travels down the transmission line and into the base station. The base station converts the signal into digital data and combines it with all the other wireless calls and digital traffic at that cell site. This data is then sent over fiber optic digital leased lines to the main switching computer. The main switching computer or Mobile Switching Center (MSC) is interconnected to the Public Switched Telephone Network (PSTN) and Internet service providers, where calls are routed to other wireless or land-line phones or Internet locations.

As this technology enables mobile calling, once a wireless call is originated and the customer travels away from the cell site of origination, the system tracks the changes and begins a process of determining whether there is a better serving cell site. Upon determination of a stronger serving site, the system automatically switches the wireless customer over to the new cell site. This process is known as a handover and allows for seamless coverage within a wireless carrier's service area. By design, this process is supposed to happen so quickly that the wireless customer does not perceive it. If the network is designed efficiently, there is no interruption of service and connection quality remains adequate. This efficient design includes the proper location of sites with minimal variance from the original grid pattern.



**VERIZON WIRELESS EXISTING AND PROPOSED SITES IN AND AROUND FRANKLIN TOWNSHIP**

V-COMM has identified Verizon Wireless’ existing antenna support structures that provide coverage to the Township of Franklin. The structures are listed in Table 1 below and depicted on the attached Map 1 – Existing Sites In and Around Franklin Township.

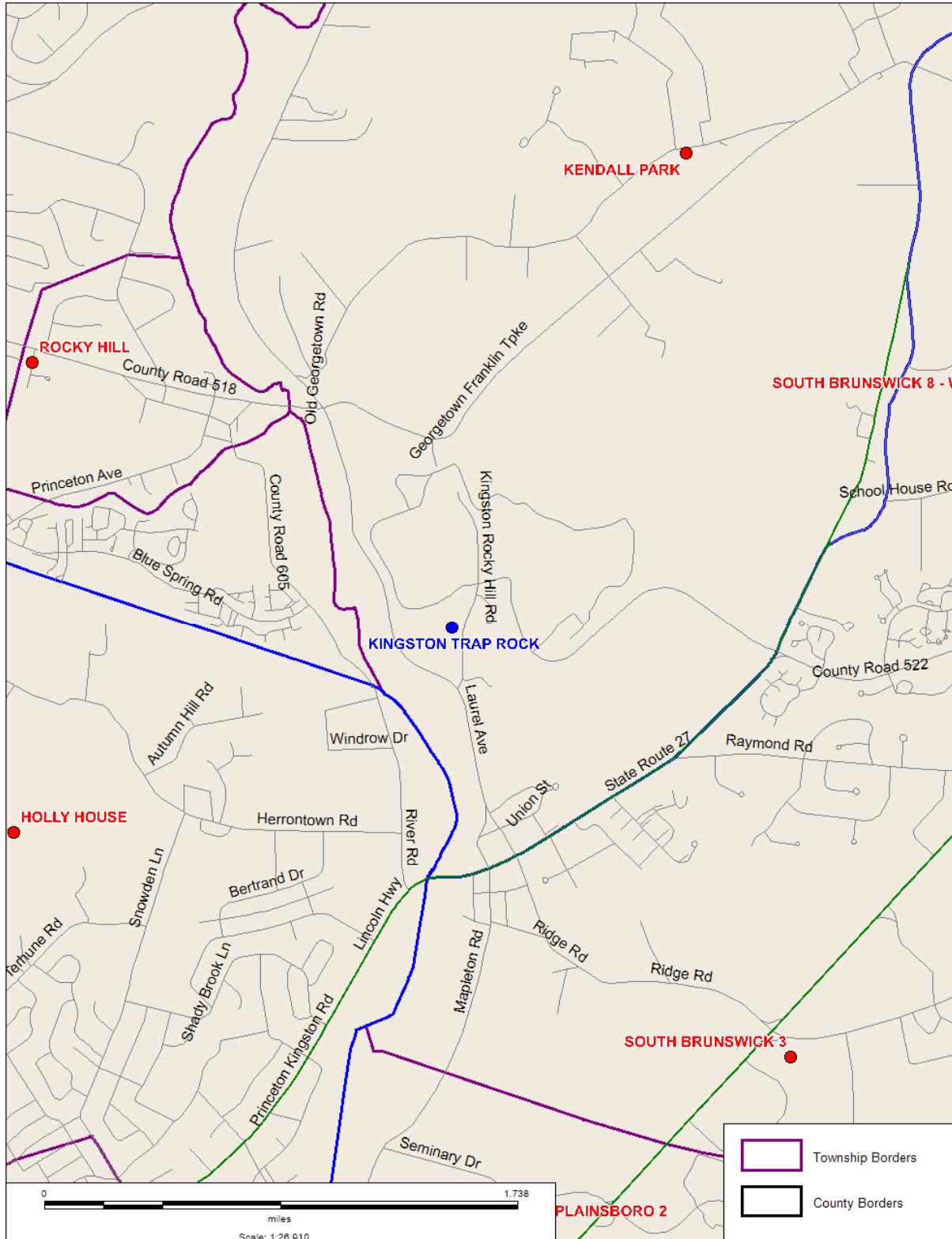
**TABLE 1 – VERIZON WIRELESS EXISTING AND PROPOSED SITES IN AND AROUND FRANKLIN TOWNSHIP**

