



**Bedford County, Virginia**  
**&**  
**Blue Ridge Towers/Brisnet**

**Grant Modification**  
**for**  
**Capital Grant Scope**

**Virginia Department of Housing and Community Development**



**May 2, 2019**



**Abstract:**

Bedford County Virginia Broadband Authority received notification that the Application for the 2019 Virginia Telecommunication Initiative Grants of \$1,040,000 for the deployment of wireless broadband to underserved and unserved geographic areas of the County was granted. The County Broadband Authority had engaged in 2017 The Atlantic Group to research, plan, design and oversee the deployment of wireless Broadband and support fiber optic cable.

The Atlantic Group studied the existing fiber optic status of several providers operating in the county. Using the existing fiber loops, the Atlantic Group designed a digital wireless network that would require twelve (12) individual telecommunications sites located in diverse areas of the County.

These sites are as follows:

Big Island	Big Island Elementary School
Wheats Valley Reservoir	Boonsboro VFD
McGhee Road	Moneta VFD
Hardy Collection	Huddleston Collection
Shady Grove EMS	Dumpling Mountain
Montvale (Existing County Tower)	New London (Existing Water Tank)

One of the design tower selection criteria was to place these towers on County owned, controlled or affiliated property thus eliminating access fees for easements, paying rent for private property owners for a ground lease or incur real estate fees or user fees by private land owners.

While all locations where secured, there was one Dumpling Mountain that has several issues.

They are:

**1. Easement and Rights of Way**

County purchased private property that was a joint venture with US Cellular approximately 20 years ago. The property owner place restrictions on access as an “Exclusive Easement” for only US Cellular and Bedford County Public Safety. As the years have progressed, the property owned has used the legal system to prevent any commercial and public safety i.e. Region 2000 deployment of PS System equipment or antennas.

## **2. Purchase of Easement**

Verizon Wireless has attempted many times to “Purchase” an easement and has been unsuccessful. When approached by Blue Ridge Towers for an easement for the Broadband project, the landowner became more unreasonable in the demanded amount.

## **3. Purchase of Land**

As an alternative, Blue Ridge sought to purchase land on the mountain and obtain an independent “non-exclusive” easement to access this property. This effort was also unsuccessful.

## **4. Structural modifications to the Existing Bedford/Dumpling Mountain Tower**

A structural analysis was performed to see if the tower could structurally support the co-location of three (3) microwave dishes (for Backhaul) and the host of antennas and cable for this project. The Analysis indicated that the existing Dumpling tower would require a significant level of reinforcement and that the erection of a new tower would be less costly.

## **5. Alternative Tower**

An alternative site for Dumpling was selected because it met the criteria of availability for service to underserved and unserved broadband residents. This site has virtually the same coverage as Dumpling Mountain but also adds to the planned existing network seamlessly.

This site is “Bedford County Landfill”.

This site was in consideration early in the project but it was used as the alternate if Dumpling Mountain could not be negotiated.

The Dumpling Mountain property owner has been approached the Chairman of the Board of Supervisors, Supervisor of his district, County Administrator, Chairman of the Broadband Authority, Consultant to the Broadband Committee, Blue Ridge Towers, Inc. and various others.

Simply put, there is no amount of money that would satisfy the property owner.

## **Alternative Site**

The most effective and efficient site as an alternative is the Bedford Landfill.

The tower information is:

AGL 195' in height

Latitude: 37-15-14.44 N

Longitude: 79-28-55.16 W

AMSL: 848'

Location is approximately 1.5 miles from Dumping site. This is north-east thus serving a greater number of unserved and underserved residents.

## **Technical Data**

### **Frequencies:**

The network is a Wireless Internet Service or WISP. There are several licensed and unlicensed broadband radio frequency bands that are currently being used for this type of network. They are unlicensed WISP, Unlicensed TVWS, Licensed LTE and Licensed LMR.

