

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

**Application ID:** 64508062019135822  
**Application Status:** Pending  
**Program Name:** Virginia Telecommunications Initiative 2020  
**Organization Name:** LENOWISCO Planning District Commission  
**Organization Address:** 372 Technology Trail Lane  
Duffield, VA 24244  
**Profile Manager Name:** Duane Miller  
**Profile Manager Phone:** (276) 431-2206  
**Profile Manager Email:** dmiller@lenowisco.org

**Project Name:** LENOWISCO Regional Broadband Expansion Phase I  
**Project Contact Name:** Duane Miller  
**Project Contact Phone:** (276) 431-2206  
**Project Contact Email:** dmiller@lenowisco.org  
**Project Location:** 372 Technology Trail Lane  
Duffield, VA 24244-5330  
**Project Service Area:** Lee County

**Total Requested Amount:** \$790,464.00

**Required Annual Audit Status:** Accepted

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

## Budget Information:

Cost/Activity Category	DHCD Request	Other Funding	Total
<b>Telecommunications</b>	<b>\$790,464.00</b>	<b>\$526,976.00</b>	<b>\$1,317,440.00</b>
Construction	\$790,464.00	\$526,976.00	\$1,317,440.00
<b>Total:</b>	<b>\$790,464.00</b>	<b>\$526,976.00</b>	<b>\$1,317,440.00</b>

## Budget Narrative:

This project has a total project cost of \$1,317,440.00. LENOWISCO is proposing a 60/40 combination, in which \$790,46.00 (60%) is requested from DHCD with a cash match of \$526,976.00 (40%) from Scott County Telephone Cooperative in cooperation with Powell Valley Electric Cooperative. Service Area 1 (Right Poor Valley) - The total cost is \$590,180.00. This project will construct 15.5 miles of fiber optic cable to serve 185 customers with a projected take rate of 60%. Service Area 2 (Ocoonita) - The total cost is \$363,207.00. This project will construct 12 miles of fiber optic cable to serve 106 customers with a projected take rate of 60%. Service Area 3 (Fleenortown) - The total cost is \$364,053.00. This project will construct 7.5 miles of fiber optic cable to serve 96 customers with a projected take rate of 60%. Project cost include outside plant construction, make-ready for Old Dominion Power, Central Office electronics, Customer Premise electronics, PON splitters, and engineering. SCTC will contract Powell Valley Electric Cooperative to build this project. Hence, why there is no make-ready on their poles. That will save us about \$30,000 in Service Area 2. SCTC has constructed 15 Fiber-to-the-Home projects for a total project cost of approximately \$44 million to date. SCTC has the experience to complete this project in a timely manner. Also, cost estimates are based on the pricing received for our last few projects. SCTC seeks pricing on each project from different vendors to keep costs as low as possible. The only exception is electronics to keep each new network addition operational with the existing network SCTC has in-place. SCTC obtains electronic pricing too, but it is not an option for it would diminish customers experience. Since SCTC buys electronics from one vendor, we ask for volume discounts and discounted upgrades. The total DHCD costs for this project is 60% of the project costs at \$790,464.00 which is \$2,042.54/potential customer passed.

## Questions and Responses:

### 1. Project Area

Explain why and how the project area(s) was selected. Describe the proposed geographic area including specific boundaries of the project area (e.g. street names, local and regional boundaries, etc.). Attach a copy of the map of your project area(s). Label map: Attachment 1 –Project Area Map.

### Answer:

Scott County Telephone Cooperative (SCTC) has targeted three (3) different areas for this project that are unserved and in need of broadband services. These three areas in the project are all residential homes that currently have no broadband service. The areas selected have been set up in three Service Areas and are identified as: Service Area 1 -Right Poor Valley, Service Area 2-Ocoonita, and Service Area 3-Fleenortown. All three service areas of the

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

project area are located in Lee County, Virginia. Lee County, VA is the westernmost county in the Commonwealth of Virginia and borders Kentucky and Tennessee. The geographic area where these projects are located is extremely rural, rugged and mountainous with rocky areas of steep ridges and narrow valleys. The three service areas of the project were selected due to being unserved and they met the criteria of the DHCD grant requirements.

Service Area 1-Right Poor Valley lies in the Eastern portion of Lee County, VA generally along Rt 620 and Rt 621, and will have 15.5 miles of new plant construction and will pass 185 residential homes. The roads that are associated with the Service Area 1-Right Poor Valley are Right Poor Valley Rd , Soaring Eagle Trail, Ely Town Rd, Mossican Trail, Cave Springs Rd, Dalton Gap Rd, Charles Thompson Dr, Schoolhouse Ridge Rd, Middleton Dr, Cave Springs Park Rd, Shubert Estate Trail, Dave Lawson Dr, Greenbriar Dr, Blanken Dr, Bailey Loop, Hen Reasor Rd, Teet Reasor Rd, Williams Dr, and Simon Dr.

Service Area 2-Ocoonita lies in the Eastern portion of Lee County, VA generally along Rt 621, and will have 11 miles of new plant construction and pass 106 residential homes. The roads associated with Service Area 2-Ocoonita are Ocoonita Rd, Truro Trail, Ramsey Dr, Popular Dr, Vermont Dr, Sassafras Dr, Cactus Dr, Rattlesnake Dr, Lima Dr, Brumby Trail, Outfitters Rd, Carroll Rd, West Sugar Run Rd, and Feather Ridge Dr.

Service Area 3-Fleenortown lies in the Eastern portion of Lee County VA generally along Rt 647 and VA-T659, and will have 7.5 miles of new plant construction and will pass 96 residential homes. The roads associated with Service Area 3-Fleenortown are Fleenortown Rd, Abbey Dr, Blue Bonnet Dr, Zephyr Dr, Shady Rd, Donnie Blanken, Spivey Dr, Kids Dr, Old Harlan Rd (North), Dale Eldridge Rd, Calamity Hill Dr, Gales Farm Dr, Mollie Huff Dr, East Sugar Run Rd, Steel Run Dr, Garrett Dr, Huron Dr, Texas Dr, Rainbow Ridge Trail, and Golden Finch Dr.

Attachment 1-Project Area Map

2.

Describe your outreach efforts to identify existing providers in the selected project area. Provide a detailed explanation of how this information was compiled and the source(s). Provide a map and list of all existing providers (fixed and wireless) and speeds offered within the project area. Label Map: Attachment 2 – Existing Provider Map; label documentation: Attachment 3 – Documentation on CAF Funding Area.

**Answer:**

Scott County Telephone Cooperative's (SCTC's) Marketing/Member Relations Director/STE Manager, Greg Hood has discussed the lack of service with the majority of the residences of the project areas that have been targeted and they have shown their interest by completing a survey which states that they do not have 10/1 available.

Wireless providers: Verizon Wireless's Coverage Map shows all three service areas of this project with 100% coverage. (Map is Attached-See Attachment 2) After inspecting each of the three service areas, only Service Area 3- Fleenortown, had any wireless signal. SCTC did speed tests in four (4) locations which showed less than 5Mbps of download speed and less than 1Mbps of upload speed in 3 out of 4 locations. The Verizon Wireless speed tests are included in attachment 4.

SCTC has surveyed the proposed service areas and did not find any indication of wireless coverage in Service

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

Areas 1 and 2. Service area 3 - Fleenortown has very limited wireless service from Verizon Wireless.

In reference to Fixed Providers, SCTC created the attached maps utilizing the FCC Fixed Broadband Deployment Map. We have indicated the three proposed service areas in yellow on the attached map.

Fixed Providers: All 3 Service Areas:

Light Blue color indicates no service except satellite service.

Medium Blue or Purple color indicates a claim of service from these providers in those areas.

Sunset Digital 1000Gbps down 50Mbps up

BVU 1000Gbps down 50Mbps up

Comcast/Xfinity 25Mbps down 4Mbps up

Verizon Comm. 3-15Mbps down 1Mbps up

After inspecting the three service areas for fiber or coaxial cable to provide possible service from BVU, Sunset Digital or Comcast /Xfinity, SCTC found no such outside plant. Therefore, no such service could exist. Verizon Communications shows from 3-15Mbps/1Mbps service in all three service areas. SCTC's Marketing/Member Relations Director, Greg Hood and his staff surveyed the area quite extensively and only found five (5) customers with Verizon Communications service. The speed tests for the five Verizon Communication customers showed less than 5Mbps download and less than 1 Mbps upload. The fixed broadband speed tests are included in Attachment 4.

After extensive due diligence, SCTC also surveyed 217 residences in the three proposed Service Areas who signed a survey indicating they could not get 10/1Mbps service. SCTC's conclusion is that this area is eligible for DHCD's criteria for VATI grant funding.

Attachment 2-Existing Provider Map

Attachment 3-Documentation of CAF Funding Area.....No CAF funding areas are included in any of the three service areas of this project. Those areas have been excluded as a part of this project. Attachment 3 is a map utilizing the FCC CAF II website of each area in the project that shows where CAF II Funding is located. The map shows CAF II in Service Areas 1 and 2, but again, those areas are not included in this project. The areas are in purple on the Maps in Attachment 3.

### 3. Project Need/Description

To be eligible for VATI, applicants must demonstrate that the proposed project area(s) is unserved. An unserved area is defined as an area with speeds of 10 Mbps / 1 Mbps or less and with less than 10 percent service overlap within the project area. Describe any anticipated service overlap with current providers within the project area. Provide specific information as to how you determined the percentage overlap. Label Attachment: Attachment 4 – Documentation Unserved Area VATI Criteria.

**Answer:**

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

There are no broadband services available with the 10/1 Mbps speeds as defined by the DHCD criteria in any of the three service areas of this project according to the surveys conducted by SCTC. There is a service overlap with Verizon, but the service offered does not meet the 10/1 Mbps requirement. SCTC found 5 customers total with 3 Mbps or less in the three Service Areas where Verizon is stating they have service. All residences surveyed do not have the speed of the VATI criteria. (Attachment 4 will include speed test screen shots).

SCTC surveyed all three service areas and all potential customers have assured SCTC that they do not have any broadband service that meets the VATI criteria. (Attachment 4 has those surveys attached). Service Area 3 (Fleenortown) shows Comcast/Xfinity has service in that area, but they do not have service there according to the surveys conducted. SCTC Management conducted multiple site visits several different times to make sure there was no evidence of any outside plant/coaxial cable belonging to Comcast/Xfinity. The Fleenortown residences confirmed that as well.

Lee County, Virginia is designated a Distressed County, one of four in Virginia, according to the Appalachian Regional Commission (ARC). Attachment 4 includes maps indicating distressed areas in Virginia. USDA has designated Lee County as a “persistent poverty county” and is the only county in the state of Virginia with that designation. That definition means Lee County has had a poverty rate that exceeds 20% for more than three consecutive 10-year periods. In 2017, Lee County lead the Commonwealth with a 28.2% poverty rate.

The median household income for Lee County of \$32,590.00 is 53% below the median household income for the State of Virginia of \$68,766.00 and it is 43% below the median household income for the United States of \$57,652.00. As you can see, the project is in an area that is well below the National Average of median household income and the median household income is even much lower when compared to the State of Virginia. The previously mentioned poverty level in Lee County, VA is 28.2%. Virginia's poverty level is 10.6% and the national poverty level is 12.3%. This demonstrates a rural regional economy in dire need of an economic boost. (<https://www.census.gov/quickfacts/fact/table/US,leecountyvirginia,VA/PST045218>)

The educational needs in Lee County are no different from any other rural community which faces the financial challenges of providing an effective education to its rural students. The citizens of Lee County 25 and older that are high school graduates is 74.6% of the population and for the State of Virginia, it is 89.0% of the population. Also, the people 25 and older who have a Bachelor's Degree make up only 11.1% of the population in Lee County and make up 37.6% of the population for the State of Virginia. These percentages clearly demonstrate that having the ability to pursue not only a college degree on-line, but specialized certifications and/or General Educational Development/Diploma (GED), would help the students in these distressed areas to have a better quality of life by helping them obtain the education to attain better jobs. The Lee County School System does not have facilities/schools in the three service areas, but the Lee County School System does have Interactive classrooms at their high schools. They also have computer labs at all the schools in their system. They offer on-line classes for college credit. They have homework and school related activities (school closings due to weather and ballgames, etc.) posted on their website. The students in the three service areas are at a distinct disadvantage because they are not able to take advantage of these services because of the lack of broadband services. The proposed broadband project will allow the students in the 3 service areas to have a more fulfilling educational experience by just being able to take advantage of existing offerings they are unable to access at the present time. Also, these students in the three proposed service areas of the project will have access to the World Wide Web/Internet and can use the many resources available to complete research projects or take on-line classes that they do not have access to at the

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

present time.

There are no health care facilities located in the three service areas of the project. If funded, once this proposed broadband project is completed, there is a greater possibility that one of the regional providers might consider locating a facility that could be closer to the three service areas. Or, at least, healthcare employees would be able to work from home via telemedicine when needed if there are broadband services available to them.

There are no public safety entities in the three service areas of the project. The public safety entities that serve the three service areas of the project are the Lee County Sheriff's Office and a Volunteer Fire & Rescue Squad which are located in Jonesville, Virginia.

Attachment 4-Documentation Unserved Area VATI Criteria (US Census Economic quick facts, Distressed areas in Virginia, Wireless Speed Tests-Verizon Wireless, Fixed Broadband Speed Tests-Verizon Communications and Surveys).

4. Provide the number of residential serviceable units in the project area(s). Describe the eligible premises that will be served by the proposed project and the basis for these projections.

**Answer:**

Service Area 1 - Right Poor Valley has 185 serviceable units within the project area.

Service Area 2 - Ocoonita has 106 serviceable units within the project area.

Service Area 3 - Fleenortown has 96 serviceable units within the project area for a grand total of 387 serviceable units within the project area.

The eligible premises that will be served by the project are based on the following projections: W. Metts Engineering, SCTC's Engineering firm for all SCTC projects, used the E-911 Maps for Lee County to project the number of residences located in Old Dominion Powers service area. SCTC used Powell Valley Electric Cooperatives mapping tool to determine the number of customers located in Powell Valley Electric Cooperatives footprint. SCTC employees did multiple site visits "riding-out" the proposed plants in the area as well when doing their surveys in the project area.

These three service areas of the project are in a very rural mountainous area. There are no businesses, Community Anchor Institutions, or home-based businesses located in the three areas of the project. This project will primarily be to improve the quality of life and improve educational opportunities for the people living there. Any CAF II funded areas were left out of this grant application.

5. Indicate the numbers of businesses and community anchor institutions the proposed project will pass in the project area. Also indicate the number of home-based businesses. Provide specific information.

**Answer:**

Businesses - There are no businesses located in any of the three service areas of the proposed Project.

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

Community Anchor Institutions - There are no community anchor institutions located in any of the three service areas of the proposed Project.

Home-Based Businesses - There are no home-based businesses located in any of the three service areas of the proposed Project.

6. Understanding that projected take rates are an estimate, provide the anticipated take rate for the proposed service within one year of project completion and describe the basis for the estimate. Also detail all actions (e.g. marketing activities, outreach plan) to be implemented to reach the identified potential serviceable units within the project area.

**Answer:**

Scott County Telephone Cooperative (SCTC) anticipates a 60% penetration rate for broadband services for all three service areas of the proposed project within one year of the projects completion date. This estimate is based on historical data from the fifteen (15) broadband projects that SCTC has completed, which have a 60%(+) penetration rate in unserved areas. SCTC's Marketing/Member Relations Director and STE Operations Manager, Greg Hood, will be responsible for providing data management to identify all customers within each phase of the project area. Flyers will be posted and letters will be sent out via USPS Mail announcing that the service is available to all serviceable units in each Service Area of the project area. Door-to-door sales, outbound calling, social media and website information will be done as well.

Attachment 17-Supplemental Documentation - Marketing and Outreach Plans of Project

7. For wireless projects only: Please explain the ownership of the proposed wireless infrastructure. Will the wireless co-applicant own or lease the radio mast, tower, or other raised structure onto which the wireless infrastructure will be installed?

**Answer:**

N/A

8. Provide the proposed download and upload speeds for the project area. Detail whether that speed is based on dedicated or shared bandwidth, and detail the technology that will be used. This description can be illustrated by a map or schematic diagram, as appropriate. Describe the Internet service offerings to be provided after completion of this project and your price structure for these services. The service offerings should include all relevant tiers.

**Answer:**

In the proposed project, SCTC will be utilizing Calix's Passive Optical Network (PON) solution as well as Calix Passive Optical Network (NG-PON2) in preparation of 10Gbps becoming a standard service offering. PON technology allows the service provider to centralize access equipment and reduce turn-up time. With a PON solution SCTC is able to offer higher service speeds while reducing the total number of network components

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

needed, thus simplifying network design and lowering administrative overhead. SCTC will have the ability to offer up to 10Gbps of dedicated bandwidth per location. (A description of the technology to be used is Attachment 18 - Supplemental info Detailed Technology of the Project)

Scott County Telephone Cooperative (SCTC) will offer the following Internet service offerings for residential regular, non-discounted monthly broadband Internet service:

25M/5M @ \$59.95, 30M/5M @ \$79.95, 50M/5M @ \$89.95, and 100M/5M @ \$99.95

Higher bandwidth speeds up to 10Gbps of dedicated bandwidth per location will be available if requested.

Residences with school-age students in Lee County will be offered a discount of \$10.00/month.

Business customers, schools, libraries and higher education are always given competitive and preferred rates to encourage economic development, job creation and educational opportunities for the youth in SCTC's footprint.

\*Note: at the customer's request, additional bundled services will be available that would include telephone and video.