Cell No.	Cell Name	Address	Structure	Structure Ht. in Ft.	Antenna C/L in Ft.
<i>Subject Site</i>	Kingston Trap Rock	122 Laurel Ave Franklin Township	Treepole	128	120
130	South Brunswick 3	100 Independence Way Monmouth Junction	Monopole	120	110
96	South Brunswick 8	5 Fernwood Drive Princeton	Water Tank	201	153
227	Rocky Hill	Young Drive (SE of Route 206/518 Intersection) Rocky Hill	Building	100	88
255	Kendall Park	63 Old Georgetown Road Rocky Hill	Lattice Tower	256	130
279	Plainsboro 2	201 Village Blvd Princeton	Building	90	77 & 80
PHI - 273	Holly House	1 Holly House Princeton	Building	68	70

The existing sites are depicted with red dots and the subject site is depicted with a blue dot on the map below.



### MAP 1 - VERIZON WIRELESS EXISTING AND PROPOSED SITES IN AND AROUND FRANKLIN TOWNSHIP





## RF COVERAGE

The critical issue for Verizon Wireless is the provision of “substantial” Radio Frequency (RF) service to serve its wireless customers. The wireless industry is governed by the Rules of the FCC. The FCC mandates in CFR 47, Parts §22.940 and §24.16 that each carrier must provide “substantial service” in its licensed service area, or risk having their license revoked. The FCC defines “substantial service” as service which is sound, favorable, and substantially above a level of mediocre service.

A metric called Reference Signal Received Power (RSRP) is used to specify the coverage capabilities of the Verizon Wireless network. This standard has been chosen to best represent the Long-Term Evolution (LTE) data technology (also known as 4G) being utilized as well as the Voice-Over LTE (VoLTE) technology, which is being deployed on 4G to augment and ultimately replace Verizon’s wireless voice capacity. RSRP is the average received power over all resource elements that carries a reference signal. Resource elements are the fundamental unit of frequency allocation in LTE and carry the information from the cell site to the mobile device and back. The reference signal is one of the components of the LTE channel that the mobile receiver uses to determine the channel power.

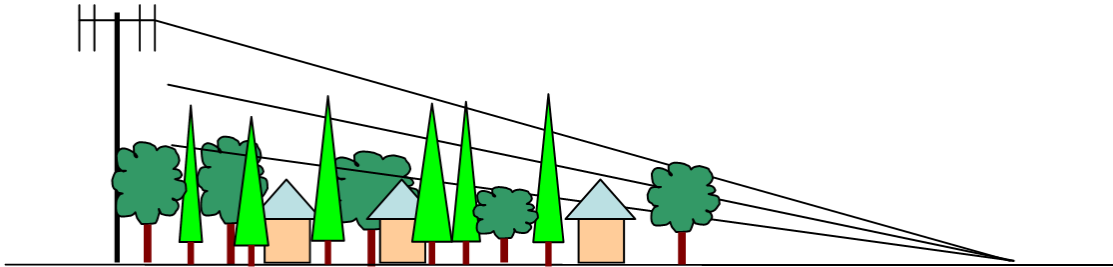
RSRP is measured in units of “decibels” referenced against 1 milliwatt, or dBm. The decibel is a logarithmic unit that allows ratios to be added or subtracted. The definition formula for decibels referenced against 1 milliwatt is  $dBm = 10 \log(P / 1mW)$  with P measured in milliwatts. So 10 mW would be 10dBm, 100 mW would be 20dBm, etc.

The service boundary of a 4G site is defined using RSRP equating to an acceptable receiver signal threshold. This value is derived from industry standards, 4G received signal levels and quality and acceptable signal to noise ratios, along with statistically quantifiable variations in terrain. This threshold must also take into account additional losses associated with location of the mobile user.

To comply with FCC Rules, Verizon Wireless must provide service to all of its users including those in buildings. In order to account for users within buildings, additional margin must be added to RSRP so that adequate coverage exists inside. Industry standards and Verizon Wireless engineering policy adds an additional 10dB of margin to RSRP to be used for light suburban areas, with increasing values for higher density land usage. This additional margin also is required for in-vehicle service specifically to account for increased Path Loss associated with the use of hands-free headsets, where the phone usually winds up on the seat or center console.

As the antenna center line (ACL) descends from the proposed 120 feet, it enters into a range where clutter becomes an increasingly problematic factor. Examples of clutter are trees, houses, buildings, soil, and other physical objects on the ground. Clutter attenuates or weakens and disperses, the RF energy necessary for wireless telecommunications. As the ACL descends, RF energy is increasingly attenuated by the total accumulated volume of clutter. A graphic depiction of attenuation is found in Figure 1 (not to scale).

**FIGURE 1 – IMPACT OF CLUTTER**



V-COMM uses an industry standard RF computer-aided design tool to aid in the design of wireless networks. This tool can generate a plot of RSRP that shows underlying geographic (highways, arterial roads, etc.). For the Township of Franklin, the subject site is in a predominately suburban area. The propagation map is drawn showing the region where the RSRP equates to the minimally acceptable received signal level for adequate service, as measured at the mobile's receiver. The propagation map includes the RSRP of the surrounding environment including the attenuation of In-Building and In-Vehicle use of service.