Each modulates very similar in coverage; however, the TVWS has a better coverage because of the UHF spectrum which does not require line of sight.

### **Equipment:**

The equipment on the market today is first or second generation for this technology. Through the years and evolution of the equipment, the service providers will upgrade their equipment to keep competitive in the service delivery and price.

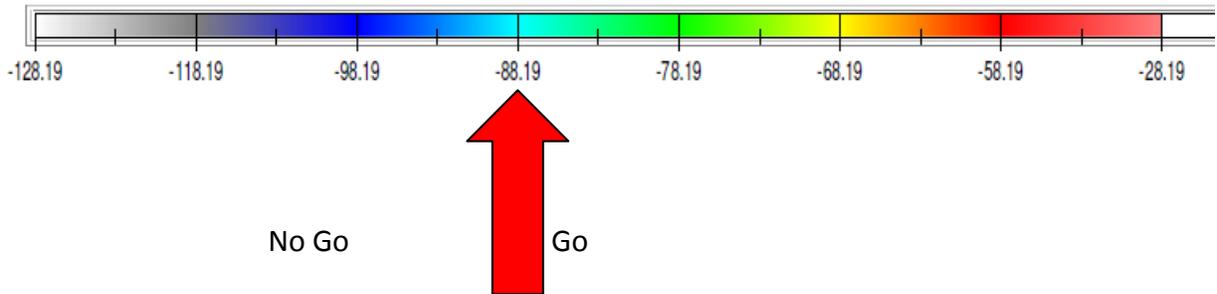
Most of the equipment works at the Rx or Receive rate of -88.1 Mbs. Since Bedford does not know what service providers will use what equipment or frequency blocks, the network was developed for the best coverage with average equipment. Bedford has designed these towers to have the ability to host all the current and future technologies such as TVWS.

**Coverage/Propagation Map Analysis:**

When reviewing any of the propagation maps, there are three important areas of analysis.

1. Equipment Field Strength requirements and sensitivities. These are measured in dBm.
2. Knowing what colors are within the level of acceptable Transmit and Receive. In the case of these maps: Red, Orange, Yellow and Green are the acceptable levels.

(Indicated below on the maps)