## Attachment 18 - Supplemental Documentation-Detailed Technology of the Project

9. Provide a description of the network system design used to deliver broadband service from the network's primary Internet point(s) of presence to end users, including the network components that already exist and the ones that would be added by the proposed project. Also describe specific advantages of using this technology. Provide a detailed explanation on how this information was compiled and source(s). For wireless projects, provide a propagation map including the proposed project. Label Map: Attachment 5 – Propagation Map Wireless Project

### Answer:

The Scott County Telephone Cooperative's (SCTC's) network is configured as an actively switched Ethernet network. Active Ethernet is a relatively simpler protocol that uses less complexity and signaling overhead that can provide higher transmission speeds and greater throughput capacities. It allows a greater direct control of actual packet routing and traffic management that provides more granularity for grooming data flow and for analysis/trouble-shooting when needed. The resultant customer and inter-carrier connections provide better interoperability and less signaling complexity. SCTC currently uses a combination of Ciena and Calix hardware to light their network. Our current standard deployment gear can provide each end user with up to 1Gbps of bandwidth. But, with alternate interface cards, speeds up to 10Gbps can be provided to the end user without deploying special hardware.

In the proposed project, SCTC will be utilizing Calix's Passive Optical Network (PON) solution as well as Calix Passive Optical Network (NG-PON2) in preparation of 10Gbps becoming a standard service offering. PON technology allows the service provider to centralize access equipment and reduce turn-up time. With a PON solution SCTC is able to offer higher service speeds while reducing the total number of network components needed, thus simplifying network design and lowering administrative overhead.



# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

The SCTC regional network consists of redundantly ringed fiber pathways across the region, each with multiple fiber strands in each cable sheath. These individual fiber strands are lit using Dense Wave Division Multiplexing (DWDM) technology that enables multiple transmission pathways within each fiber strand. Currently SCTC only uses eight wavelengths to enable up to 80Gbps of throughput capacity strand, but is currently in the process of expanding this to forty wavelengths. With this expansion, SCTC will be capable of transporting up to forty 100Gpbs connections.

SCTC uses redundant Juniper routers in its core to process all internet traffic. The routers currently have four 10Gbps based gateway connections to the Internet backbone. These are contracted from four different providers (Level3, CenturyLink, Hurricane Electric, and Windstream). Windstream provides direct content provider peering and web caching to reduce latency delays of accessed data. These four 10Gbps connections terminate at diverse nodes in our redundantly ringed network. Each gateway is homed back to diverse Internet backbone nodes such as Chicago, Ashburn, Atlanta, Louisville and Raleigh/Durham. The dynamic routing of Internet-destined traffic across these four pathways is managed using Border Gate Routing Protocol (BGP). This is the same protocol that automatically controls traffic on the Internet backbone itself.

## 10. Project Readiness

What is the current state of project development (e.g. planning, preliminary engineering, identifying easements/permits, final design, etc.)? Prepare a detailed project timeline or construction schedule which identifies specific tasks, staff, contractor(s) responsible, collection of data, etc., and estimated start and completion dates. Provide any Memorandums of Understanding (MOUs) or Memorandums of Agreement (MOAs) (drafts are allowable), letters of support, etc. The timeline should include all activities being completed within 12 months of contract execution with DHCD. Label Attachments: Attachment 6 – Timeline/Project Management Plan; Attachment 7 – Relationship between Applicant/Co-Applicant; Attachment 8 – Letters of Support;

- i. If the partnership is formalized in a written agreement, provide a copy of that agreement.
- ii. If the partnership has not been formalized, provide a short description of the project management role, financial commitment, or other contribution to the project for the applicant, co-applicant, and any additional partners.
- iii. If applicant is not a locality(s) in which the project will occur, please provide a letter of support from that locality.

### Answer:

Planning and Preliminary Engineering for this project is complete. A Project Timeline/Project Management Plan is attached along with Staking Sheets and a Materials List for a portion of Service Area 2-Ocoonita of the project. This is to demonstrate that SCTC is ready to begin construction immediately if the project is awarded. The staking and materials list for the remaining Service Areas in the Powell Valley Electric Cooperative footprint can be completed in a short time using their mapping system to engineer this project. The service area in the Old Dominion Power footprint will be completed once the project is awarded to keep from incurring expenses from field engineering and obtaining pole attachment permits-(See Attachment 6 for the Project Timeline/Management Plan and Staking/Materials Sheets) SCTC's partnership with Powell Valley Electric Cooperative will result in no

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

make-ready fees and no pole rental fees for Service Area 2. Powell Valley Electric Cooperative will build this project and purchase outside plant materials. Scott County Telephone Cooperative will purchase materials to install the electronics in the network and at the customer premise and provide that installation. We have obtained estimates from contractors and vendors to price check them. Construction will primarily be aerial, as the lines will be installed on preexisting poles. Minimal to no ground disturbance is expected and significantly decreases potential environmental impacts.

LENOWISCO will administer the grant funds, help with obtaining easements and permits, if needed, from Old Dominion Power and SCTC will manage the construction of the Project. Scott County Telephone Cooperative has an existing relationship with Old Dominion Power to attach to their poles. (See Attachment 7 for Pole Attachment Agreement between SCTC and Old Dominion Power Company)

Scott County Telephone Cooperative (SCTC) has a revenue sharing agreement with LENOWISCO. In 2012, SCTC purchased the LENOWISCO Network, LLC through its subsidiary company, Appalachian Broadband, LLC. SCTC is currently doing a revenue share of 2% of the gross revenue from that network with LENOWISCO. Those funds are used for seed money to expand broadband service or economic development projects in the LENOWISCO Planning District footprint. (A copy of a MOU and the Purchase Agreement is included in Attachment 7) Scott County Telephone Cooperative has entered into a partnership with Powell Valley Electric Cooperative to provide Broadband service to all Powell Valley Electric Cooperative customers. Powell Valley will build the outside plant and Scott County Telephone Cooperative will supply the electronics. A revenue sharing agreement is in place to pay Powell Valley Electric Cooperative for their investment. When they are paid in full, Scott County Telephone Cooperative will own the network. Powell Valley Electric Cooperative will then begin charging pole rental and Scott County Telephone Cooperative will pay Powell Valley Electric a maintenance fee to maintain the network and sell services over the network. Together, the partnership will serve the region. (A copy of the MOU and Agreement between SCTC and Powell Valley Electric Cooperative is included in attachment 7)

Attachment 6-Timeline/Project Management Plan & Staking and Material Sheets for a portion of the Project

Attachment 7-Relationship between Applicant/Co-Applicant MOUS, Purchase Agreement, Pole Attachment Agreements

Attachment 8-Letters of Support

11. Matching funds: Provide a description of the matching funds the applicant and co-applicant will invest in the proposed project (VATI funding cannot exceed 80 percent of total project cost). The Funding Sources Table must be completed. Label Attachments: Attachment 9 - Documentation of Match Funding; Attachment 10 – Funding Sources Table;
  - i. For each element of matching funds in the description, indicate the type of match (e.g. cash, salary expense, or in-kind contribution).
  - ii. Identify whether the applicant or co-applicant is responsible for providing each element of the proposed matching funds.

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

iii. Include copies of vendor quotes or documented cost estimates supporting the proposed budget.

**Answer:**

The type of match will be cash.

Scott County Telephone Cooperative (SCTC) will be responsible for the total match on this project. SCTC will do the match on all engineering, electronics and installation of electronics in the field and at the premise. Per the agreement Scott County Telephone Cooperative has with Powell Valley Electric Cooperative, Powell Valley Electric Cooperative will do the match on all outside plant construction. Per this Agreement, SCTC will repay Powell Valley Electric Cooperative thru a revenue sharing agreement.

See the attached costs estimates from W. Metts Engineering, SCTC's Telecommunications Engineer. The estimates are based on the latest unit pricing we have received on a similar fiber to the premise project. SCTC has attached that pricing as well.

Attachment 9-Documentation of Match Funding

Attachment 10-Funding Sources Table

12. Applicant and Co-Applicant: A description of the public-private partnership involved in the project. Detail the local government assistance: Local government co-applicants should demonstrate assistance to project that will lower overall cost and further assist in the timely completion of construction, including assistance with permits, rights of way, easements, and other issues that may hinder or delay timely construction and increase cost. Provide detail if this project includes additional partners such as municipal providers, middle-mile providers, or investor-owned utilities

**Answer:**

The LENOWISCO Planning District Commission and Scott County Telephone Cooperative (SCTC) have worked together for many years to better our communities, counties and region. LENOWISCO will help Scott County Telephone Cooperative assistance in obtaining permits, right of ways, easements, and any help needed to resolve any other issues that may arise with this project. LENOWISCO will manage the grant funds and document the monies to insure they are dispersed properly.

Scott County Telephone Cooperative's management team has completed 15 fibers to the premise projects totaling approximately \$44 million. SCTC will design, construct, manage and maintain this project. SCTC will be responsible for the match on this project.

Powell Valley Electric Cooperative has completed several fibers to home projects for other providers totaling roughly \$30 million or more. So, a partnership with each other to extend broadband to unserved areas in our region gain the efficiencies of scope and volume which allows us to combine our resources to serve a much larger area without hiring additional staff. This partnership is ideal for all constituents, whether it's a residential customer or

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

business owner. This partnership will allow us to offer more bandwidth at a lower price to improve the quality of life and to promote economic development in our region. That is, by example, the driving force behind Cooperatives.

Scott County Telephone Cooperative has an agreement with Powell Valley Electric Cooperative that any projects we do together, they will construct the outside plant and Scott County Telephone will light it. So, Powell Valley Electric Cooperative will provide the match for the outside plant construction. This match will be repaid from the revenue sharing agreement Scott County Telephone Cooperative has with Powell Valley Electric Cooperative. When repaid from both parties revenue sharing agreement, Scott County Telephone Cooperative will own the network. This partnership is a win/win for our communities, our region and our state.

13. Identify key individuals, including name and title, who will be responsible for the management of the project. Provide a concise description of their role and responsibilities for the project. Present this information in table format.

**Answer:**

NAME	TITLE	YEARS OF EXPERIENCE	RESPONSIBILITIES
William J. Franklin	Chief Executive Officer (SCTC)	25 Years	Co-oversight of all aspects of the project
Daniel Odom	Chief Financial Officer (SCTC)	38 Years	Accounting functions of the project.
Roger Fraysier	Operations Manager (SCTC)	19 Years	Operational functions of the project.
Greg Hood	Operations Manager (STE)	21 Years	Providing all marketing plans/materials and data management to identify all broadband customers in proposed project area.
Matt Hill	Chief Operating Officer/Chief Engineer (SCTC)	28 Years	Engineering management, network management & design functions of the project.

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

Gwen Richardson	Project Manager/Office Manager/Exec. VP & Operations Manager MountainNet (SCTC)	33 Years	Timelines, reporting and customer service on the projects.
Duane A. Miller	Executive Director (LENOWISCO)	24 Years	Co-Oversight of all aspects of the project
Rebecca Crockett	Director of Project Development (LENOWISCO)	13 Years	Project management/ grant administration of the project.
Marcella Powers	Project Management Specialist (LENOWISCO)	18 Years	Project management aspects of the project.
Deana Stoddard	Project Management Specialist (LENOWISCO)	2 Years	Project management aspects of the project.

## 14. Project Budget and Cost Appropriateness

Applicants shall provide a detailed budget as to how the grant funds will be utilized, including an itemization of equipment and construction costs and a justification of proposed expenses. Expenses should be substantiated by clear cost estimates. Label Attachment: Attachment 11 – Derivation of Costs; Attachment 12 - Documentation of Supporting Costs; Attachment 13 – Supporting Documentation of Cost Estimates.

### Answer:

W. Metts Engineering has completed the costs estimates. These costs estimates are based on the pricing Scott County Telephone Cooperative (SCTC) received for materials, labor, electronic equipment, engineering and make-ready for one of our most recent projects. SCTC has completed 15 fiber projects to date. The costs estimates were based on historical data. SCTC has attached the competitive pricing received on their current (Summer 2018) fiber-to-the-home project in Surgoinsville, TN. Attachment 13 has the information for the basis for the costs projections.

The budget is attached in attachment 11-Derivation of Costs.

SCTC's Pro Forma 5-Year Financial Forecast for all areas along with the Pro Forma 5-Year Financial Forecasts with each of the three service areas broken down with a Summary of Forecast Assumptions in Attachment 16-Supplemental Documentation - SCTC Pro Forma and Assumptions

Attachment 11-Derivation of Costs

Attachment 12-Documentation of Supporting Costs

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

Attachment 13-Supporting Documentation of Cost Estimates

Attachment 16-Supplemental Documentation-SCTC Pro Forma and Assumptions

15. The cost benefit index is comprised of three factors: (i) state share for the total project cost, (ii) state cost per unit passed, and (iii) the internet speed. From these statistics, individual cost benefit scores are calculated. Finally, the three component scores are averaged together and converted to a 30-point scale to form a composite score. Please provide the following three pieces of information:
- Total State funding requested / Total Project cost
  - Number of serviceable units
  - Highest residential speed available

**Answer:**

Total State Funding requested: \$ 790,464.00  
Total Project Cost: \$ 1,317,440.00

Number of serviceable units: 387  
(Service Area 1 - 185 customers)  
(Service Area 2 - 106 customers)  
(Service Area 3 - 96 customers)

Highest residential speed available: 10 gigabyte

16. A brief description of applicant and co-applicant's history or experience with managing grants and constructing broadband communication facilities in the Commonwealth of Virginia and elsewhere.

**Answer:**

Established in 1969, the LENOWISCO Planning District Commission (the Applicant) is authorized under the Virginia Regional Cooperation Act to serve as one of the twenty-one planning district commissions in the Commonwealth of Virginia. LENOWISCO serves the Counties of Lee, Scott, Wise and the City of Norton. The Commission is recognized by the Appalachian Regional Commission as an ARC Local Development District and by the Economic Development Administration as an Economic Development District. LENOWISCO has been heavily involved in local infrastructure planning and development. Emphasis has been placed on community development, economic development, transportation and public utility infrastructure.

The Co-Applicant, Scott County Telephone Cooperative (SCTC), a "501© (12) non-profit Organization", was

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

Chartered by the State Corporation Commission on September 10, 1951 to serve 420.2 square miles of Scott County, Virginia. In 1960, 15.4 square miles of service area was added in Hancock County, Tennessee. SCTC is a Local Exchange Carrier (LEC) that serves about 4,904 customers. SCTC's customer base is 94% residential and 6% business. SCTC is operated by a ten (10) member Board of Directors which is elected by the member/owners. The SCTC Board of Directors hires a CEO who, with the help of a Management Team, manages the business affairs of SCTC.

The geographic area where SCTC currently provides service is a rugged, mountainous, rocky area of steep ridges and narrow valleys. SCTC subscriber density is 6.1 customers per mile. The company's headquarters building is located in Gate City, Virginia. The company has six exchanges and seven NXX codes. Clinchport, Duffield, Dungannon, Ft. Blackmore, Nickelsville, and Williams Mill make up the six exchanges along with several subsidiary companies that are owned by SCTC.

SCTC's success is achieved with many years of experience constructing broadband communication facilities/Fiber-to-the-Premise (FTTP) projects. SCTC first deployed fiber in its network in 1992 by replacing the backbone cable in its network. Then, in 2003, SCTC began deploying broadband/FTTP projects. To date, SCTC has deployed fifteen (15) such projects, which have passed approximately 14,500(+) customers. SCTC has deployed eight (8) FTTP projects thru Community Connect Grants totaling approximately \$10.7 million from RUS. SCTC has one Community Connect project under construction in the amount of \$3.450 million. SCTC has also received six (6) grants of about \$8.5 million from the Virginia Tobacco Region Revitalization Commission to deploy broadband/FTTP projects. SCTC received and completed a BIP Grant/Loan award from RUS for \$24,850,000.00 to construct a FTTP project in southern Scott County and a portion of Russell County.

In 2013, SCTC completed a 110-mile fiber ring thru Lee and Wise Counties, Virginia for the Virginia Coalfield Coalition. SCTC has a 20-year contract to operate and manage this network. This network will provide fiber backhaul services to Verizon Wireless (ten-year contract) and give SCTC the ability to provide services in those two adjoining counties. SCTC provides backhaul to 25 cell sites and carries approximately 40,000 wireless customers access to the world. This project is 100% complete and took approximately 18 months to complete and passed approximately 600 businesses. Approximately 15% of the businesses have switched to SCTC's service to date.

Based on SCTC's experience and the projects completed, SCTC is capable of completing the proposed project in a cost-effective and timely manner.

Scott County Telephone Cooperative (SCTC) has also been recognized by RUS as a "Success Story" for its ability to deliver 1 Gig of Bandwidth to all locations on our Fiber-to-the-Premise (FTTP) networks. The Virginia Business published an article about SCTC's futuristic regional network in Southwest Virginia. The local Optimist and Rotary Clubs have recognized SCTC for its efforts to bring broadband services to their communities.

(<https://www.rd.usda.gov/newsroom/success-stories/broadband-mountains>)

## 17. Commonwealth Priorities

Additional points will be awarded to proposed projects that reflect Commonwealth priorities. Please describe if the project fits into a larger locality or regional universal broadband plan.

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

**Answer:**

The LENOWISCO Planning District Commission and Scott County Telephone Cooperative recognizes the opportunity to work together to serve the communities where we live. LENOWISCO has taken steps to ensure that the telecommunication needs are met in the region by initiating the "Telecommunications Needs Assessment and Development of Remedial Strategies for Southwest Virginia." This Appalachian Regional Commission funded project is providing a "game-plan/tool" for rural broadband expansion. Attachment 19 is a copy of the Telecommunications Needs Assessment and Development Strategies for Southwest Virginia.

Scott County Telephone Cooperative (SCTC) has shown the determination to serve in hard to serve "unserved" areas. This is a high priority due to the need of these economically depressed communities. The LENOWISCO Planning District Commission and SCTC want to improve the quality of life and promote economic development by constructing a network that is robust and reliable and can meet the needs of any potential customers or businesses that would want to locate to any location in Southwest Virginia. Together, our vision and priority is for the entire Region to have broadband services available where there is no broadband or adequate broadband services. Broadband services are a necessity in this day and time for promoting economic development and improving the quality of life throughout the Appalachian Region and the Commonwealth of Virginia.