In the case of the Kingston Trap Rock site, Verizon Wireless lacks adequate 4G signal coverage. Therefore, the purpose of the proposed location is to fill the gap of the existing Verizon Wireless sites. Without this signal fill site, Verizon Wireless subscribers will experience gaps in service caused by insufficient signal strength.

The green shaded areas on the propagation maps represent the acceptable RSRP threshold, at the AWS frequency, as described above. Where there is no green shading between the sites, there is less than adequate service, which results in dropped calls, missed calls and lost data and data connectivity. These areas are known as gaps, where there is insufficient coverage to originate, maintain or receive calls from "Public Switched Telephone Network" and the Internet for VoLTE calls and data sessions.

Outside of the sites (towards the edges of the coverage maps) there may be coverage from other sites but these sites have been eliminated from this report as they do not impact the area surrounding the subject location and to keep focus on the sites in and around the Township of Franklin.

The propagation maps generated at 1:26,910 scale show Verizon Wireless sites in the Township of Franklin, with -100 dBm RSRP at the AWS frequency (2120 MHz). In addition to the RSRP level, the coverage that is generated from a given site is dependent upon the Verizon Wireless' licensed frequency band, the height of the antenna above the ground, as well as the terrain and morphology around the site.

## **VERIZON WIRELESS SERVICE**

### **RF Coverage Deficiency**

V-COMM analyzed whether there was sufficient RF coverage and found that there was a gap in coverage for Verizon Wireless in the PCS and AWS frequency bands. Verizon Wireless' FCC licensed frequencies allow for 1 LTE channel in the 700 MHz band and 1 LTE channel in the 2120 MHz AWS band, as well as a future LTE channel in the PCS band. However, if the existing coverage in the 2120 MHz frequency band,



or PCS band, is not adequate, which is the case in this section of the Township of Franklin, then a new wireless facility is needed.

When Verizon Wireless Radio Frequency engineers identify a coverage gap in the system or sites that have or will reach data capacity exhaustion, they issue a search area in order to locate a possible site to fill this gap in wireless coverage or resolve the capacity problem. A search area is a geographical area located within the poor service area. A search area is designed such that if a wireless telecommunications facility is located within its area at an appropriate height, it will provide the required coverage. The goal of this search area is to provide full and seamless coverage to users of Verizon Wireless' services in and around the subject site.

Verizon Wireless personnel investigated the area for suitable locations to fill the gaps in service and found the property located at 122 Laurel Ave, Franklin Township, NJ. This site was analyzed using computer modeling, as well as a site visit. It was determined that this site would fulfill the objectives for Verizon Wireless' system throughout this section of the Township of Franklin. Therefore, this site can be used to meet the requirements of the intended search area.

The proposed site will provide Verizon Wireless with additional 700 MHz LTE capacity and improved coverage for the PCS and AWS frequencies. The improved coverage will allow for additional LTE capacity in the PCS and AWS frequency bands as well.

Verizon Wireless utilizes LTE technology for its wireless base stations. Currently, Verizon Wireless has 6 existing sites immediately surrounding the subject site, as previously outlined in Table 1.

The Kingston Trap Rock site will be located on a proposed 128 foot Treepole located at 122 Laurel Ave in Franklin Township. Verizon Wireless proposes to install its antenna at a centerline of 120 feet Above Ground Level (AGL).

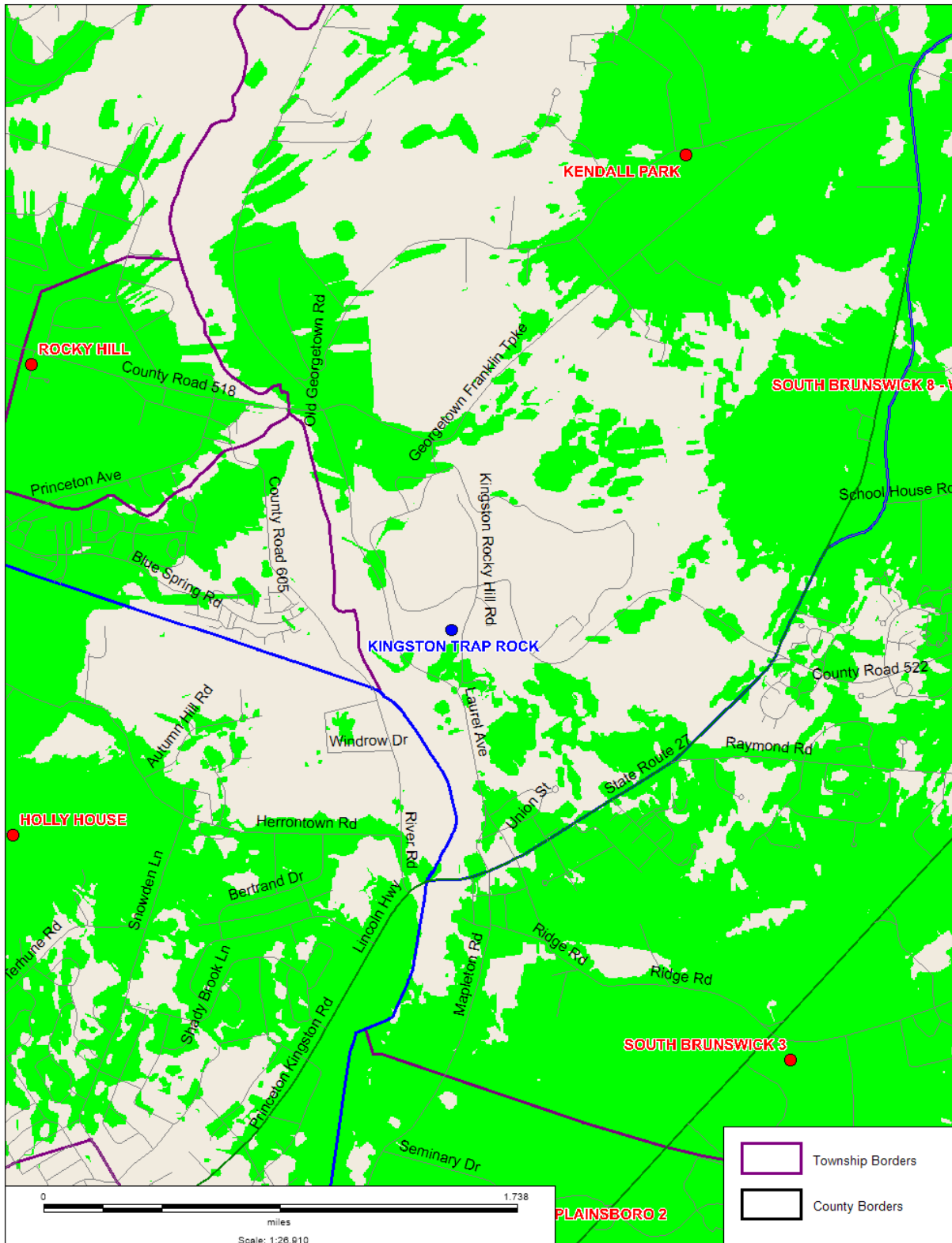
The propagation map titled "Map 2 - Verizon Wireless Existing Sites Coverage" depicts service from the closest existing sites without the proposed site. The map demonstrates that there is a coverage gap along County Rd 518, County Rd 603/Kingston Rocky Hill Rd, River Rd, NJ-27/Main St and other small streets within this boundary.