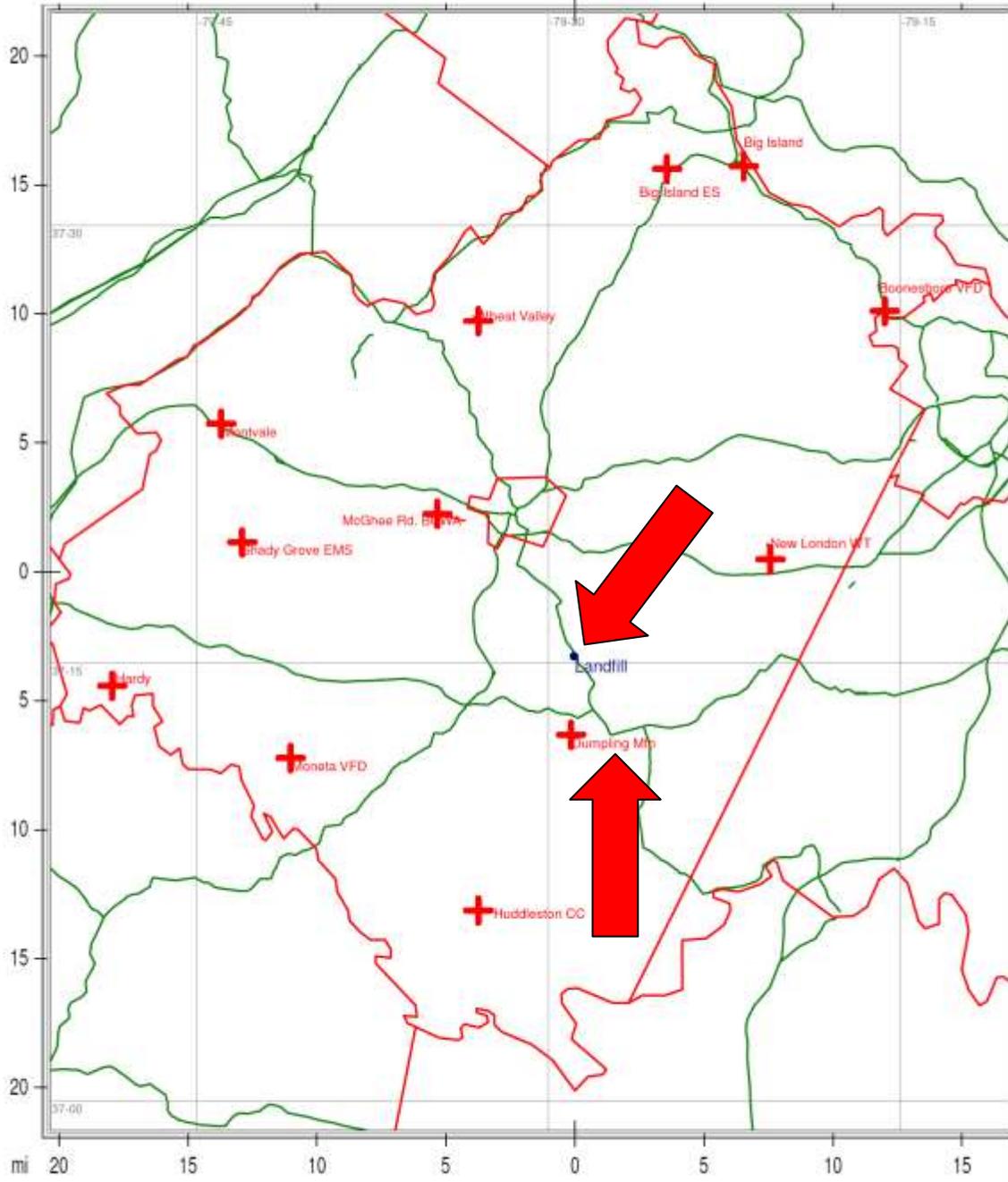
3. Each site operated on what is known as “Effective Radiated Power” or ERP. As each site operates independently, together they boost a weak signal to a stronger signal when there is overlap in transmit and receive areas.

Example:

Think of a dark room. As more lights are turned on of 60 watt bulbs, the light level increases in total because of the overlap of illumines that are produced from each light. This is a total effect.

In this type of technology, the ERP from the tower site is important to the total Effect.