Attachment 19 - Supplemental Documentation-Telecommunications Assessment and Development Strategies

18. Additional Information

Any other equitable factor that the applicant desires to include. Applicants are limited to four additional attachments. Label Additional Attachments as:

- a. Attachment 14 – Two most recent Form 477 submitted to the FCC or equivalent
- b. Attachment 15 – Copy of Public Notice
- c. Attachment 16 – XXXXXXXX
- d. Attachment 17 – XXXXXXXX
- e. Attachment 18 – XXXXXXXX
- f. Attachment 19 – XXXXXXXX

**Answer:**

Attachment 14 – Two most recent Form 477 submitted to the FCC or equivalent from Co-Applicant

Attachment 15 – Copy of Public Notice

Attachment 16 – SCTC Pro Forma and Assumptions



# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

Attachment 17 – Supplemental Documentation SCTC Marketing Plans

Attachment 18 – Detailed Technology for the Project

Attachment 19 – Supplemental Documentation-Telecommunication Strategies

## **Attachments:**

Map(s) of project area, including proposed infrastructure

Attachment1ProjectAreaMap8302019105532.pdf

Map(s) or schematic of existing broadband providers (inventory of existing assets)

Attachment2ExistingProviderMaps8302019113807.pdf

Documentation that proposed project area is not designated for Connect America Funding (CAF)

Attachment3DocumentationonCAFFundingAreas830201990432.pdf

Documentation that proposed project area is unserved based on VATI criteria

Attachment4DocumentationUnservedAreasVATICriteria830201972427.pdf

Propagation Map if Wireless Project

Attachment5NotApplicable829201984652.docx

Project Management Plan

Attachment6TimelineandStakingSheets830201984619.pdf

Documentation of relationship between applicant and co-applicant (formal or informal)

Attachment7RelationshipbetweenApplicantCoApplicant8302019114603.pdf

Letters of Support

Attachment8LettersofSupport829201964947.pdf

Documentation for in-kind contributions, including value(s)

Attachment9DocumentationofMatchFunding829201920701.pdf

# Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

LENOWISCO Regional Broadband Expansion Phase I

---

Funding Sources Table

Attachment10FundingSourcesTable8292019122656.pdf

Derivation of Cost (Project Budget)

Attachment11DerivationofCosts830201932732.pdf

Documentation supporting project costs (i.e. vendor quotes)

Attachment12DocumentationofSupportingCosts829201953900.pdf

Supporting documentation for costs estimates

Attachment13SupportingDocumentationofCostEstimates828201931115.pdf

Two most recent Form 477 submitted to FCC

Attachment14TwomostrecentForm477submittedtotheFCC814201915532.pdf

Copy of Public Notice

Attachment15CopyofPublicNotice8132019112510.pdf

Optional

Attachment16SCTCProFormaandAssumptions829201963718.pdf

Optional

Attachment17SupplementalDocumentationSCTCMarketingPlans8302019100706.pdf

Optional

Attachment18DetailedTechnologyfortheProject830201985138.pdf

Optional

Attachment19SupplementalDocumentationTelecommunicationStrategies829201972728.pdf

PROJECT: \_\_\_\_\_  
 DRAWN BY: HGH  
 CHECKED BY: MAM  
 DATE: 08/28/19

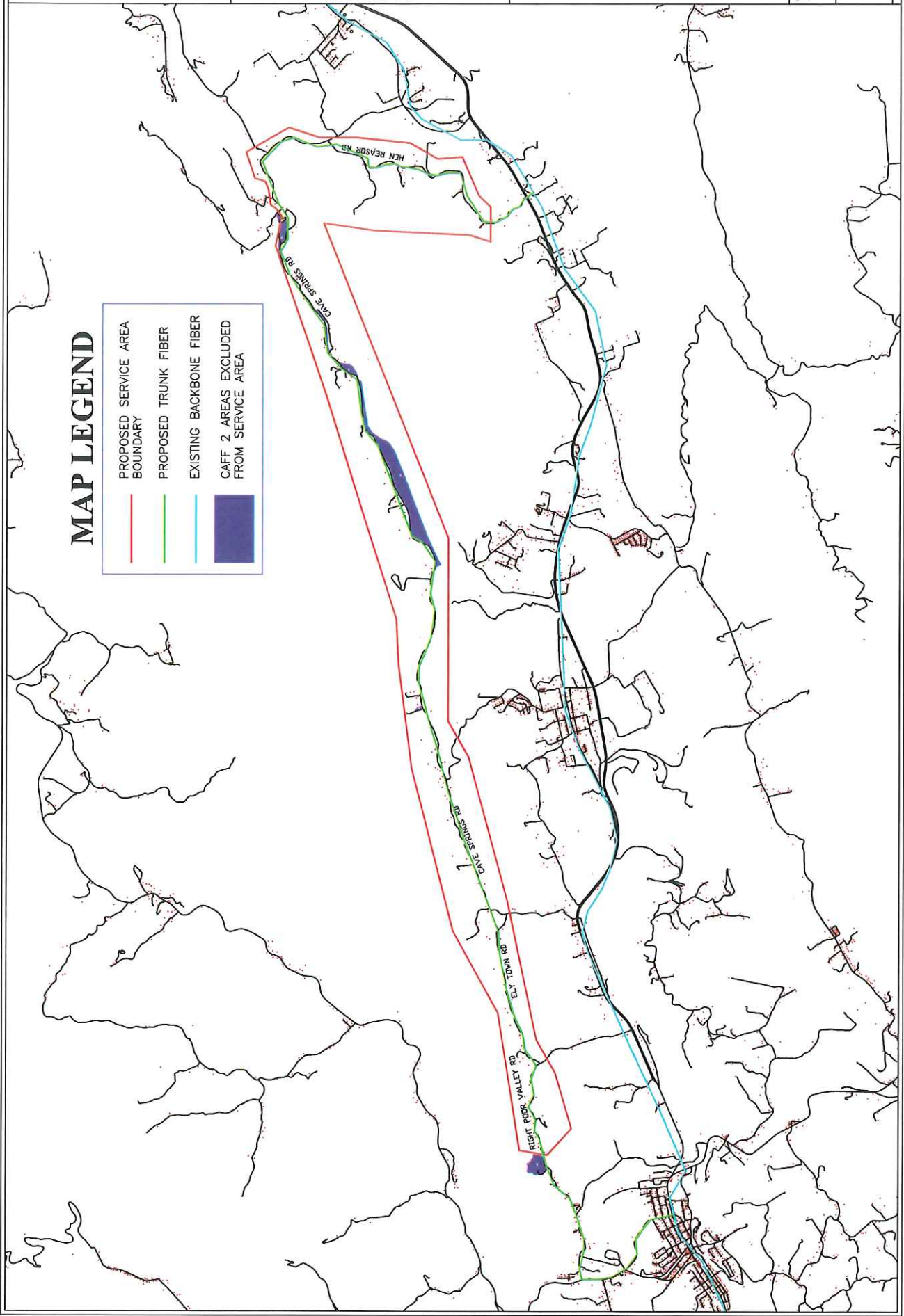
**W. METTS ENGINEERING CO., INC.**  
 121 BRIDGE ST.  
 BRANCHVILLE SC, 29432  
 (803) 274-4242

**SERVICE AREA 1**  
 RIGHT POOR VALLEY  
 08/28/19

SHEET 1  
 OF 1

**MAP LEGEND**

- PROPOSED SERVICE AREA BOUNDARY
- PROPOSED TRUNK FIBER
- EXISTING BACKBONE FIBER
- CAFF 2 AREAS EXCLUDED FROM SERVICE AREA

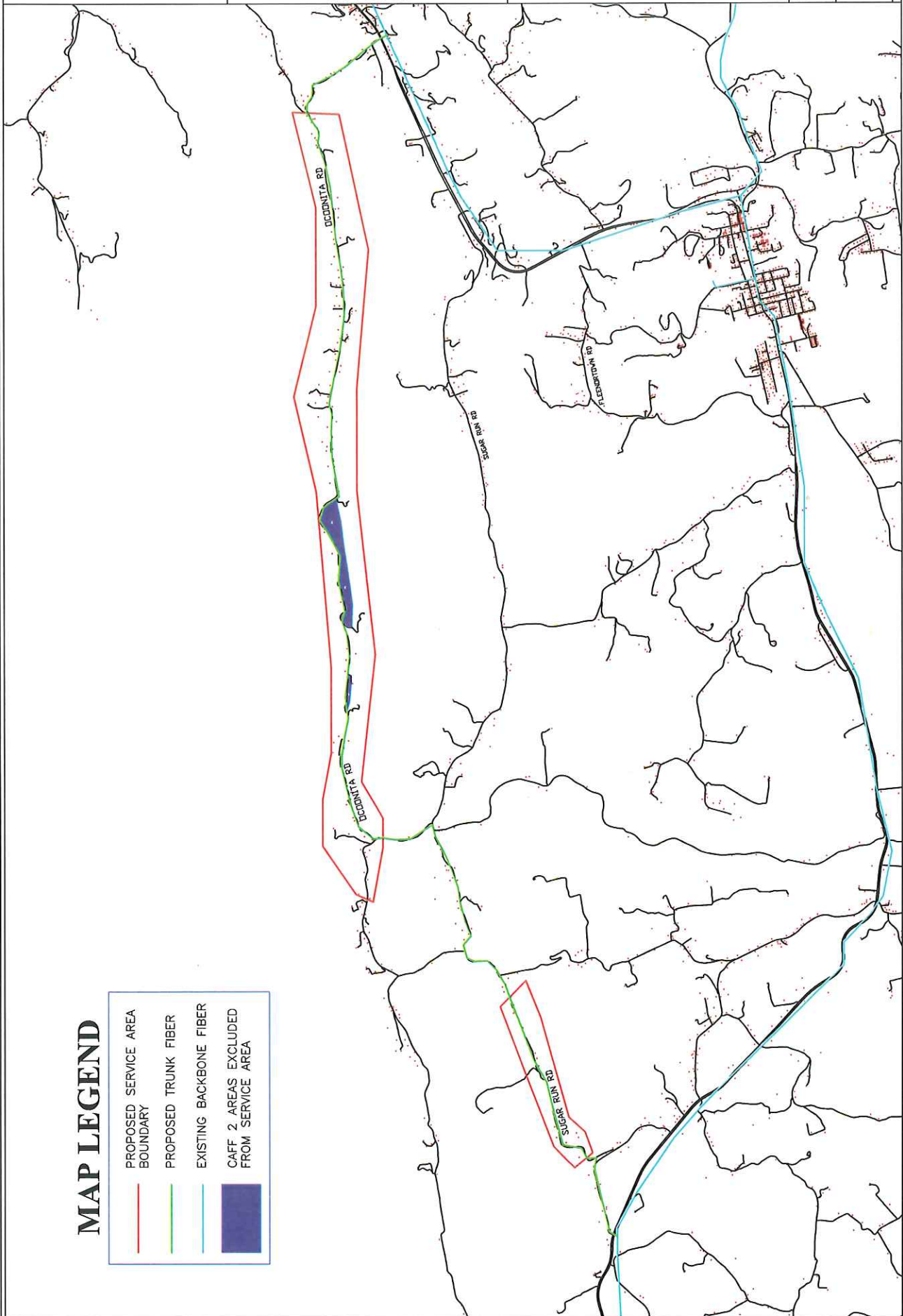


PROJECT: \_\_\_\_\_  
 DRAWN BY: HGH  
 CHECKED BY: MAM  
 DATE: 08/28/19

**W. METTS**  
 ENGINEERING CO., INC. ©  
 121 BRIDGE ST.  
 BRANCHVILLE SC, 29432  
 (803) 274-4242

SERVICE AREA 2  
 OCOONITA  
 08/28/19

SHEET  
 1  
 OF  
 1



### MAP LEGEND

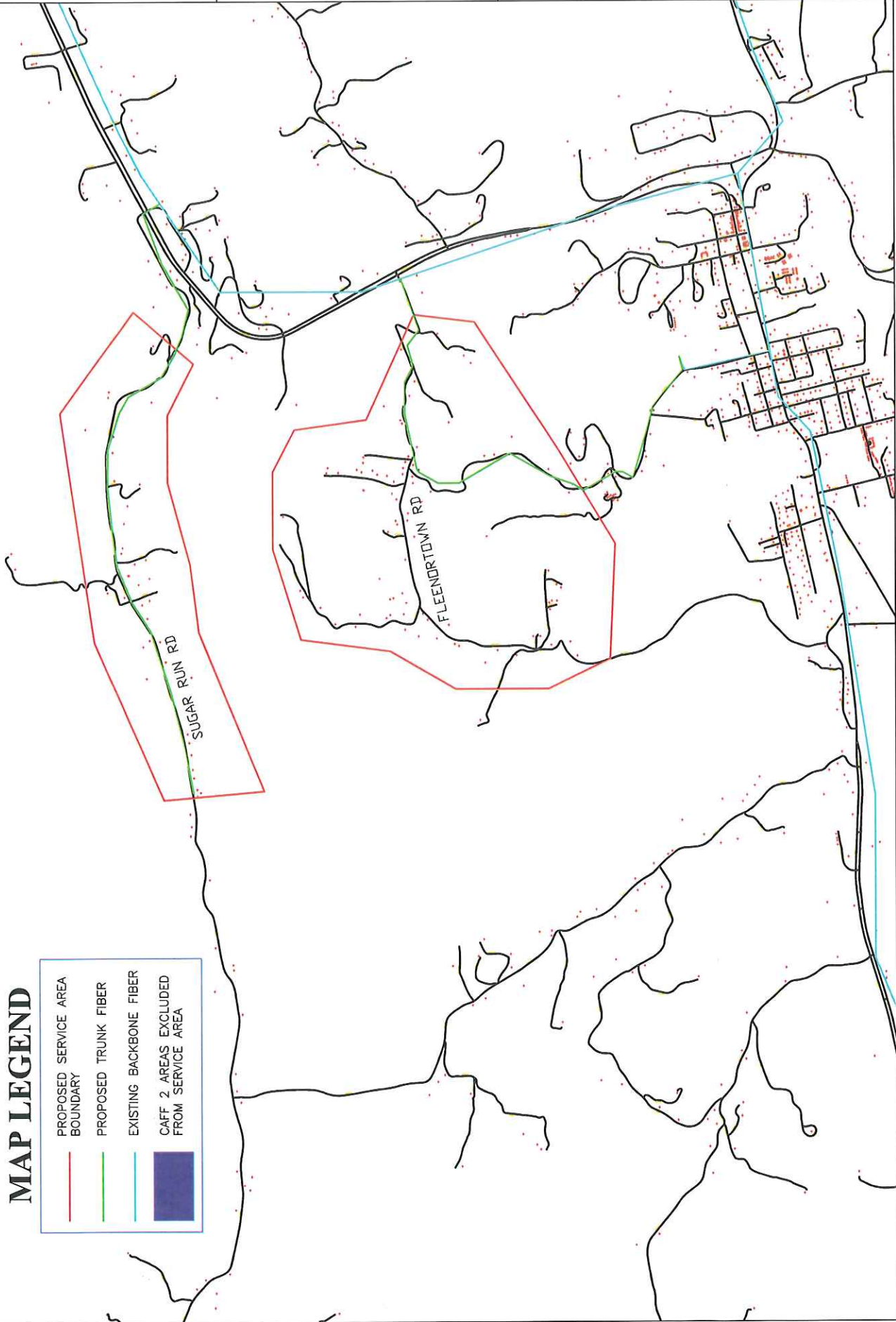
- PROPOSED SERVICE AREA BOUNDARY
- PROPOSED TRUNK FIBER
- EXISTING BACKBONE FIBER
- CAFF 2 AREAS EXCLUDED FROM SERVICE AREA