The propagation map titled "Map 3 - Verizon Wireless Coverage with" Kingston Trap Rock" Site" depicts the service from the closest existing sites along with coverage from the subject "Kingston Trap Rock" site. The subject site fills in most of the coverage gaps with sufficient signal and provides service through this part of the Township of Franklin.

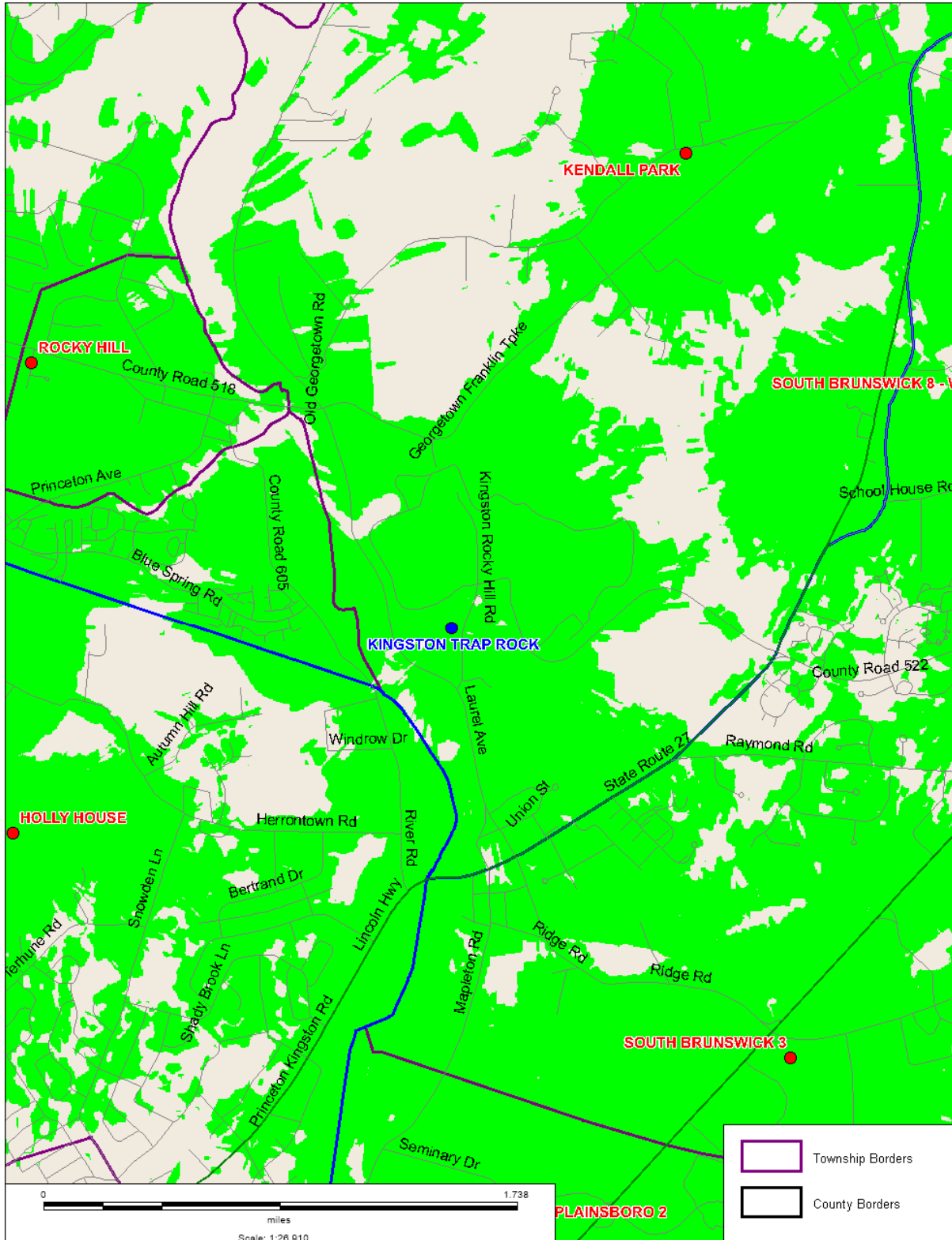
The proposed centerline height of 120 feet AGL is the minimum height possible at this location to provide the desired reliable coverage. The location of the site will also provide capacity relief to the adjacent sites including the Rocky Hill and South Brunswick 3 sites.