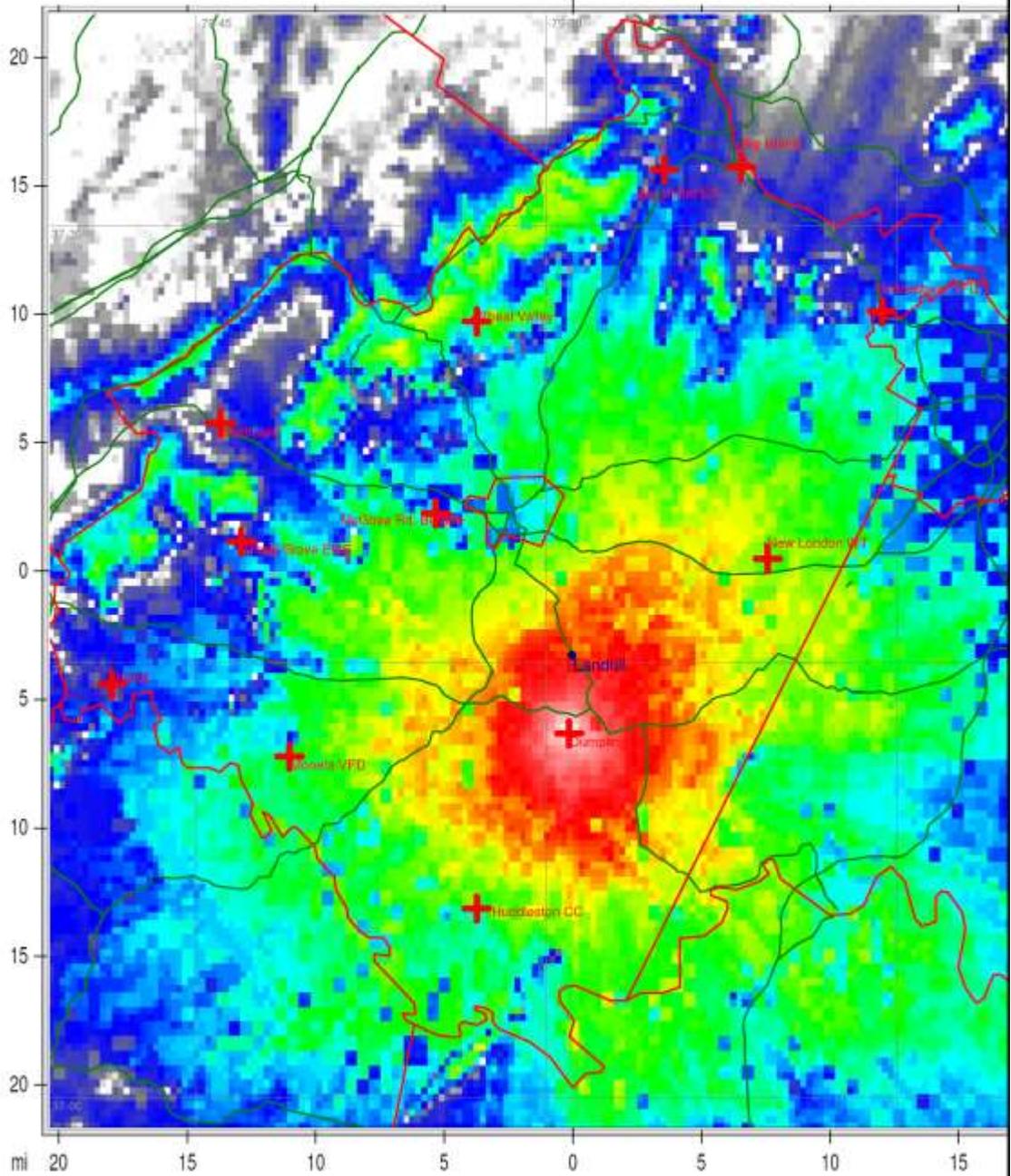
Bedford County, Virginia



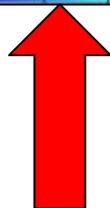
Project Sites (Red) + Alternative (Landfill = Blue)