PROJECT: \_\_\_\_\_  
 DRAWN BY: HGH  
 CHECKED BY: MAM  
 DATE: 08/28/19

**W. METTS**  
**ENGINEERING CO., INC.**  
 121 BRIDGE ST.  
 BRANCHVILLE SC, 29432  
 (803) 274-4242

SERVICE AREA 3  
 FLEENORTOWN RD  
 08/28/19

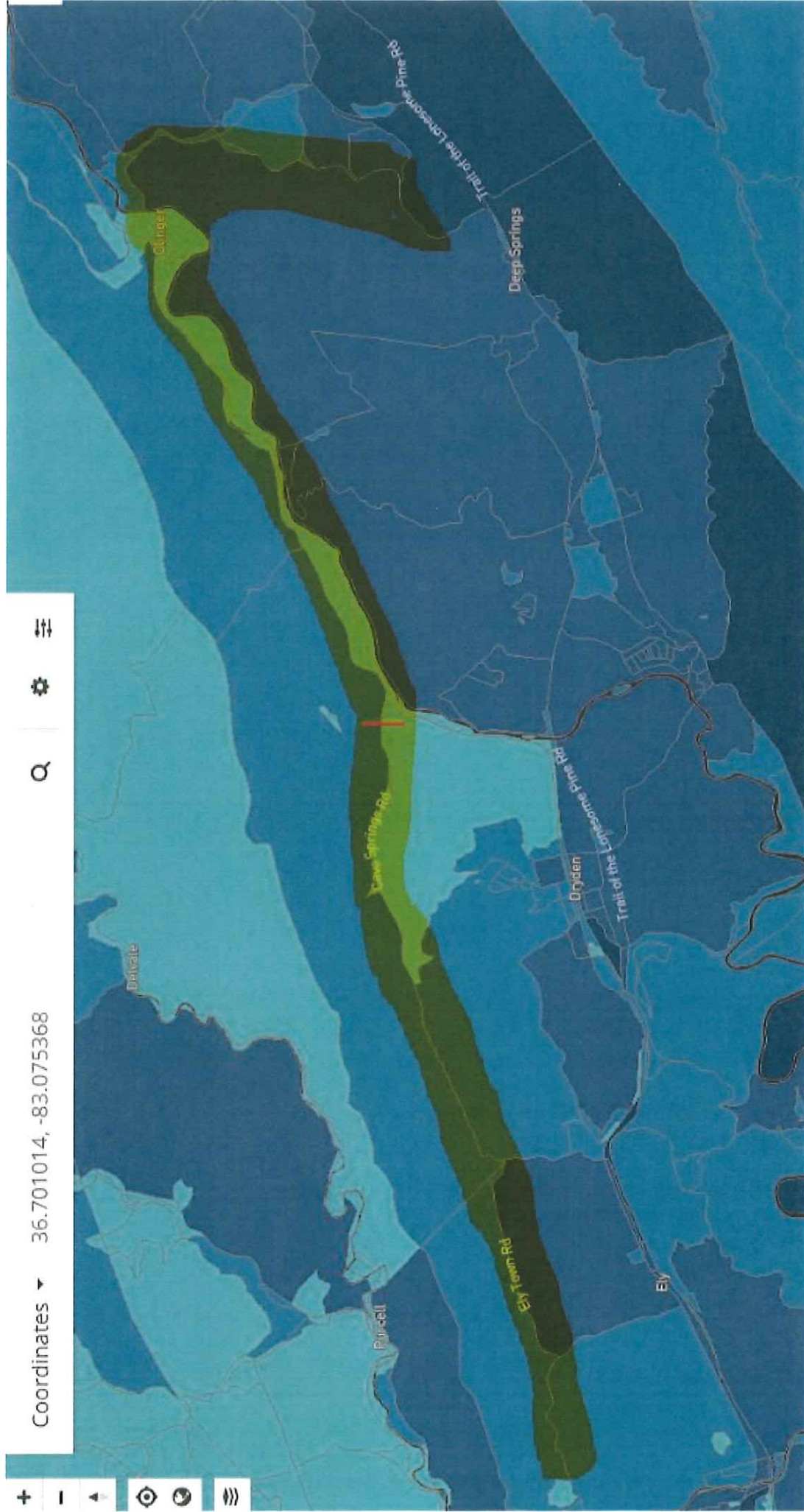
SHEET  
 1  
 OF  
 1



**MAP LEGEND**

- PROPOSED SERVICE AREA BOUNDARY
- PROPOSED TRUNK FIBER
- EXISTING BACKBONE FIBER
- CAFF 2 AREAS EXCLUDED FROM SERVICE AREA

Attachment 2 - Existing Provider Map  
Service Area 1 - Right Poor Valley



Attachment 2 - Existing Provider Map

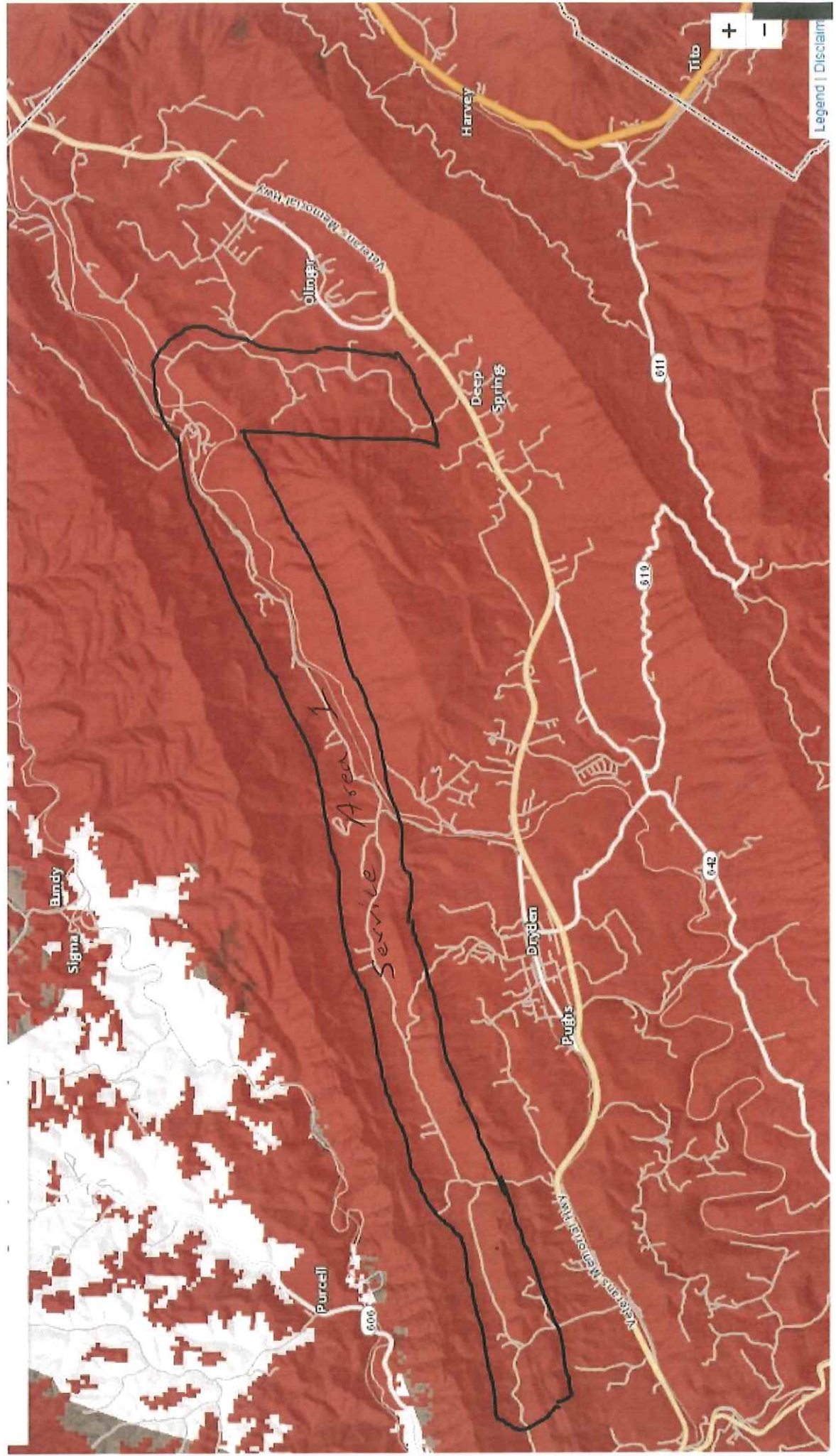
Service Area 2 - Ocoonita

& Service Area 3 - Fleenortown





- Wireless
- In Home
- Business
- Stores
- Search
- Spanish
- Sign in
- Phones
- Plans
- Deals
- Shop
- Support
- 5G





# Verizon Wireless Coverage Map

Service Areas 2-Ocoonita &

Service Area 3-Fleenorntown

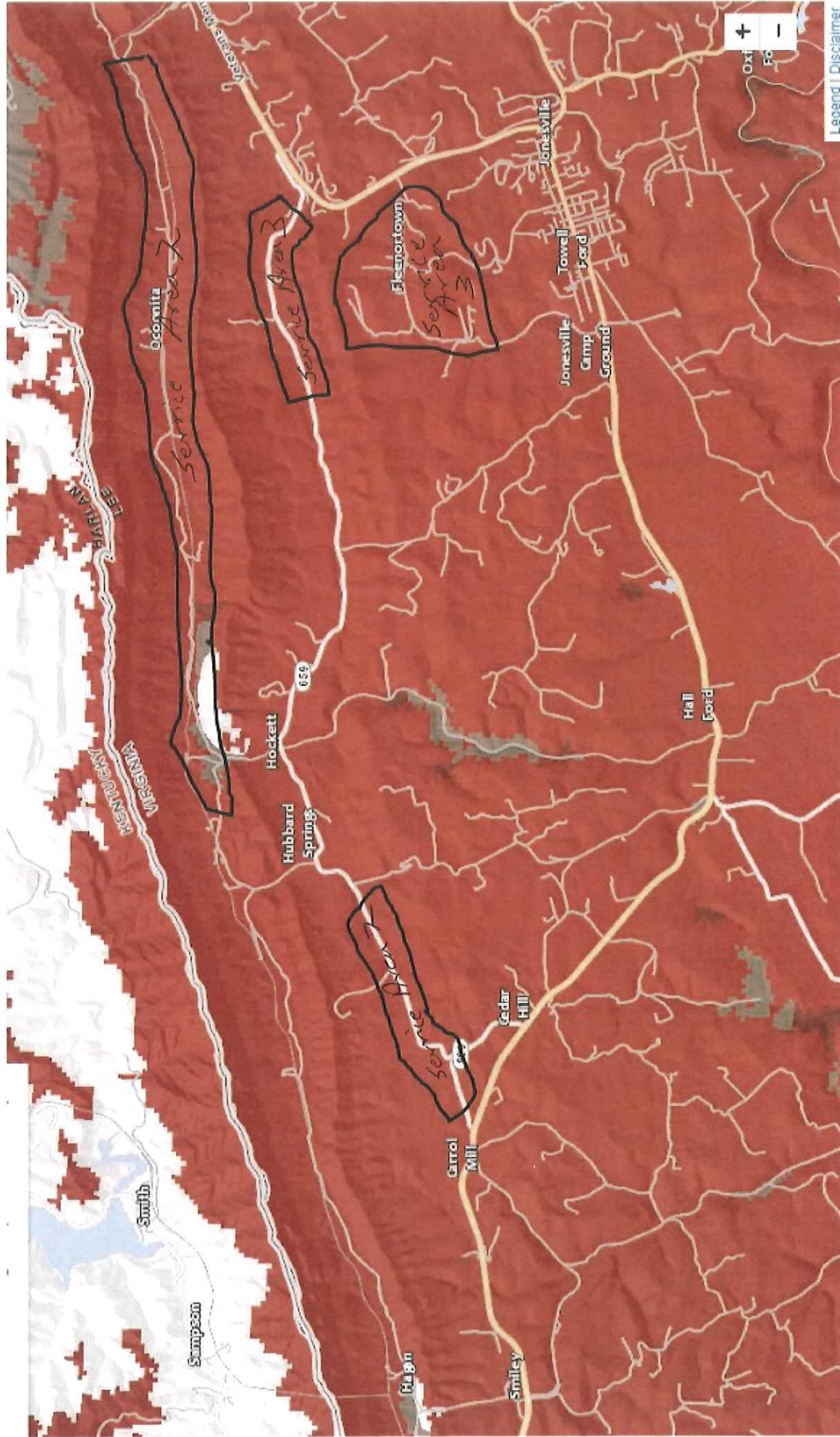
Wireless In Home Business

Stores Search

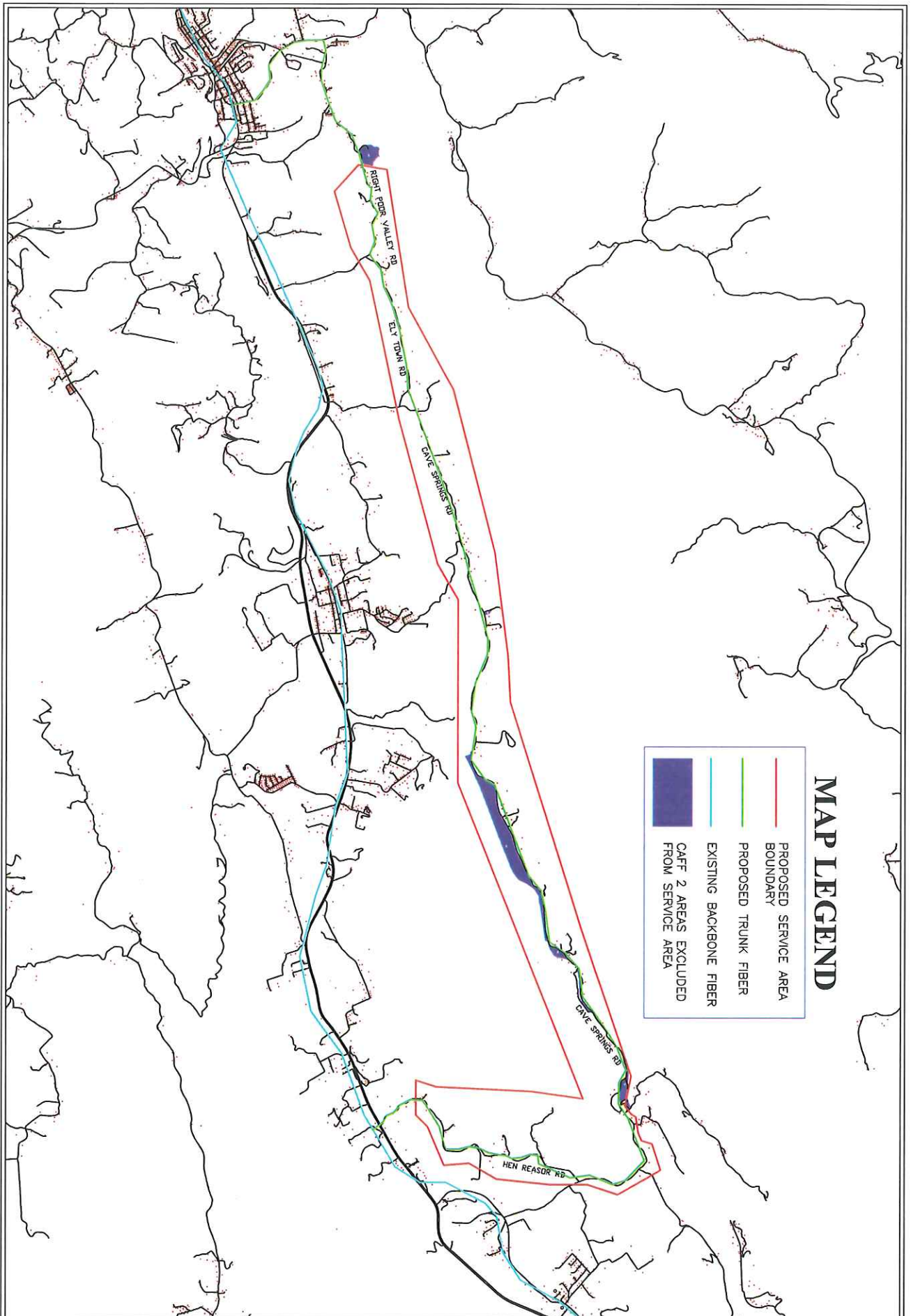
Phones Plans Deals Shop Support 5G

Español





Sign in



Legend | Disclaimer



# MAP LEGEND

	PROPOSED SERVICE AREA BOUNDARY
	PROPOSED TRUNK FIBER
	EXISTING BACKBONE FIBER
	CAFF 2 AREAS EXCLUDED FROM SERVICE AREA





SHEET 1 OF 1

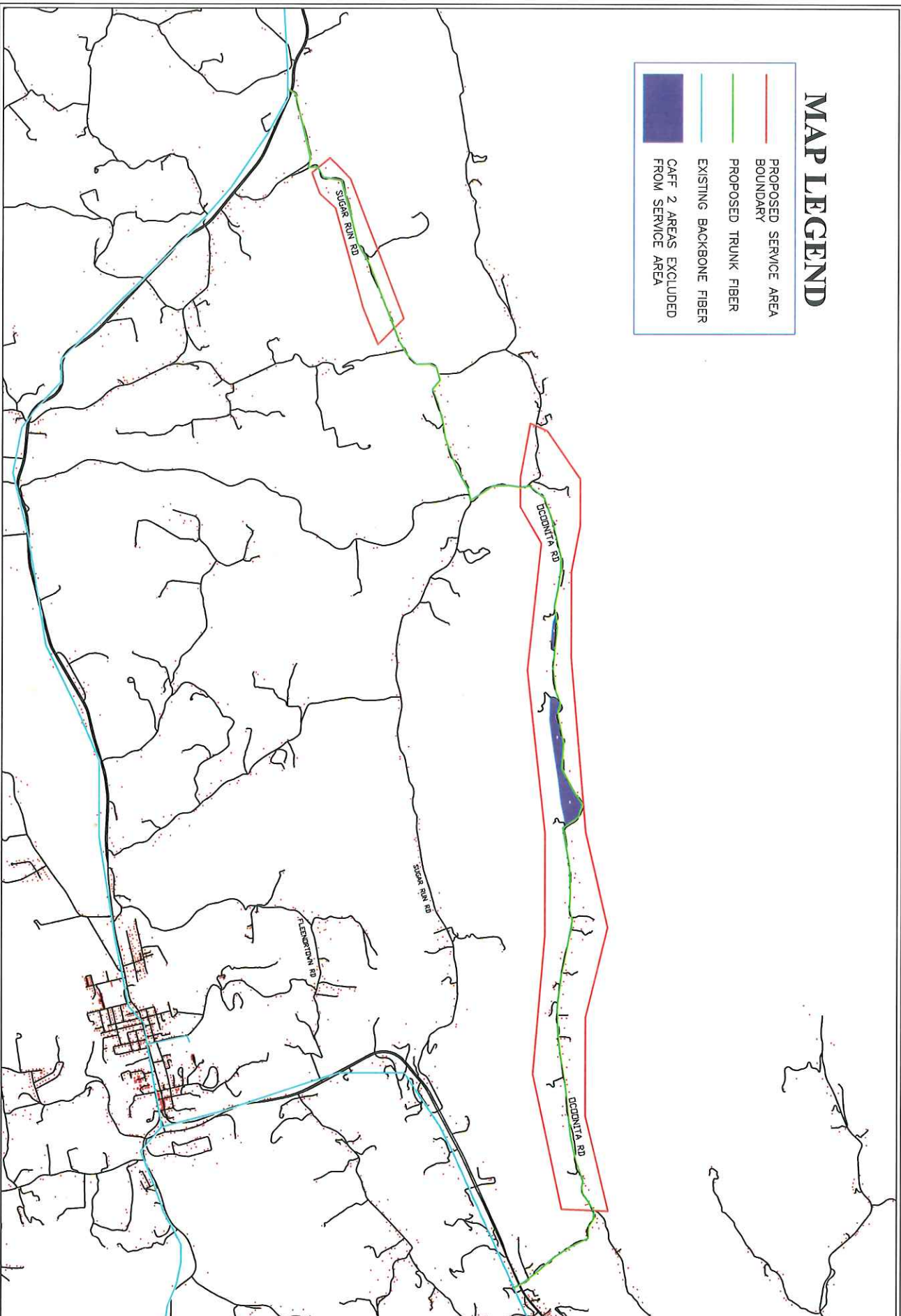
**SERVICE AREA 1**  
**RIGHT POOR VALLEY**  
 08/28/19