### MAP 2 - VERIZON WIRELESS EXISTING SITE COVERAGE



### MAP 3 - VERIZON WIRELESS COVERAGE WITH "KINGSTON TRAP ROCK" SITE





## ALTERNATIVE LOCATIONS

The subject site was identified as a suitable location for a wireless communications facility and it also met Verizon Wireless' coverage objectives. A thorough review was conducted to determine whether there were any existing structures of suitable height upon which Verizon Wireless could mount its antennas.

### PRIORITY LOCATIONS

In accordance with section 112-58A(1) of Franklin Township Wireless Ordinance the placement of wireless communication antennas shall only require review and approval by the Technical Review Committee (TRC). The placement of these antennas shall be considered a permitted use in the subject zoning district and therefore shall not require conditional use approval, nor shall any variance be required. Section 112-58A(1)(b) states wireless communication equipment can be placed on the following existing structures:

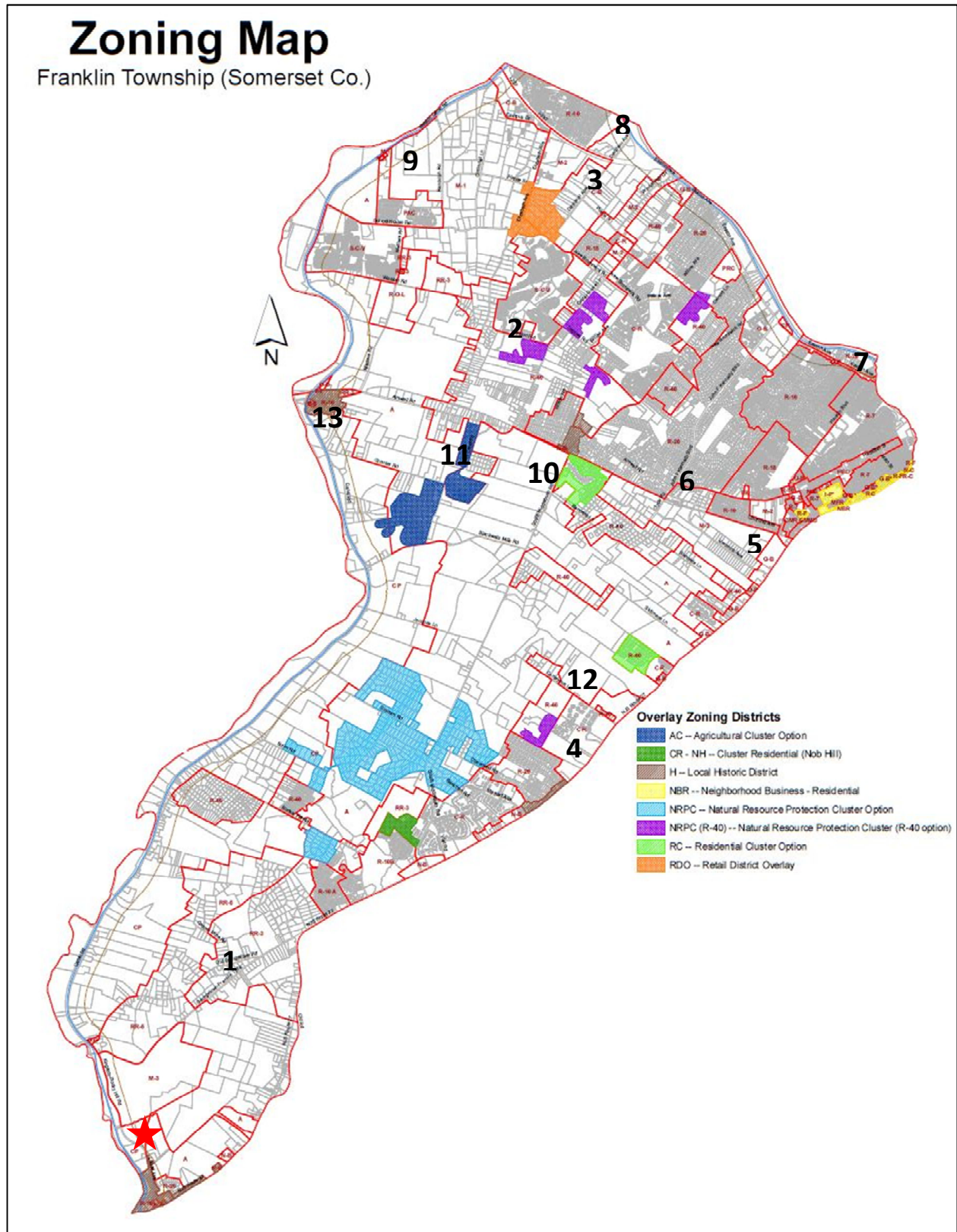
Site ID Number	Site Location	Type of Existing Structure and Location of Antennas	Reason not approved as Proposed Site Location
1	43 Old Georgetown Road	Lattice Tower	Currently used by Verizon Wireless for Kendall Park Site
2	281 Cedar Grove Lane	Monopole	Verizon Wireless located on a Monopole near this location
3	275 Davidson Avenue	"The Tower" Building	Priority Location too far from coverage gap
4	Route 27 (near Finnigans)	Monopole	Priority Location too far from coverage gap
5	78 Veronica Avenue	Lattice Tower	Priority Location too far from coverage gap
6	Hamilton & Veronica	Monopole	Verizon Wireless located on Monopole near this location
7	575 Easton Avenue	"Harrison Towers" Building	Priority Location too far from coverage gap
8	8 Davidson Avenue	"Marriott" Building	Verizon Wireless located on Building near this location
9	Off Randolph Road	Elizabethtown Water Tank	Priority Location too far from coverage gap
10	Bennetts Lane (near Middlebush)	Power Line Towers	Priority Location too far from coverage gap
11	Grouser & Van Cleef	Power Line Towers	Priority Location too far from coverage gap