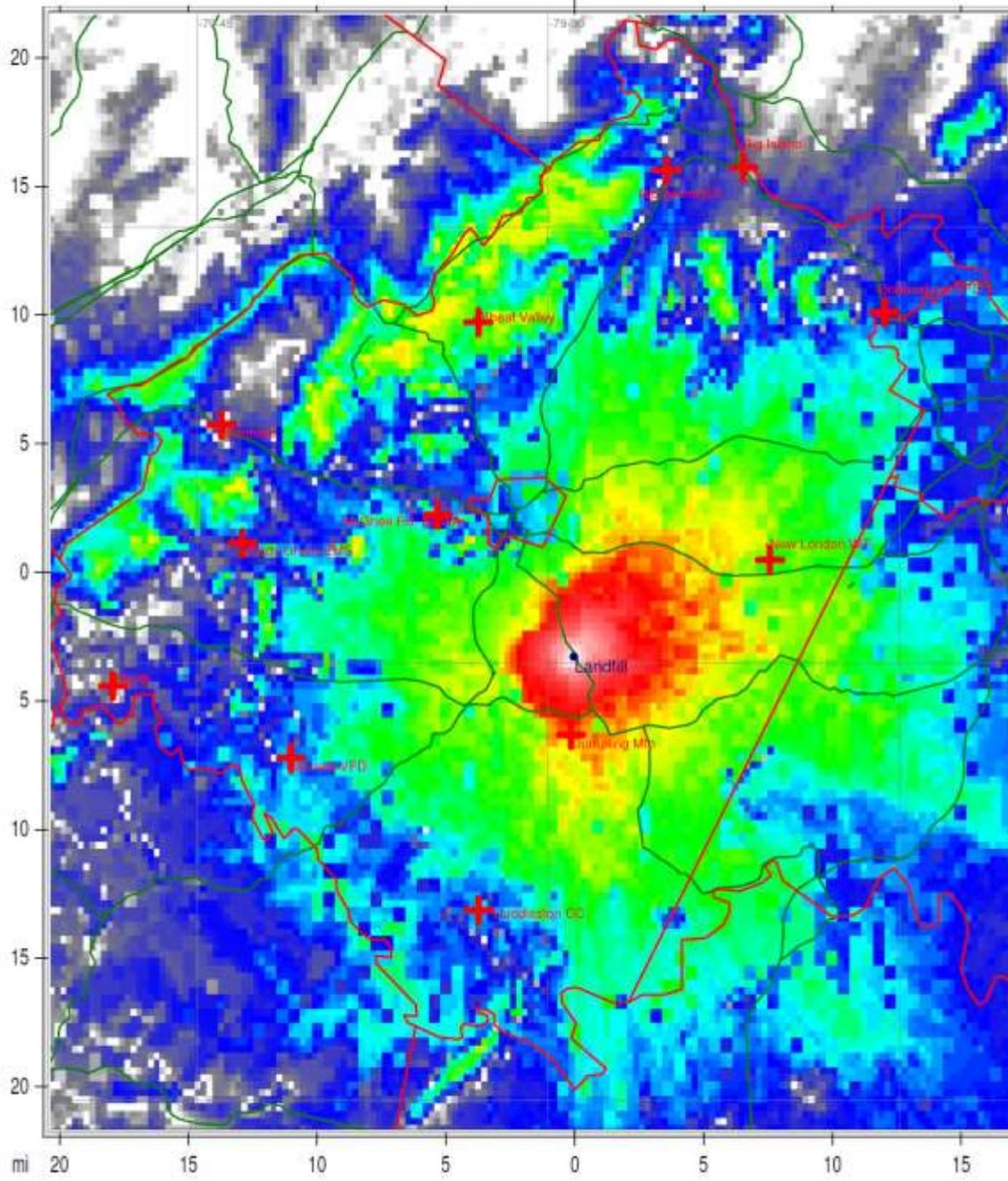
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Dumpling Mtn. Coverage Area= Effective coverage (Green, Yellow, Orange, Red)