**W. METTS**  
**ENGINEERING CO., INC. ©**  
 121 BRIDGE ST.  
 BRANCHVILLE SC, 29432  
 (803) 274-4242

PROJECT: \_\_\_\_\_  
 DRAWN BY: HCH  
 CHECKED BY: MAM  
 DATE: 08/28/19

# MAP LEGEND

	PROPOSED SERVICE AREA BOUNDARY
	PROPOSED TRUNK FIBER
	EXISTING BACKBONE FIBER
	CAFF 2 AREAS EXCLUDED FROM SERVICE AREA







SHEET  
1  
OF  
1

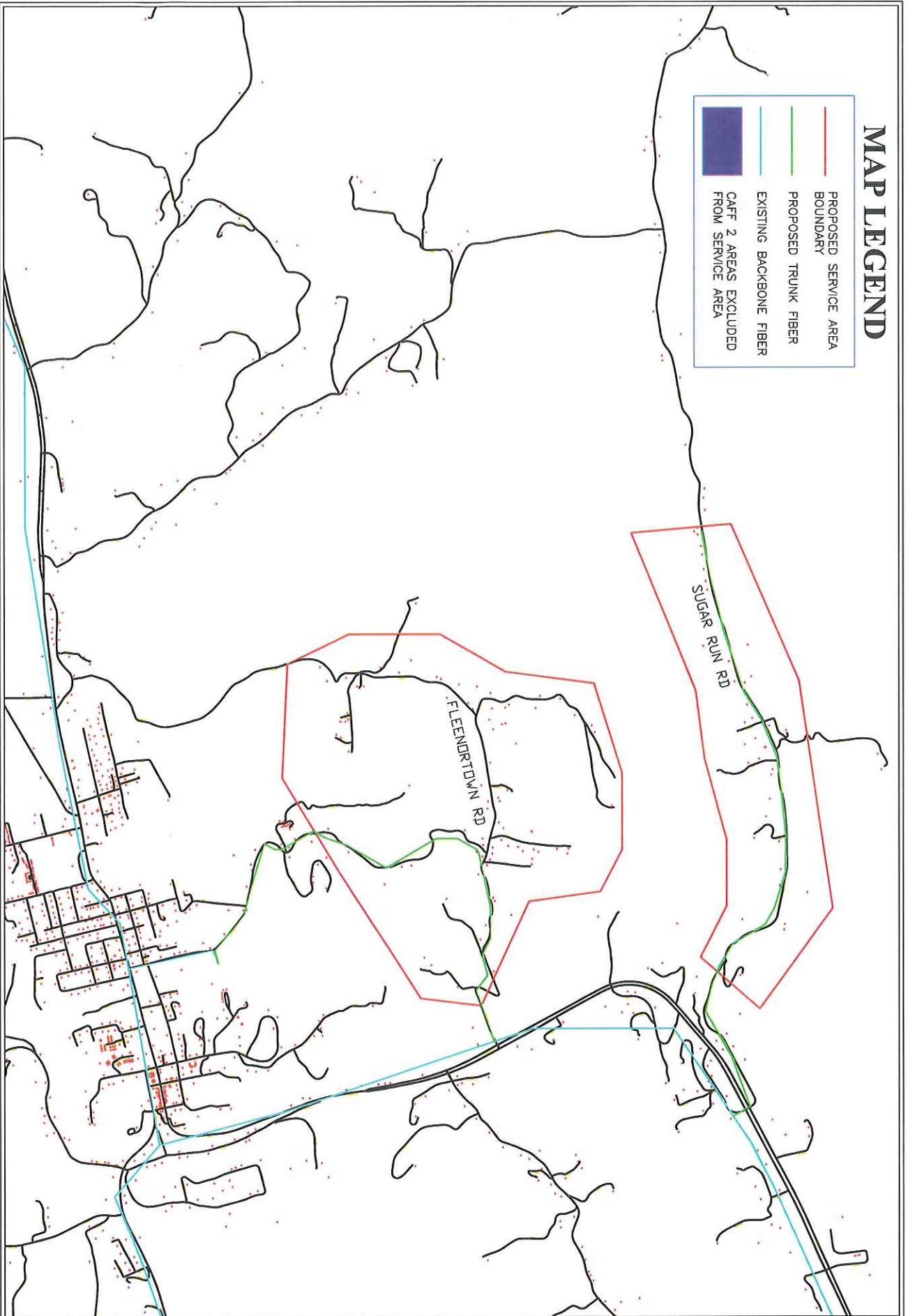
**SERVICE AREA 2**  
**OCOONITA**  
**08/28/19**

**W. METTS**  
**ENGINEERING CO., INC. ©**  
121 BRIDGE ST.  
BRANCHVILLE SC, 29432  
(803) 274-4242

PROJECT: \_\_\_\_\_  
DRAWN BY: HCH  
CHECKED BY: MAM  
DATE: 08/28/19

# MAP LEGEND

	PROPOSED SERVICE AREA BOUNDARY
	PROPOSED TRUNK FIBER
	EXISTING BACKBONE FIBER
	CAFÉ 2 AREAS EXCLUDED FROM SERVICE AREA



<p>SHEET 1 OF 1</p>	<p>SERVICE AREA 3 FLEENORTOWN RD 08/28/19</p>	<p><b>W. METTS ENGINEERING CO., INC. ©</b> 121 BRIDGE ST. BRANCHVILLE SC, 29432 (803) 274-4242</p>	<p>PROJECT: _____ DRAWN BY: HCH CHECKED BY: MAM DATE: 08/28/19</p>
---------------------------------	---	--	--

**Attachment 4**  
**Documentation Unserved Area VATI Criteria**

**US Census Economic Quick Facts**

**&**

**Distressed Areas in Virginia**

**QuickFacts****United States; Lee County, Virginia; Virginia**QuickFacts provides statistics for all states and counties, and for cities and towns with a *population of 5,000 or more*.**Table**

<b>ALL TOPICS</b>	<b>United States</b>	<b>Lee County, Virginia</b>	<b>Virginia</b>
Population estimates, July 1, 2018, (V2018)	327,167,434	23,541	8,517,685
 <b>PEOPLE</b>			
<b>Population</b>			
Population estimates, July 1, 2018, (V2018)	327,167,434	23,541	8,517,685
Population estimates base, April 1, 2010, (V2018)	308,758,105	25,583	8,001,055
Population, percent change - April 1, 2010 (estimates base) to July 1, 2018, (V2018)	6.0%	-8.0%	6.5%
Population, Census, April 1, 2010	308,745,538	25,587	8,001,024
<b>Age and Sex</b>			
Persons under 5 years, percent	▲ 6.1%	▲ 4.6%	▲ 6.0%
Persons under 18 years, percent	▲ 22.4%	▲ 18.7%	▲ 22.0%
Persons 65 years and over, percent	▲ 16.0%	▲ 21.3%	▲ 15.4%
Female persons, percent	▲ 50.8%	▲ 48.0%	▲ 50.8%
<b>Race and Hispanic Origin</b>			
White alone, percent	▲ 76.5%	▲ 94.6%	▲ 69.5%
Black or African American alone, percent (a)	▲ 13.4%	▲ 3.7%	▲ 19.9%
American Indian and Alaska Native alone, percent (a)	▲ 1.3%	▲ 0.4%	▲ 0.5%
Asian alone, percent (a)	▲ 5.9%	▲ 0.3%	▲ 6.9%
Native Hawaiian and Other Pacific Islander alone, percent (a)	▲ 0.2%	▲ 2	▲ 0.1%
Two or More Races, percent	▲ 2.7%	▲ 1.0%	▲ 3.1%
Hispanic or Latino, percent (b)	▲ 18.3%	▲ 1.9%	▲ 9.6%
White alone, not Hispanic or Latino, percent	▲ 60.4%	▲ 93.1%	▲ 61.5%
<b>Population Characteristics</b>			
Veterans, 2013-2017	18,939,219	1,650	688,536
Foreign born persons, percent, 2013-2017	13.4%	1.1%	12.1%
<b>Housing</b>			
Housing units, July 1, 2018, (V2018)	138,537,078	11,778	3,538,847
Owner-occupied housing unit rate, 2013-2017	63.8%	71.9%	66.2%
Median value of owner-occupied housing units, 2013-2017	\$193,500	\$81,700	\$255,800
Median selected monthly owner costs -with a mortgage, 2013-2017	\$1,515	\$898	\$1,728
Median selected monthly owner costs -without a mortgage, 2013-2017	\$474	\$273	\$453
Median gross rent, 2013-2017	\$982	\$530	\$1,166
Building permits, 2018	1,328,827	15	31,977
<b>Families &amp; Living Arrangements</b>			
Households, 2013-2017	118,825,921	9,278	3,105,636
Persons per household, 2013-2017	2.63	2.47	2.62
Living in same house 1 year ago, percent of persons age 1 year+, 2013-2017	85.4%	87.9%	84.3%
Language other than English spoken at home, percent of persons age 5 years+, 2013-2017	21.3%	2.4%	15.8%
<b>Computer and Internet Use</b>			
Households with a computer, percent, 2013-2017	87.2%	69.3%	88.6%
Households with a broadband Internet subscription, percent, 2013-2017	78.1%	48.8%	80.0%
<b>Education</b>			
High school graduate or higher, percent of persons age 25 years+, 2013-2017	87.3%	74.6%	89.0%
Bachelor's degree or higher, percent of persons age 25 years+, 2013-2017	30.9%	11.1%	37.6%
<b>Health</b>			
With a disability, under age 65 years, percent, 2013-2017	8.7%	21.1%	7.9%
Persons without health insurance, under age 65 years, percent	▲ 10.2%	▲ 12.3%	▲ 10.2%

**Economy**

	US	Lee County	VA
In civilian labor force, total, percent of population age 16 years+, 2013-2017	63.0%	41.8%	64.4%
In civilian labor force, female, percent of population age 16 years+, 2013-2017	58.2%	42.7%	60.6%
Total accommodation and food services sales, 2012 (\$1,000) (c)	708,138,598	D	17,795,901
Total health care and social assistance receipts/revenue, 2012 (\$1,000) (c)	2,040,441,203	53,337	47,705,003
Total manufacturers shipments, 2012 (\$1,000) (c)	5,696,729,632	D	96,389,872
Total merchant wholesaler sales, 2012 (\$1,000) (c)	5,208,023,478	33,426	86,613,641
Total retail sales, 2012 (\$1,000) (c)	4,219,821,871	208,128	110,002,365
Total retail sales per capita, 2012 (c)	\$13,443	\$8,170	\$13,438

**Transportation**

Mean travel time to work (minutes), workers age 16 years+, 2013-2017	26.4	29.8	28.2
--	------	------	------

**Income & Poverty**

Median household income (in 2017 dollars), 2013-2017	\$57,652	\$32,590	\$68,766
Per capita income in past 12 months (in 2017 dollars), 2013-2017	\$31,177	\$18,514	\$36,268
Persons in poverty, percent	▲ 12.3%	▲ 28.2%	▲ 10.6%

**BUSINESSES****Businesses**

Total employer establishments, 2016	7,757,807	273	199,548 <sup>1</sup>
Total employment, 2016	126,752,238	2,656	3,254,172 <sup>1</sup>
Total annual payroll, 2016 (\$1,000)	6,435,142,055	72,432	170,160,430 <sup>1</sup>
Total employment, percent change, 2015-2016	2.1%	-1.8%	1.7% <sup>1</sup>
Total nonemployer establishments, 2017	25,701,671	1,093	617,046
All firms, 2012	27,626,360	1,530	653,193
Men-owned firms, 2012	14,844,597	779	353,012
Women-owned firms, 2012	9,878,397	394	236,290
Minority-owned firms, 2012	7,952,386	F	185,043
Nonminority-owned firms, 2012	18,987,918	1,482	450,109
Veteran-owned firms, 2012	2,521,682	125	76,434
Nonveteran-owned firms, 2012	24,070,685	1,258	548,439

**GEOGRAPHY****Geography**

Population per square mile, 2010	87.4	58.8	202.6
Land area in square miles, 2010	3,531,905.43	435.52	39,490.09
FIPS Code	00	51105	51

About datasets used in this table

**Value Notes**

- 1. Includes data not distributed by county.

▲ Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Q1 left of each row in TABLE view to learn about sampling error.

The vintage year (e.g., V2018) refers to the final year of the series (2010 thru 2018). *Different vintage years of estimates are not comparable.*

**Fact Notes**

- (a) Includes persons reporting only one race
- (b) Hispanics may be of any race, so also are included in applicable race categories
- (c) Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data

**Value Flags**

- Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the interval of an open ended distribution.
- D Suppressed to avoid disclosure of confidential information
- F Fewer than 25 firms
- FN Footnote on this item in place of data
- NA Not available
- S Suppressed; does not meet publication standards
- X Not applicable
- Z Value greater than zero but less than half unit of measure shown

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

**ABOUT US**

- Are You in a Survey?
- FAQs
- Director's Corner
- Regional Offices
- History
- Research
- Scientific Integrity
- Census Careers
- Diversity @ Census
- Business Opportunities
- Congressional and Intergovernmental
- Contact Us

**FIND DATA**

- QuickFacts
- American FactFinder
- 2010 Census
- Economic Census
- Interactive Maps
- Training & Workshops
- Data Tools
- Developers
- Catalogs
- Publications

**BUSINESS & INDUSTRY**

- Help With Your Forms
- Economic Indicators
- Economic Census
- E-Stats
- International Trade
- Export Codes
- NAICS
- Governments
- Longitudinal Employer-Household Dynamics (LEHD)
- Survey of Business Owners

**PEOPLE & HOUSEHOLDS**

- 2020 Census
- 2010 Census
- American Community Survey
- Income
- Poverty
- Population Estimates
- Population Projections
- Health Insurance
- Housing
- International
- Genealogy

**SPECIAL TOPICS**

- Advisors, Centers and Research Programs
- Statistics in Schools
- Tribal Resources (AIAN)
- Emergency Preparedness
- Statistical Abstract
- Special Census Program
- Data Linkage Infrastructure
- Fraudulent Activity & Scams
- USA.gov

**NEWSROOM**

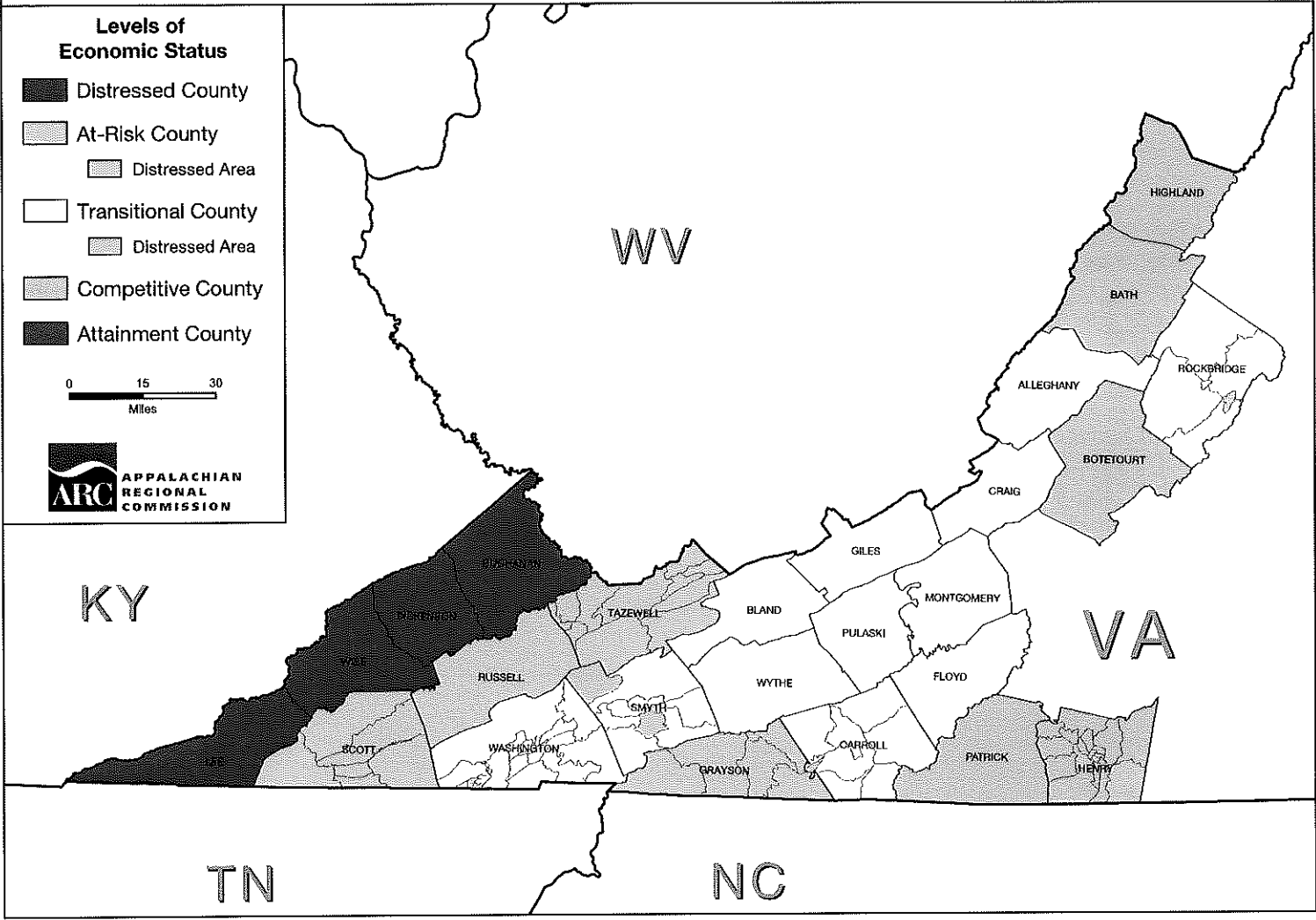
- News Releases
- Release Schedule
- Facts for Features
- Stats for Stories
- Blogs