<b>Site ID Number</b>	<b>Site Location</b>	<b>Type of Existing Structure and Location of Antennas</b>	<b>Reason not approved as Proposed Site Location</b>
12	Route 27 (near Cortelyous)	Power Line Towers	Currently used by Verizon Wireless for Franklin Park Site
13	E. Milestone (Grouser)	Power Line Towers	Currently used by Verizon Wireless for East Millstone Site

Map 4 below shows the Franklin Township First Priority locations and displays the approximate location of the structures, along with the proposed site location (labeled with red star). The proposed site “Kingston Trap Rock Site” will be located in zoning district CP-Canal Preservation which is not township owned land.

## MAP 4 – FIRST PRIORITY LOCATIONS FOR WIRELESS COMMUNICATION ANTENNAS





## **COMPREHENSIVE PLAN**

Verizon Wireless is committed to providing full and adequate service throughout the Township of Franklin. No additional sites are planned for this area other than the proposed “Kingston” site.

## **ALTERNATIVE TECHNOLOGIES**

As part of this analysis, V-COMM investigated the use of alternative technologies such as microcells or small network nodes and found that in a suburban area like the Township of Franklin as many as 20 to 25 small network nodes, evenly distributed, would be needed to provide the same coverage as a single macrocell (full-size wireless communication facilities). Typically, small network nodes are used in a campus or dense urban environment to provide capacity or coverage in a specific venue to supplement the existing coverage and capacity of the macrocell network. Taking into account the coverage, capacity and design requirements of macrocell networks, it is not practical to deploy small network nodes as an alternate technology to meet Verizon Wireless’ coverage requirements in the Township of Franklin.



## CONCLUSIONS

V-COMM reviewed the materials provided by Verizon Wireless and prepared an analysis of the existing cell sites, their respective RF coverage and System Data usage. With the existing sites, there is a substantial gap in coverage which restricts Verizon Wireless customers from originating, maintaining or receiving calls from the “Public Switched Telephone Network” for VoLTE calls. It is our expert opinion that Verizon Wireless’ subject site at the building located at 122 Laurel Ave in Franklin Township, NJ, will satisfy the coverage and 4G data needs of Verizon Wireless and its subscribers in this portion of the Township of Franklin.

In addition, V-COMM has reviewed the overall system plan for Verizon Wireless in the Township of Franklin and finds that the plan is sound and consistent with industry standards and practices.

Dominic C. Vilecco  
President, V-COMM, L.L.C.

9/10/2019

David K. Stern  
Vice President, V-COMM, L.L.C.

9/10/2019

**Peter Longo, P.E.**  
**NJ Professional Engineer License #24GE03476100**

9/10/2019

**Date**



**Dominic C. Villecco  
President and Founder  
V-COMM, L.L.C.**

Dominic Villecco, President and founder of V-COMM, is a pioneer in wireless telecommunications engineering, with 36 years of executive-level experience and various engineering management positions previously. Under his leadership, V-COMM has grown from a start-up venture in 1996 to a highly respected full-service consulting telecommunications engineering firm.

In managing V-COMM's growth, Mr. Villecco has overseen expansion of the company's portfolio of consulting services, which today include a full range of RF and Network support, network design tools, measurement hardware, and database services as well as time-critical engineering-related services such as business planning, zoning hearing expert witness testimony, regulatory advisory assistance, and project management.

Before forming V-COMM, Mr. Villecco spent 10 years with Comcast Corporation, where he held management positions of increasing responsibility, his last being Vice President of Wireless Engineering for Comcast International Holdings, Inc. Focusing on the international marketplace, Mr. Villecco helped develop various technical and business requirements for directing Comcast's worldwide wireless venture utilizing current and emerging technologies (GSM, PCN, ESMR, paging, etc.).