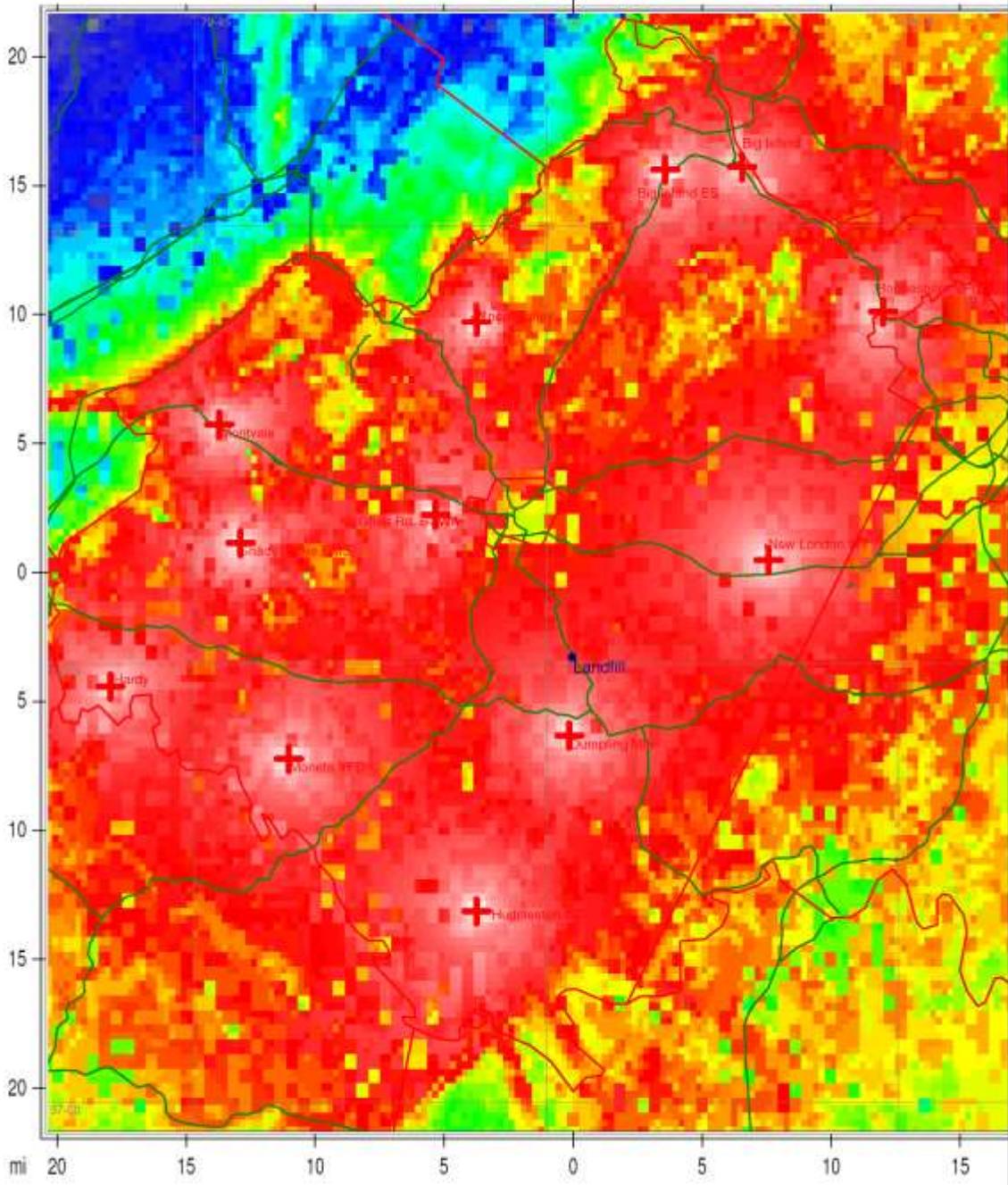
Bedford County, Virginia



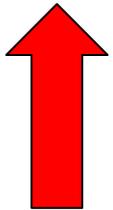
Landfill Coverage Area= Effective coverage (Green, Yellow, Orange, Red)