**CONNECT WITH US**

Accessibility | Information Quality | FOIA | Data Protection and Privacy Policy | U.S. Department of Commerce



## County Economic Status and Distressed Areas in Appalachian Virginia, Fiscal Year 2019

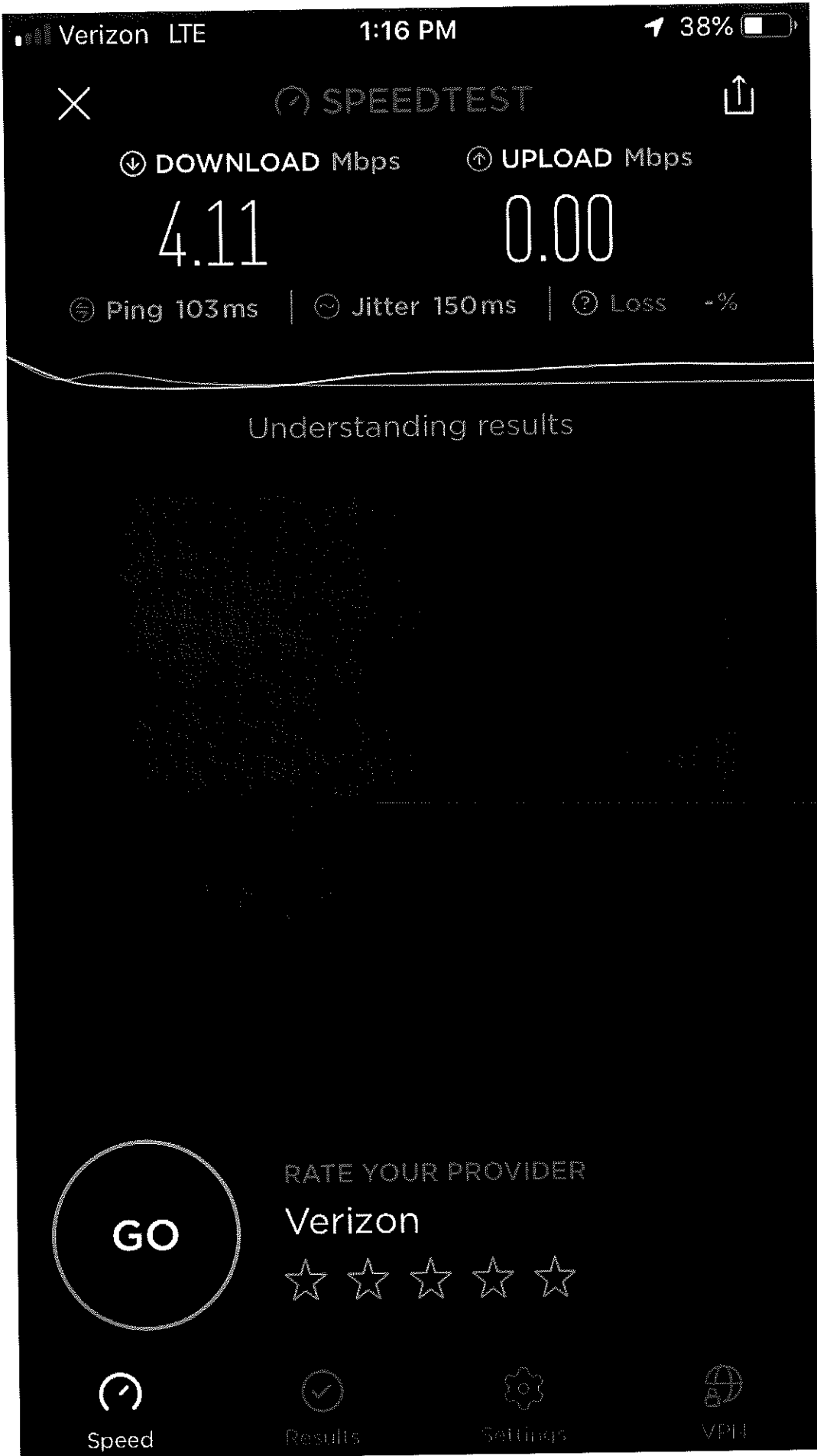


**Attachment 4**  
**Documentation Unserved Area VATI Criteria**

**Wireless Speed Tests - 4**  
**(Verizon Wireless)**

Verizon Wireless

(1)



1121  
Fleemontown  
Road,  
Jonesville, Va.

Verizon Wireless

(2)

Verizon LTE 1:11 PM 40%

SPEEDTEST

DOWNLOAD Mbps 4.75

UPLOAD Mbps 0.12

Ping 146ms | Jitter 260ms | Loss -%

Understanding results

RATE YOUR PROVIDER

Verizon

GO

Speed Results Settings VPN

1064  
Fleenortown  
Road,  
Jonesville, Va.

Verizon Wireless

(3)

Verizon LTE 1:24 PM 33%

**SPEEDTEST**

DOWNLOAD Mbps: 4.57      UPLOAD Mbps: 0.61

Ping 66ms | Jitter 180ms | Loss -%

Understanding results

**GO** RATE YOUR PROVIDER

Verizon

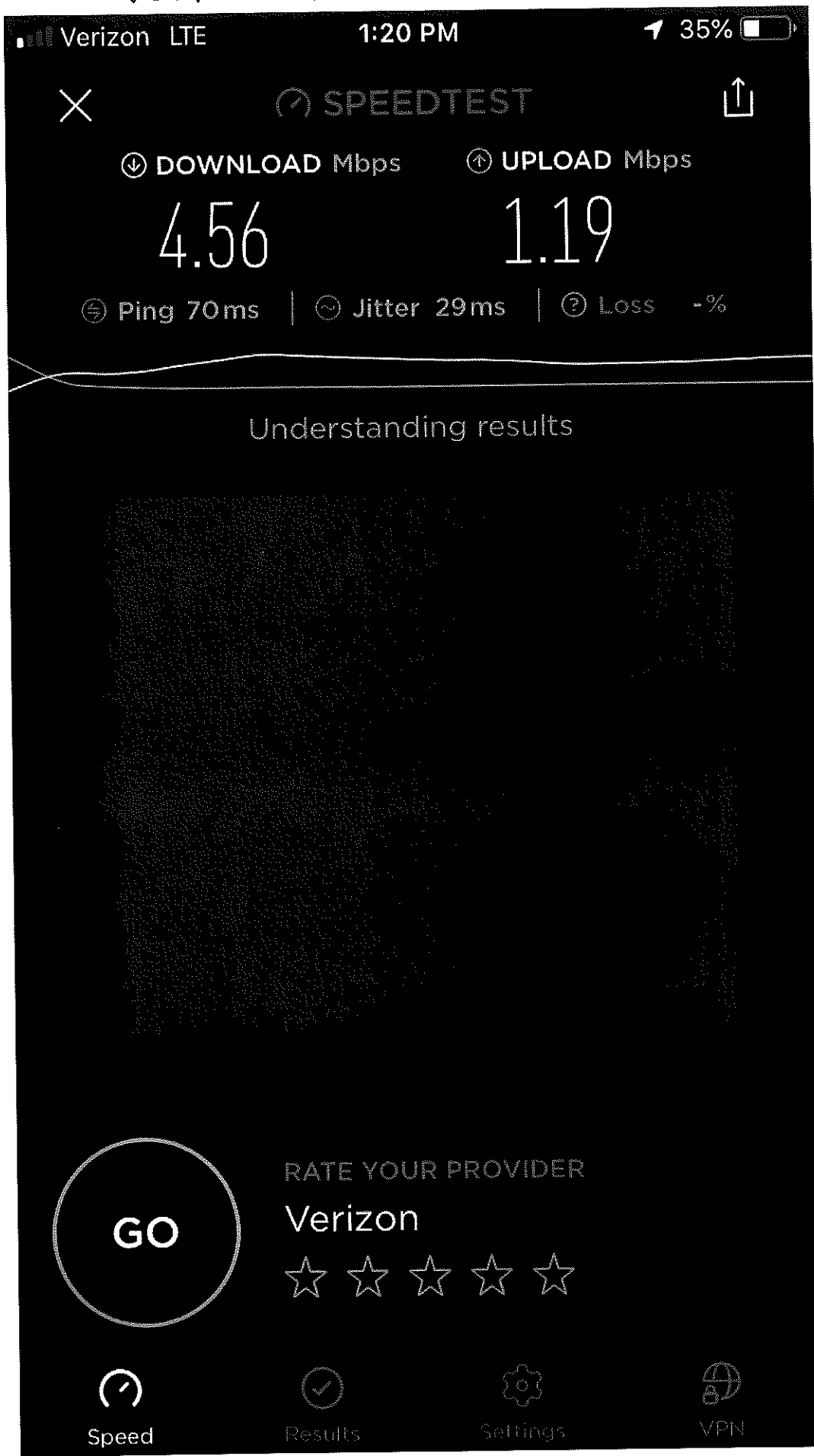
★ ★ ★ ★ ★

Speed Results Settings VPN

998  
Fleenor town  
Road,  
Jonesville, Va

Verizon Wireless

(4)



914  
 Fleenortown  
 Road,  
 Jonesville, Va.

**Attachment 4**  
**Documentation Unserved Area VATI Criteria**

**Fixed Broadband Speed Tests - 5**  
**(Verizon Communications)**

SHARE

Result ID

PING ms

540

DOWNLOAD Mbps

1.30

UPLOAD Mbps

0.00

Verizon  
174.195.4.78  
★★★★★



Ltd. "Flex"  
Noginsk  
Change Server

108 Popular Drive Oceanita

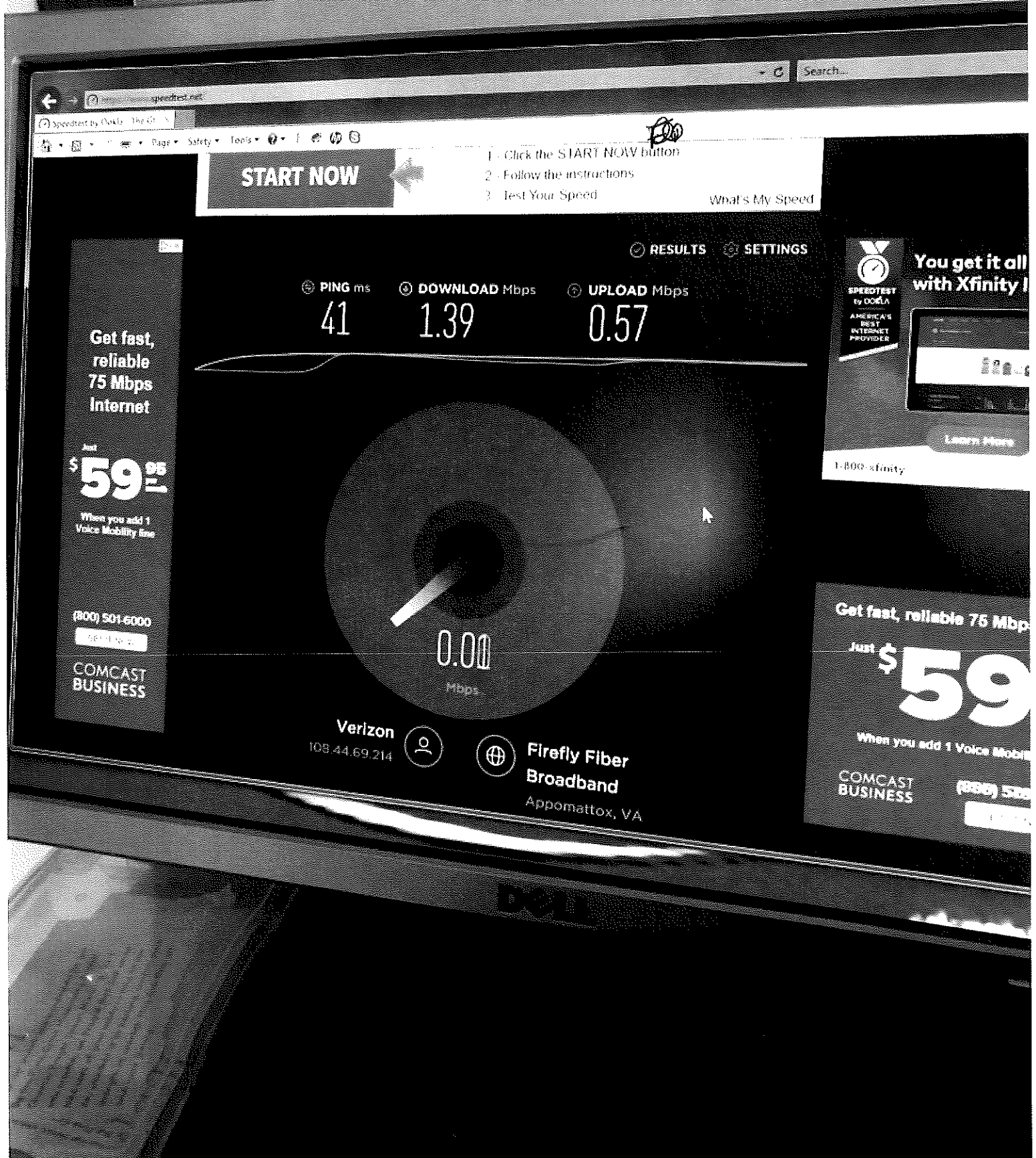
Fixed Broadband

HP All-in-One  
ALL TOUCH. ALL-IN-ONE. ALL  
YOUR FAMILY NEEDS.



Fixed Broadband

1243 Sugar Ru Road



Speedtest by Ookla

Search...

START NOW

- 1. Click the START NOW button
- 2. Follow the instructions
- 3. Test Your Speed

What's My Speed

RESULTS SETTINGS

PING ms

41

DOWNLOAD Mbps

1.39

UPLOAD Mbps

0.57



Get fast, reliable 75 Mbps Internet

Just \$59.95

When you add 1 Voice Mobility line

(800) 501-6000

501-6000

COMCAST BUSINESS



You get it all with Xfinity!



Learn More

1-800-xfinity

Get fast, reliable 75 Mbps

Just \$59.95

When you add 1 Voice Mobility

COMCAST BUSINESS

(800) 500-5700

500-5700

DELL



You get it all with Xfinity Internet.

xfinity

Learn More

1-800-xfinity

SHARE

Result ID: 8512402457

RESULTS SETTINGS

PING ms

338

DOWNLOAD Mbps

3.77

UPLOAD Mbps

0.57

Verizon

71.171.45.205

★★★★★



GO



Citizens Telephone Cooperative

Floyd, VA

Change Server

1133 Flannertown Rd - Jonesville, VA 24263

Fixed Broadband

# SPEAKEASY SPEED TEST

Fixed Broadband

## Your Speed Results

↓  
DOWNLOAD

0.4  
Mbps

↑  
UPLOAD

0.3  
Mbps

Test Again

Change City:  
Atlanta, GA

1191 Fleenor town Rd. - Jonesville, VA 24263

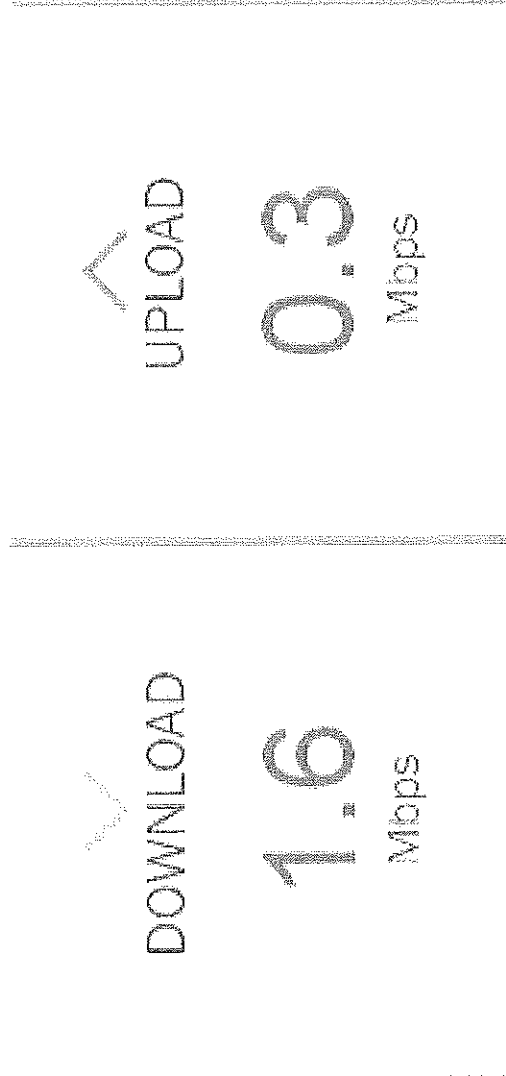
Sun Aug 18 2019 14:21:58 GMT-0400 (Eastern Daylight Time)  
Your IP: 71.171.44.165

Fleerortown

Fixed Broadband

# SPEAKEASY SPEED TEST

## Your Speed Results



**Test Again**

Change City:  
Atlanta, GA

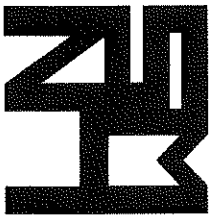
226 Shady Road - Jonesville, VA 24263

Sun Aug 18 2019 17:58:38 GMT-0400 (Eastern Daylight Time)

Your IP: 108.4.185.194

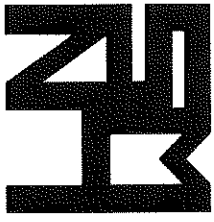
**Attachment 4**  
**Documentation Unserved Area VATI Criteria**