Previously he was Vice President of Engineering and Operations for Comcast Cellular Communications, Inc. His responsibilities included overall system design, construction and operation, capital budget preparation and execution, interconnection negotiations, vendor contract negotiations, major account interface, new product implementation, and cellular market acquisition. Following Comcast's acquisition of Metrophone, Mr. Villecco successfully merged the two technical departments and managed the combined department of 140 engineers and support personnel.

Mr. Villecco served as Director of Engineering for American Cellular Network Corporation (AMCELL), where he managed all system implementation and engineering design issues. He was responsible for activating the first cellular system in the world utilizing proprietary automatic call delivery software between independent carriers in Wilmington, Delaware. He also had responsibility for filing all FCC and FAA applications for AMCELL before it was acquired by Comcast.

Prior to joining AMCELL, Mr. Villecco worked as a staff engineer at Sherman and Beverage (S&B), a broadcast consulting firm. He designed FM radio station broadcasting systems and studio-transmitter link systems, performed AM field studies and interference analysis and TV interference analysis, and helped build a sophisticated six-tower arrangement for a AM antenna phasing system. He also designed and wrote software to perform FM radio station allocations pursuant to FCC Rules Part 73.

Mr. Villecco started his career in telecommunications engineering as a wireless engineering consultant at Jubon Engineering, where he was responsible for the design of cellular systems, both domestic and international, radio paging systems, microwave radio systems, two-way radio systems, microwave multipoint distribution systems, and simulcast radio link systems, including the drafting of all FCC and FAA applications for these systems.

Mr. Villecco has a BSEE from Drexel University, in Philadelphia, and is an active member of IEEE. Mr. Villecco also serves as the Vice Chairman of the Advisory Council to the Drexel University Electrical and Computer Engineering (ECE) Department.





## Relevant Expert Witness Testimony Experience

Over the past twenty years, Mr. Villecco had been previously qualified and provided expert witness testimony in the following venues:

### Expert Witness Zoning Testimony

- Avalon Borough, NJ
- Belleville, NJ
- Belmar, NJ
- Berkeley Heights Township, NJ
- Bernards Township, NJ
- Bernardsville, NJ
- Branchburg, NJ
- Bridgewater Township, NJ
- Brielle, NJ
- Bushkill Township, PA
- Colts Neck Township, NJ
- Cranbury Township, NJ
- Cresskill, NJ
- Cross Village / Emmett County, MI
- Cumru Township, PA
- Exeter Township, PA
- Fair Haven, NJ
- Fanwood Borough, NJ
- Franklin, NJ
- Freehold, NJ
- Garfield, NJ
- Glen Gardner, NJ
- Glen Rock, NJ
- Hampton Borough, NJ
- Hanover, NJ
- Hardyston Township, NJ
- Harrington Park, NJ
- Helmetta, NJ
- Hempstead, NY
- Highland Park, NJ
- Hoboken, NJ
- Holmdel Township, NJ
- Hopewell Borough, NJ
- Hopewell Township, NJ
- Howell Township, NJ
- Jackson Township, NJ
- Jersey City, NJ
- Kearny, NJ
- Kingston, NJ
- Lawrence Township, NJ
- Little Egg Harbor Twp., NJ
- Little Silver Borough, NJ
- Long Valley, NJ
- Lower Alsace Twp., PA
- Middletown Township, NJ
- Millstone Township, NJ
- Morris Township, NJ
- Neptune Township, NJ
- Newark, NJ
- New Castle County, DE
- New Providence, NJ
- N. Caldwell Township, NJ
- Orange, NJ
- Plainfield, NJ
- Princeton Township, NJ
- Reading Township, NJ
- Ridgefield, NJ
- Rochelle Park, NJ
- Rutherford, NJ
- Saddle Brook Township, NJ
- Sayreville, NJ
- Somers Point, NJ
- Somerville, NJ
- South Brunswick, NJ
- South Coventry Twp., PA
- South Plainfield, NJ
- Stone Harbor, NJ
- Tenafly, NJ
- Upper Allen Township, PA
- Upper Freehold, NJ
- Wall Township, NJ
- Wallington, NJ
- Wantage Township, NJ
- Washington Township, NJ
- Wayne Township, NJ
- Weehawken Township, NJ

### United States Bankruptcy Court

Nextwave Personal Communications, Inc. vs. Federal Communications Commission (FCC)\*

Pocket Communications, Inc. vs. Federal Communications Commission (FCC)\*

\*In these cases, Mr. Villecco was retained by the FCC and the Department of Justice as a technical expert on their behalf, pertaining to matters of wireless network design, optimization and operation



**David K. Stern**  
**Vice President and Co-Founder**  
**V-COMM, L.L.C.**

David Stern, Vice President and co-founder of V-COMM, has 35 years of hands-on operational and business experience in telecommunications engineering. While at V-COMM, Mr. Stern oversaw the design and implementation of several major Wireless markets in the Northeast United States, including T-Mobile - New York, Verizon Wireless, Unitel Cellular, West Virginia Wireless, South Canaan Cellular and Conestoga Wireless. In his position as Vice President, he has testified at a number of Zoning and Planning Boards in New Jersey, New York, Pennsylvania, West Virginia and Michigan, and qualified as an Expert Witness in US Federal District Court and Ocean County Superior Court, including:

- Bayonne, NJ
- Berkeley Township, NJ
- Brick, NJ
- Bridgewater Township, NJ
- Byram Township, NJ
- Carteret, NJ
- Cedar Grove, NJ
- Charlevoix, MI
- Charleston, WV
- Chatham Borough, NJ
- Chatham Township, NJ
- Clinton Township, NJ
- Cranford, NJ
- Dumont, NJ
- East Brunswick, NJ
- East Hempfield, PA
- Edgewater, NJ
- Edison, NJ
- Elizabeth, NJ
- Elmwood Park, NJ
- Englewood Cliffs, NJ
- Fairfield, NJ
- Fairlawn, NJ
- Fanwood, NJ
- Fort Lee, NJ
- Franklin Township, NJ
- Freehold Township, NJ
- Galloway Township, NJ
- Hackensack, NJ
- Haledon, NJ
- Hazlet, NJ
- Hempstead, NY
- Highland Park, NJ
- Hillsborough Township, NJ
- Hoboken, NJ
- Holmdel, NJ
- Hopatcong, NJ
- Hopewell Township, NJ
- Howell Township, NJ
- Huntington, NY
- Jackson Township, NJ
- Jersey City, NJ
- Keyport, NJ
- Kingwood Township, NJ
- Lakewood, NJ
- Lancaster, PA
- Lawrence Township, NJ
- Little Egg Harbor, NJ
- Livingston, NJ
- Lodi, NJ
- Long Branch, NJ
- Long Hill Township, NJ
- Lyndhurst, NJ
- Manchester Township, PA
- Manheim Township, PA
- Manalapan Township, NJ
- Marlboro Township, NJ
- Millstone Township, NJ
- Monroe Township, NJ
- Montgomery Township, NJ
- Montville Township, NJ
- Morris Township, NJ
- Mount Freedom, NJ
- Neptune, NJ
- Newark, NJ
- New Brunswick, NJ
- New Holland, PA
- Newton, NJ
- North Bergen, NJ
- North Brunswick, NJ
- Nutley, NJ
- Oakland, NJ
- Old Bridge, NJ
- Old Tappan, NJ
- Paramus, NJ
- Parsippany/Troy Hills, NJ
- Patterson, NJ
- Peapack/Gladstone, NJ
- Perth Amboy, NJ
- Plainsboro, NJ
- Piscataway, NJ
- Randolph Township, NJ
- Red Bank, NJ
- Rochelle Park, NJ
- Rockleigh, NJ
- Sayreville, NJ
- Shrewsbury, NJ
- South Plainfield, NJ
- South Brunswick, NJ
- Stafford Township, NJ
- Teaneck, NJ
- Tenafly, NJ
- Tewksbury, NJ
- Trenton, NJ
- Union, NJ
- Union City, NJ
- Vernon, NJ
- Wall Township, NJ
- Wantage Township, NJ
- Washington Township, NJ
- Wayne, NJ
- West Caldwell, NJ
- West Milford, NJ
- West New York, NJ
- West Orange, NJ
- Woodbridge, NJ



Mr. Stern has a formidable background in wireless technologies including CDMA, EVDO, LTE, GSM, EDGE, 3G, TDMA, Project 25, and Wi-Fi. As an expert witness, David represented major wireless carriers, which aided in the expansion of their networks. One of his major accomplishments at V-COMM was the design and project management for Madison, NJ's Public Safety Communication Center. David was also a key in New York City's first PCS network launch. He is a member of APCO Region 8 and Region 28 Regional Planning Committees, and is dedicated to creating standards for 700 MHz Public Safety and Commercial Wireless deployments.

Prior to joining V-COMM, Mr. Stern spent seven years with Comcast Cellular Communications, Inc., where he held several engineering management positions. As Director of Strategic Projects, he was responsible for all technical aspects of Comcast's wireless data business, including implementation of the CDPD Cellular Packet Data network. He also was responsible for bringing into commercial service the Cellular Data Gateway, a circuit switched data solution.

Also, Mr. Stern was the Director of Wireless System Engineering, charged with evaluating new digital technologies, including TDMA and CDMA, for possible adoption. He represented Comcast on several industry committees pertaining to CDMA digital cellular technology and served on the Technology Committee of a wireless company on behalf of Comcast. He helped to direct Comcast's participation in the A- and B-block PCS auctions and won high praise for his recommendations regarding the company's technology deployment in the PCS markets.

At the beginning of his tenure with Comcast, Mr. Stern was Director of Engineering at Comcast, managing a staff of 40 technical personnel. He had overall responsibility for a network that included 250 cell sites, three Switching offices, four Motorola EMX-2500 switches, IS-41 connections, SS-7 interconnection to NACN, and a fiber optic and microwave "disaster-resistant" interconnect network.

Mr. Stern began his career at Motorola as a Cellular Systems Engineer, where he developed his skills in RF engineering, frequency planning, and site acquisition activities. His promotion to Program Manager-Northeast for the rapidly growing New York, New Jersey, and Philadelphia markets gave him the responsibility for coordinating all activities and communications with Motorola's cellular infrastructure customers. He directed contract preparations, equipment orders and deliveries, project implementation schedules, and engineering support services.

Mr. Stern earned a BSEE from the University of Illinois, in Urbana, and is a member of IEEE.