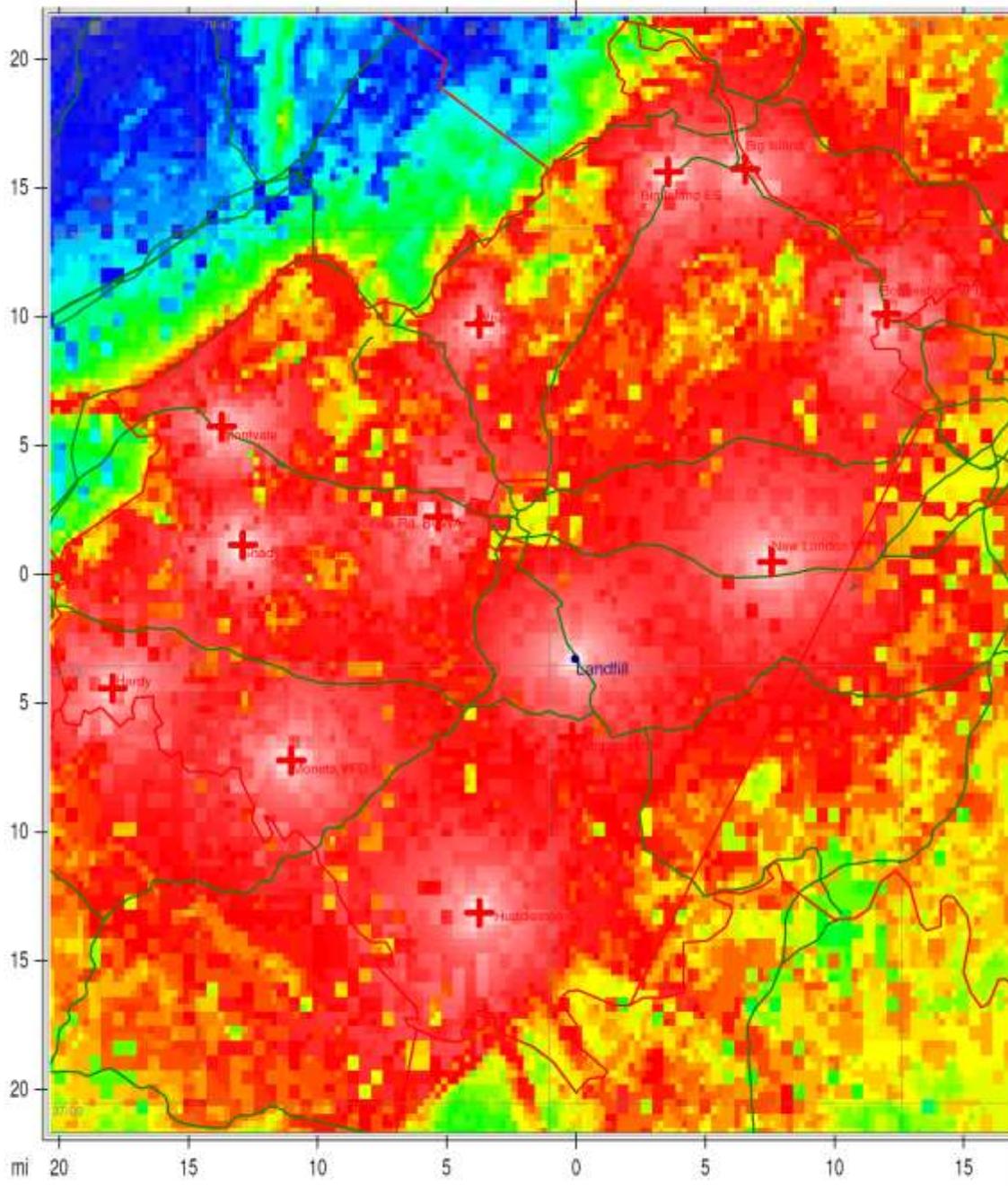
Bedford County, Virginia



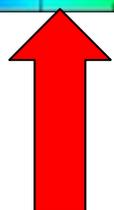
12 Site Coverage Area with (Dumpling Mtn.) Effective coverage (Green, Yellow, Orange, Red)