**Surveys**  
**conducted in the**  
**Project Areas**



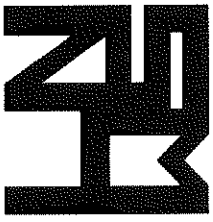
LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
GARY BROWN	1039 Cave Springs Rd.	276-546-4067	Gary Brown
Rebecca Johnson	1435 Elytown rd	276-971-5987	Rebecca Johnson
Gene Mess	1424 Elytown Rd.		Gene Mess
Randall Pease	1326 Elytown rd		Randall Pease
LONNIE BERRY	1033 ELYTOWN RD.	276-546-4245	Lonnie Berry
KAREN J STEWART	417 Elytown Rd	276-546-5808	Karen J Stewart
Betty L. Davis	403 Elytown Rd.		Betty L. Davis
Jylene Carroll	247 Elytown Rd	276-546-1118	Jylene Carroll
Ashley Hill	217 Massican Trl	276-870-5040	Ashley Hill
AUA Shuler	213 Elytown Rd	276-546-1820	Aua Shuler
Justin Shuler	162 Massican Trl	276-870-0203	Justin Shuler
Betty Oliveros	183 Massican Trl	276-546-1295	Betty Oliveros
Michael Owens	187 Elytown Rd		Michael Owens
Glen Phillips	1843 Right Foot Valley Rd.	276-870-2194	Glen Phillips



LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

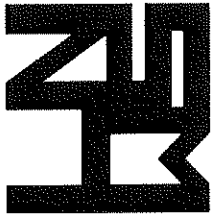
<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Earl Lawson	128 Saffrags Drive	276-393-4443	<i>Earl Lawson</i>
Irene Ingle	2038 Ocoonita	276-346-2756	<i>Irene Ingle</i>
Worley Hinkle	2170 Ocoonita	276-832-1901	<i>Worley Hinkle</i>
TERESA Smith	2232 Ocoonita Rd	276-346-2396	<i>Teresa Smith</i>
James V. Pochodzay	2479 Ocoonita Rd	276-346-2222	<i>James V Pochodzay</i>
For Stanton	2468 Ocoonita	276-346-2559	<i>For Stanton</i>
Rebekah b Stanton	2 25 <sup>th</sup> Ocoonita Rd	276-346-	<i>Rebekah b Stanton</i>
Tim Puncan	2751 Ocoonita Rd. Jonesville 41603	219-8732	<i>Scott Dumas</i>
Cecil L. Hudson	2990 . . . . .	346-1173	<i>Cecil L. Hudson JR.</i>
Cecil Hudson Sr.	2846 . . . . .	346-0806	<i>Cecil Hudson Sr.</i>
TIM PHILLIPS	3289 Ocoonita Rd.	346-0806	<i>Tim Phillips</i>
Mary Logan	3460 Ocoonita Rd.	346-1902	<i>Mary Logan</i>
Scott Lawson	3595 Ocoonita Rd	343-9434	<i>Scott Lawson</i>
Robert Spaulding	3692 Ocoonita Rd.	210-6602	<i>Robert Spaulding</i>



LENOWSCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
M7 bamer	3993 Occoonta Rd Jonesville VA	346-8137	M. bamer
Angela Williams	4061 Occoonta Rd Jonesville VA	346-0552	Angela Williams
Joseph Crowder	4606 Occoonta Rd Jonesville VA		Joseph Crowder
Rhenda Harris	259 Brumby Tr Jonesville VA	276 346-3007	Rhenda Harris
Frank Rines	5612 Occoonta rd. Jonesville va.	346-2578	Frank Rines
Scott Meyer	5746 Occoonta Rd. Jonesville va.	346-2273	Scott Meyer
Shondra Gledhill	5761 Occoonta Rd Jonesville	276-832-1706	Shondra Gledhill
Joyce Baker	4410 Occoonta Rd. Jonesville Va.	276.346-2502	Joyce Baker
Charna Davis	3719 Occoonta Rd Jonesville Va	276-832-1988	Charna Davis
Larry Burgan	120 Lima Dr. Jonesville VA	276-346-7283	Larry Burgan
Chad Baker	2053 Occoonta rd Jonesville VA	276-346-7283	Chad Baker
TIM BAKER	2041 Occoonta rd. Jonesville VA	276-832-1224	Timothy K. Baker
M. bamer	1430 Occoonta Rd. Jonesville, Va.	276-346-3085	M. bamer





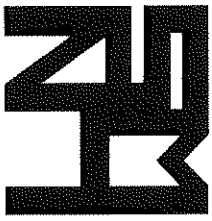
LENOWSCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Robert Smith	389 Ocoonita Rd.	365-4459	Robert Smith
Darrell Bryson	380	337-8194	Darrell Bryson Sr.
Michael Burgan	1228 Ocoonita RD.	346-7571	Michael Burgan
Janice Carroll	1357 Ocoonita RD	346-1608	Janice Carroll
T. Thomas Carroll	1351 Ocoonita RD	346-1608	Thomas Carroll
Barbara Stewart	1364 Ocoonita Rd	346-1686	Barbara Stewart
Michael Young	108 Poplar Dr.	607-664-6756	Michael Young
Marion Price	1644 Ocoonita Rd		Marion Price
Stan + Jammy Hurst	1497 Ocoonita Rd	226-344-1564	Stan Hurst
Ernest L. Mc	146 Poplar Dr.	346-4218	Ernest L. Mc
Benny Noe	146 Poplar Dr.	346-4218	Benny Noe
Bernard Noe	108 Poplar Dr	346-2038	Bernard K. Noe
Tracy Camden	210 Cactus Drive	546-9850	Tracy Camden
Shelley Jones	190 Cactus Dr	346-1296	Shelley Jones



LENOWSCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Lena Bleasoe	316 Steel Run Dr, Jonesville VA 21843	276-393-1764	<i>Lena Bleasoe</i>
Johanic Garrett	1243 Sugar Run Rd Jonesville, VA	276-393-5331	<i>Johanic Garrett</i>
Steve Garrett	269 Garrett Drive Jonesville Va.	276-219-3136	<i>Steve Garrett</i>
Dennis & Sue Hines	1473 Sugar Run Jonesville	276-346-3488 <del>276-346-3488</del>	<i>Dennis &amp; Sue Hines</i>
John Gregory	Denise Gregory 1475 Sugar Run, Jonesville.	276-838-3898	<i>Denise Gregory</i>
Joyce Williams	1501 Sugar Run Rd.	376-3422	<i>Joyce Williams</i>
Lonnie Dean	1009 Sugar Run Rd.		<i>Lonnie Dean</i>
Adam Dean	1150 Sugar Run rd.		<i>Adam Dean</i>
Lindsay Baber	1129 Sugar Run Rd	(540)509-0379	<i>Lindsay Baber</i>
Gary Dotson	631 Texas Dr		<i>Gary Dotson</i>
Anna Lee Dotson	512 TEXAS DRIVE		<i>Anna Lee Dotson</i>
Vance McPherson	159 Gold Fuch Dr		<i>Vance McPherson</i>
Tracey McPherson	197 Gold Finch Dr		<i>Tracey McPherson</i>
Bill Cody	1849 Sugar Run.	276-341-3754	<i>Bill Cody</i>



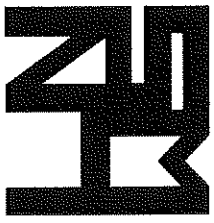
LENOVSCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Randall McNight	1959 Sugar Run Rd	Jonesville	Randall McNight
Angela Pendleton	2189 Sugar Run Rd	Jonesville VA 270-832-1770	Angela Pendleton
Barbara Pendleton	2219 Sugar Run Rd	Jonesville VA 346-2271	Barbara Pendleton
Frank Pennington	2381 Sugar Run	Jonesville 346-2381	Frank Pennington
Harvey Middleton	1820 Sugar Run Rd.	346-7509	Harvey Middleton
Harvey Middleton	1828 Sugar Run Rd.	<del>346</del> - 832-1580	Harvey Middleton
Marden Phillips	166 Henson Dr.	276-346-3014	Marden Phillips



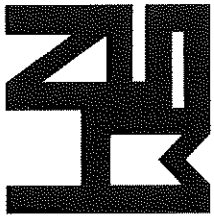
LENOWSCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Giga of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Marcella Holmes	366 Shady Rd. P.O. Box 503 Jonesville Va.	276-346-3627	Marcella Holmes
Jany Jarrett	275 Shady Rd Jonesville VA		Jany Jarrett
Robert Kell	276 Shady Rd. Jonesville VA		Robert Kell
Courtney Lawson	146 Shady Rd Jonesville VA		Courtney Lawson
Tommy Sanders	1802 Old Harlow Rd Jonesville VA		Tommy Sanders
Frank Starner	926 Fleenortown Rd. Jonesville		Frank Starner
John Broad Huff	1852 old Harlow Rd. Jonesville VA.		John Broad Huff
Laura Flinders	914 Fleenortown Rd Jonesville VA 24263	276-346-1960	Laura Flinders
Walter Mullins	1849 Old Harlow Rd Jonesville VA 24263		Walter Mullins
Thomas Sanders	958 Fleenortown Rd Jonesville VA 24263		Thomas Sanders
Peagy + James Blair	998 Fleenortown Rd Jonesville VA 24263		Peagy + James Blair
James Waller	997 Fleenortown Rd Jonesville VA 24263		James Waller
Stacy Fetteg	170 Mollie Huff Rd Jonesville VA 24263		Stacy Fetteg
Teresa Spear	449 Community Hill Dr Jonesville VA 24263		Teresa Spear



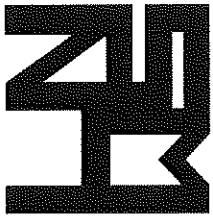
LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

Name	Address	Telephone #	Signature
Alexandra Slagle	114 Mollie Huff Dr Jonesville, VA 24263	(204) 690-5203	Alexandra Slagle
Howard Smith	1326 Fleerontown Rd	276-839-1311	Howard Smith
Roxi Fruda Tomlinson	1370 Fleerontown Rd	276-591-8864	Fruda Tomlinson
Robert & Carol Reeves	619 Dale Eldridge Rd	276-346-6151	Carol Reeves
Matachi Mitchell	520 Dale Eldridge Rd	276-346-0166	Matachi Mitchell
Quinta Willis	165 Dale Eldridge Rd	276-198-8938	Quinta Willis
Anthony Donzak	1578 Fleerontown Rd	276 298 8319	Anthony Donzak
Dennis Strangle	1133 Fleerontown Rd	276-346-1683	Dennis A. Strangle
Barlow Newman	1619 Fleerontown R	276-393-7498	Barlow Newman
Nell Newman	P.O. Box 132174 Fleerontown, VA	276-346-3569	Nell Newman
Trevor Eldridge	442 Dale Eldridge Rd	276-298-5693	Trevor Eldridge
Milton Eldridge	182 Dale Eldridge Rd	276-396-3596	Milton Eldridge
Editha Spem	2031 Fleerontown Road	Jonesville, VA 24263	Editha Spem



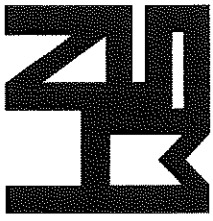
LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Robert Estes	358 BLAKEBURN CT DR	276 973 7311	R Etes
Daniel Patey	1128 FLEENORTOWN RD	276 690 0556	D Patey
Jamie Baker	1191 FLEENORTOWN RD	276 346-0254	Jamie Baker
Steve Gibson	1064 FLEENORTOWN RD	276-219-2954	Steve Gibson
Debra Bender	326 Shady	276-346-0384	Debra Bender
Mr. Bill and Cindy Calloway	265 ZEPHYR DRIVE,	276-499-9612	Bill & Cindy Calloway
Anthony Livesay	1086 Old Harlan Rd	676 393-3900	Anthony Livesay
Norma Livesay	1030 Old Harlan Rd	(276) 346-3370	Norma Livesay
Jamie Blandford	117 Old Harlan Rd	276-690-5115	Jamie Blandford
Thomas Livesay	1196 Old Harlan Rd	276-395-4726	Thomas Livesay
Ray Blain	1334 Old Harlan Rd	Jonesville	423-341-0533
Brenda Roberts	1743 Old Harlan Rd	Jonesville	276-219-5375
Carl Bishop	778 Flenor Town Rd	Jonesville Va	276-346-6769
Norathy Edens	697 Hemperston Rd	Jonesville	276-346-6769



LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Charles R BUNCH	232 ABBEY DR	276 346 1497	<i>Charles Bunch</i>
Carl Bell	270 ABBEY DR	276 346 0211	
Tony Dalling	96 g Elena Tom Rd	276 346 2407	<i>Tony Dalling</i>
Danica Blanton	432 Danica Blanton Dr 1073	276 346 0305	<i>Danica Blanton</i>
JACK BRANKEN	357 PARIS ROAD	276-298-5259	<i>Jack Branken</i>
Seth Bandy	1518 FLEENORTOWN Rd	276-337-7775	<i>Seth Bandy</i>
Marsha Stanford	200 Dale Eldridge Rd	Jmesville VA 24243	276-870-0330 <i>Marsha Stanford</i>
Marsha Stanford	236 Dale Eldridge Rd	Jmesville	276-870-0530 <i>Marsha Stanford</i>
Marsha Stanford	195 Dale Eldridge Rd	Jmesville	276-870-0330 <i>Marsha Stanford</i>
Leif Blanken	581 Dale Eldridge Rd	Jmesville, VA	276-832-2402 <i>Leif Blanken</i>
Tabitha Bales	226 Shady Rd	Jonesville, VA 24263	865-585-7220 <i>Tabitha Bales</i>
Tom Ely	278 Shady Road	Jonesville, VA	423-973-1333 <i>Tom Ely</i>
Linda Danzak	108 Shady Rd	Jonesville, VA	276-832-1769 <i>Linda Danzak</i>
Jamula Pennington	1326 Fleemontown		276-832-2589 <i>Jamula Pennington</i>

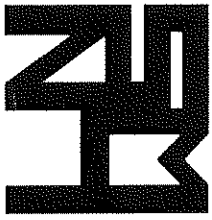


LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Stella Carroll		276-3460539	Stella Carroll
252 Jonesville, Va			
<del>James Pettay</del>	<del>1279 Fleenortown Rd</del>		
James Pettay	1279 Fleenortown Rd Jonesville, VA	292623	276-690-8209 James Pettay
Richard Eldridge	1121 Fleenortown Rd. Jonesville VA	24263	423-429-3302 Richard Eldridge
Danny Wilder	254 Shady Rd Jonesville VA	24263	276-346-3090 Danny Wilder
JAMES FAZIER	ABBEY DR 153 JONESVILLE VA	24263	276 346 3696 James Frazier
Jeff Hobbs	764 Fleenortown Road Jonesville v.A.	206.307-7885	Jeff Hobbs
Jamie Carsett	444 Cakes Farm Dr Jonesville, VA	226-608-4431	Jan Carsett
Melanie Cradic	1438 Old Harlan Jonesville, VA	276-832-2025	Melanie Cradic
Zanna Newman	581 Fleenortown Rd Jonesville, VA	276-346-0423	Zanna Newman
Melissa Dean	702 Fleenortown Rd Jonesville VA	276 346 -3699	Melissa Dean
James Cain	855 Fleenortown Rd Jonesville Va	276 832 2813	James Cain

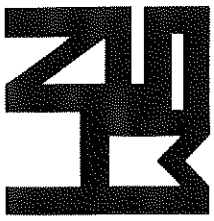






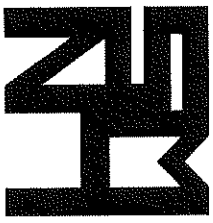
LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Roger Fenix	293 Soaring Eagle Trail	276-298-4693	Roger Fenix
Nash Aldridge	1287 Light Poor Valley Rd	316-471-8903	<i>[Signature]</i>
Ed Lambright	232 Sturling Dr. Pennington Gap	276-275-9962	<i>[Signature]</i>
Maguerez Mosier	1124 Right Poor Valley Rd.	276-202-6563	Maguerez Mosier
Jimmy L. Nelson	1054 Right Poor Valley Rd.		Jimmy Nelson
Albert + Shirley Duncan	7677 Cave Springs Rd Dryden, VA		Shirley Duncan
Mara Culp	8403 Cave Springs Rd, Big Stone Gap,		Mara Culp for Dolan Zahube
Cheerl Collice	293 Stone Mtn Rd. Big Stone Gap Va,	276-298-8839	Cheerl Collice
Richard Sturgill	326 Stone Mt Rd. Big Stone Gap Va	24219	Richard Sturgill
Kevin Tyers	126 Stone Mt Rd Big Stone Gap VA	276-523-8725	Kevin Tyers



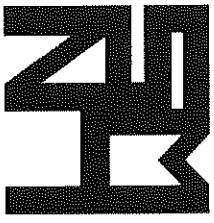
LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

Name	Address	Telephone #	Signature
Robert Middleton	Breston Dr	276-870-4163	<i>Robert Middleton</i>
Judy Blevins	2629 CAVE SPRINGS RD DRYDEN, VA 24243	276-546-5777	<i>Judy Blevins</i>
Que Rines	Cave Springs Ro.	276-298-4513	<i>Que Rines</i>
Wanda Smith	2319 Cave Springs Dryden, VA 24243	276-298-8296	<i>Wanda Smith</i>
Tanitha Banks	2310 CAVE SPRINGS RD DRYDEN VA 24243		<i>Tanitha Banks</i>
Shirley Byington	2176 CAVE SPRINGS DRYDEN, VA 24243	276-275-3168	<i>Shirley Byington</i>
David Millon	2071 Cave Springs Dryden Va 24243		<i>David Millon</i>
Michael Bonsett	2067 cave springs rd Dryden VA 24243		<i>Michael Bonsett</i>
Tamara Lamb	2017 Cave Springs Rd Dryden 24243		<i>Tamara Lamb</i>
DAVID A PARSONS	1853 CAVE SPAING RD DRYDEN VA 24243		<i>David Parsons</i>
John Parsons	1465 CAVE SPRINGS RD DRYDEN VA 24243		<i>John Parsons</i>
Charles Thompson	183 Charles Thompson Drive Dryden Va 24243		<i>Charles Thompson</i>
Larry Brown	1212 CAVE SPRINGS RD. DRYDEN, VA 24243		<i>Larry D. Brown</i>
Maurine Brown	1219 CAVE SPRINGS RD. DRYDEN, VA 24243		<i>Maurine Brown</i>