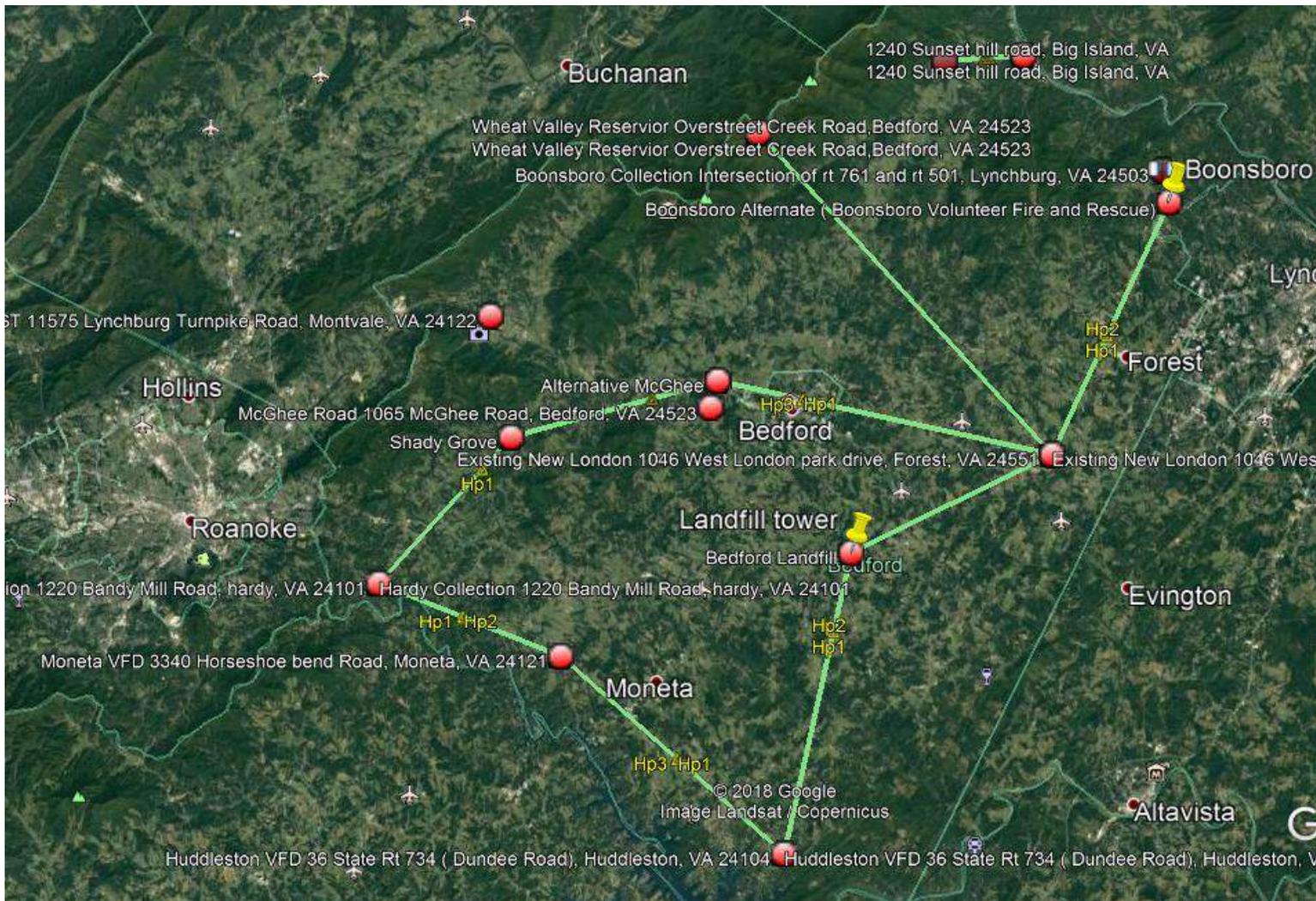
Bedford County, Virginia



12 Site Coverage Area with (Landfill.) Effective coverage (Green, Yellow, Orange, Red)



## Microwave Paths for System



This map indicates that there is a clear backhaul or microwave path to and from the Landfill Site.

**Request:**

It is requested that Bedford County Broadband Authority be authorized to move the current tower site from Dumpling Mountain and relocate to the Bedford County Landfill.

The tower sites are approximately \$250,000 each so the Net would not be any increase in funding, just a movement of a tower site that gives equal coverage and would be a benefit to the residents of Bedford.

**Approved:**

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Name & Date

Any questions concerning the data or interpretations, please feel free to contact me at my office with the contact information below.



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