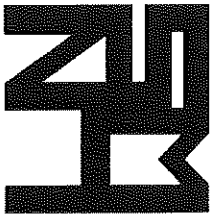
LENOISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Sandra Lawson	6313 Cave Springs Rd Dryden Va.	276-219-0517	<i>[Signature]</i>
Rachel Waddell	154 Shuler Drive Dryden Va	276-275-1707	<i>[Signature]</i>
Jammy Lawson	639 2280 Cave Springs rd Dryden VA 24243	276-275-1707	<i>[Signature]</i>
Claude Lawson	6313 Cave Springs Dryden Va	276-278-5191	<i>[Signature]</i>
MARK LAUSON	379 Green Briar Dr Dryden VA 24243	276 701 5953	<i>[Signature]</i>
Reba Olinger	137 Pam Olinger Dryden Va 24243	276-346-6411	<i>[Signature]</i>
James Robinson	4890 Cave Springs Rd Dryden VA	276-24243	<i>[Signature]</i>
Earl Ch'ngun	4820 Cone Springs Rd Dryden VA	276-219-3899	<i>[Signature]</i>
Ronald Olinger	4801 Cave Springs Rd Dryden VA	276-24243	<i>[Signature]</i>
John Olinger	4743 Cave Springs Rd Dryden VA	276-24243	<i>[Signature]</i>
John Stuber	POB Dryden, Va.	276-24243	<i>[Signature]</i>
DANNY OLINGER	4543 DAVE SPRINGS RD. DRYDEN VA	24243	<i>[Signature]</i>
Charles Kyle Lawson	152 Kyle Lawson Dr. Dryden VA	276-546-5248	<i>[Signature]</i>
Marianne Lawson	153 Kyle Lawson Dr Dryden VA	276-546-5248	<i>[Signature]</i>



LENOVISO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Ramona Drescher	162 Bailey Loop Dryden VA 24243	433-306-4855	Ramona Drescher
ALMA REASOR	7623 CAVE SPRINGS RD DRYDEN VA 24243	276-523-0415	Alma Reasor
Shelby Hannaford	7554 Cave Springs rd Dryden, VA 24243	276-298-9434	Shelby Hannaford
BOBBY WARD	7258 Cave Springs Rd Dryden VA 24243	276-523-6536	Bobby Ward
Melissa Barker	7051 Cave Springs Rd, Dryden VA 24243	276-219-8657	Melissa Barker
CONNIE HUFF	346 Railroad Loop Dryden VA 24243	276-523-1623	Connie Huff
MARTY LAWSON	6701 CAVE SPRING RD. DRYDEN VA 24243	276-298-7026	Marty
Brenda Craft	6687 CAVE SPRING RD DRYDEN VA 24243	276-439-933	Brenda Craft
JAMES HUFF	6526 CAVE SPRING RD DRYDEN VA 24243	276-523-2981	James Huff
Wendell Huff	162 Railroad Loop Dryden VA 24243	276-523-5668	Wendell Huff
Marc Huff	6712 CAVE SPRING RD. DRYDEN VA 24243	276-215-7813	Marc Huff
Virginia Lawson	6583 Cave Springs Rd. Dryden, Va 24243	276-298-0026	Virginia Lawson
Permetta Huff	6507 cave springs rd Dryden Va 24243	276-523-4888	Permetta Huff
BOBBY LAWSON	6310 cave spring RD DRYDEN VA 24243	276-523-0541	Bobby



LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Scott and Lee Counties in Virginia who do not have adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Robert Hese	304 Cave Springs Rd	276-298-4296	Robert Hese
Danae Snodgrass	530 Doc Ginger Rd	276-523-6820	Danae Snodgrass
Kim Stidham	346 Doc Olinger Rd	276-219-4217	Kim Stidham
KAY Vaughn	168 Flanary Dr.		Sharon Vaughn
Longeth Herron	115 Flanary Dr.	276-832-2185	Soketia Herron
Darzo R Bode	252 Mount Pass.	274 544 3212	Samuel Bode
Everett H. Donike	254 Doc Olinger Rd	276-523-0123	Everett Donike
Bruce Brewer	361 Doc Olinger Rd.	276-227-5392	Bruce Brewer
Rose Baker	162 Doc Olinger Rd.	276-870-4705	Rose Baker
Ferry L. Copner	143 Doc. Olinger Dr	276-345-3494	Ferry L. Copner
Curtis E. Venable	7874 Cave Springs Rd	423-470-7401	Curtis E. Venable
Charles Waddell	7977 Cave Springs Rd	523-3685	Charles Waddell
Bobby Lawson	150 Stone Mountain Rd.	870-0058	Bobby Lawson
Sharon F. Spitzer	161 Ginger Rd	639-3486	Sharon Spitzer

**Attachment 5**

Propagation Map if Wireless Project

N/A

**Timeline/Project Management Plan  
&  
Staking and Material Sheets for a portion of the  
Project – Service Area 2**





**Sugar Run L-30 to I-148L3**

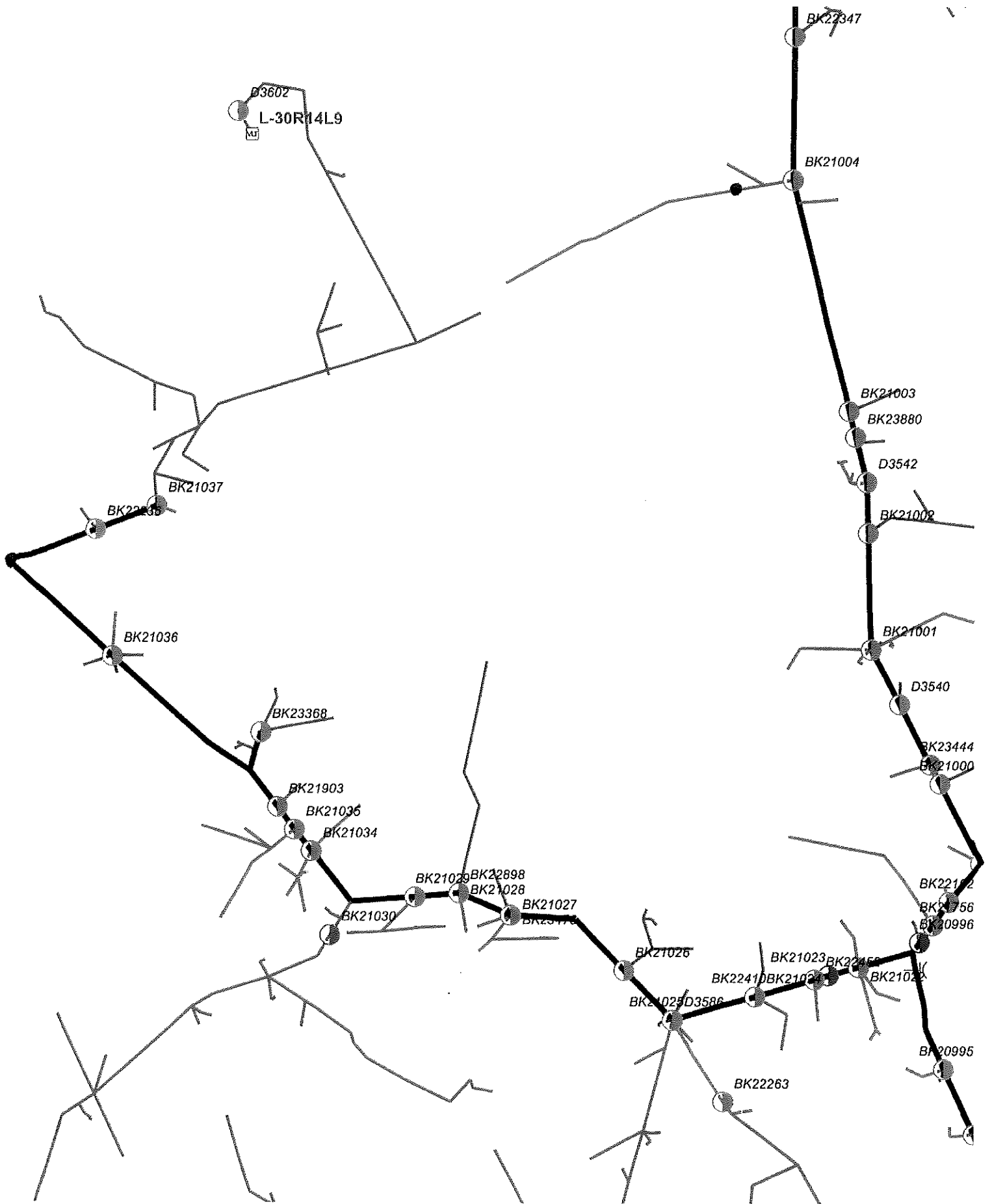
Project Number	Span (FT)	34	5	35	18	2000	
Cable Size	DE	Re-Tan	Tan	Enc SM	Enc MD	Enc LG	
(Spans, Sag, Loop)	1				1	Guys	
Totals	Span (FT)	DE	Re-Tan	Tan	Enc SM	Enc MD	Enc LG
L-30	318	1				1	200
L-29	342			1			
L-28	192			1			
L-27	282			1			
L-26	310			1			
L-25	540	2				1	100
L-24	376			1			
L-23	404			1			
L-22	230		1				
L-21	262			1			
L-20	468	2				1	100



L-5	388				1						
L-4	394	2					1				100
L-3	226				1						
L-2.5	150				1						
L-2	216				1						
L-1	562	2							1		100
I-129	122	2							1		100
I-129.5	122				1						
I-130	216				1						
I-130.5	290			1							
I-130.7	388				1						
I-131	166	2							1		100
I-131.5	552				1						

I-132	360						1						
I-132.5	218	2						1					100
I-133	348						1						
I-134	334						1						
I-134.5	356						1						
I-135	268	2							1				100
I-136	468						1						
I-137	472						1						
I-138	238	2								1			100
I-139	516								1				
I-140	480	2									1		100
I-141	272						1						
I-142	202						1						
I-143	306						1						





**MOU**

**Lenowisco Planning District Commission**

**&**

**Scott County Telephone Cooperative**

**Also....**

**Purchase Agreement**

**Scott County Telephone Cooperative**

**“Appalachian Broadband, LLC”**

**(Subsidiary Company of SCTC)**

**And**

**“Lenowisco, LLC”**





**Memorandum of Understanding Between Scott County Telephone Cooperative and the LENOWISCO Planning District Commission**

1. Whereas the LENOWISCO Planning District Commission (LENOWISCO) is authorized by Chapter 42 of title 15.2 of the Code of Virginia, 1950 as amended, to assist local government units in planning their development; and
2. Whereas, the Scott County Telephone Cooperative's (SCTC) mission includes providing regional telecommunication services, active community service and promoting economic development; and
3. Whereas, the Virginia Department of Housing and Community Development's (DHCD) Virginia Telecommunications Initiative (VATI) is established to provide financial assistance to supplement construction costs to extend service to areas that are presently unserved; and
4. Whereas, the VATI program requires a unit of government to serve as applicant, along with a private sector provider as a co-applicant; and
5. Whereas, LENOWISCO and SCTC both actively support the same goals regarding regional broadband expansion.
6. Now Therefore Be it Resolved, that the LENOWISCO Planning District Commission and Scott County Telephone Cooperative's partnership consist of, but not limited to, the following components:
  - SCTC will coordinate planning/technical staff and applicable consultants in gathering the information necessary to submit the identified projects and subsequent implementation if awarded.
  - LENOWISCO will provide grant administrative services and technical assistance with utilities, localities, public entities, etc. where applicable.
7. Be it further resolved, that, unless duly noted, the SCTC and/or applicable consultants are responsible for creation and compilation of any and all necessary data or information required for submission and implementation of any partnered project.

Accepted by Scott County Telephone Cooperative

William J. Franklin  
WILLIAM J. FRANKLIN, Chief Executive Officer

8-29-19  
Date

Accepted by the LENOWISCO Planning District Commission

Duane A. Miller  
DUANE A. MILLER, Executive Director

8/30/19  
Date

EXECUTION VERSION

MEMBERSHIP INTEREST PURCHASE AGREEMENT  
dated as of October 8, 2012  
by and between

APPALACHIAN BROADBAND, LLC  
("Purchaser")

and

LENOWISCO PLANNING DISTRICT COMMISSION  
("Seller")

with respect to all  
outstanding membership interest of

LENOWISCO, LLC  
("Company")

**TABLE OF CONTENTS**

This Table of Contents is not part of the Agreement to which it is attached but is inserted for convenience only.

	Page <u>No.</u>
Article I DEFINITIONS .....	4
Article II SALE OF SHARES AND CLOSING .....	10
2.01 Purchase and Sale.....	10
2.02 Purchase Price.....	11
2.03 Closing.....	11
2.04 Further Assurances; Post-Closing Cooperation.....	11
Article III REPRESENTATIONS AND WARRANTIES OF SELLER.....	12
3.01 Organization of Seller.....	12
3.02 Authority.....	12
3.03 Organization of the Company.....	13
3.04 Capital Interest.....	13
3.05 [Intentionally omitted].....	13
3.06 No Conflicts.....	13
3.07 Governmental Approvals and Filings.....	14
3.08 Books and Records.....	14
3.09 Financial Statements.....	14
3.10 Absence of Changes.....	14
3.11 No Undisclosed Liabilities.....	15
3.12 Taxes.....	15
3.13 Legal Proceedings.....	15
3.14 Compliance with Laws.....	16
3.15 Benefit Plans.....	16
3.16 Real Property.....	16
3.17 Tangible Personal Property.....	17
3.18 Intellectual Property Rights.....	17
3.19 Contracts.....	17
3.20 Licenses.....	18
3.21 Insurance.....	18
3.22 Affiliate Transactions.....	18
3.23 Employees; Labor Relations.....	19
3.24 Environmental Matters.....	19
3.25 [Intentionally omitted].....	20
3.26 Brokers.....	20
3.27 Disclosure.....	20

Article IV REPRESENTATIONS AND WARRANTIES OF PURCHASER .....	20
4.01 Organization .....	20
4.02 Authority .....	20
4.03 No Conflicts .....	21
4.04 Governmental Approvals and Filings .....	21
4.05 Legal Proceedings .....	21
Article V COVENANTS OF SELLER .....	22
5.01 Regulatory and Other Approvals .....	22
5.02 Investigation by Purchaser .....	22
5.03 Non-Solicitation/Non-Competition .....	22
5.04 Conduct of Business .....	23
5.05 Financial Statements and Reports; Filing .....	24
5.06 Employee Matters .....	25
5.07 Certain Restrictions .....	25
5.08 Affiliate Transactions .....	26
5.09 Books and Records .....	27
5.10 Notice and Cure .....	27
5.11 Fulfillment of Conditions .....	27
Article VI COVENANTS OF PURCHASER .....	27
6.01 Regulatory and Other Approvals .....	27
6.02 Notice and Cure .....	28
6.03 Fulfillment of Conditions .....	28
6.04 Name Change .....	28
6.05 Economic Development Fund Override .....	28
Article VII CONDITIONS TO OBLIGATIONS OF PURCHASER .....	29
7.01 Representations and Warranties .....	29
7.02 Performance .....	29
7.03 Closing Certificates .....	29
7.04 Orders and Laws .....	29
7.05 Regulatory Consents and Approvals .....	29
7.06 Third Party Consents .....	30
7.07 Resignations of Directors and Officers .....	30
7.08 Reserved .....	30
7.09 Environmental Survey .....	30
7.10 Proceedings .....	30
7.11 Additional Deliverables .....	30
Article VIII CONDITIONS TO OBLIGATIONS OF SELLER .....	31
8.01 Representations and Warranties .....	31
8.02 Performance .....	31
8.03 Officers' Certificates .....	31
8.04 Orders and Laws .....	31
8.05 Regulatory Consents and Approvals .....	31
8.06 Third Party Consents .....	31

8.07	Proceedings.....	32
Article IX	TAX MATTERS AND POST-CLOSING TAXES .....	32
9.01	Tax Filings.....	32
9.02	Tax Cooperation.....	33
9.03	Transfer Taxes.....	33
9.04	Tax Treatment of Indemnity Payments.....	33
Article X	SURVIVAL OF REPRESENTATIONS, WARRANTIES, COVENANTS AND AGREEMENTS .....	33
10.01	Survival of Representations, Warranties, Covenants and Agreements.....	33
Article XI	INDEMNIFICATION .....	34
11.01	Tax Indemnification.....	34
11.02	Other Indemnification.....	35
11.03	Method of Asserting Claims.....	35
11.04	Exclusive Remedy; Mitigation; Etc.....	36
Article XII	TERMINATION .....	37
12.01	Termination.....	37
12.02	Effect of Termination.....	37
Article XIII	MISCELLANEOUS .....	38
13.01	Notices.....	38
13.02	Entire Agreement.....	39
13.03	Expenses.....	39
13.04	Public Announcements.....	39
13.05	Confidentiality.....	39
13.06	Waiver.....	40
13.07	Amendment.....	40
13.08	Third Party Beneficiaries.....	40
13.09	No Assignment; Binding Effect.....	40
13.10	Headings.....	41
13.11	Consent to Jurisdiction and Service of Process.....	41
13.12	Invalid Provisions.....	41
13.13	Governing Law.....	41
13.14	Counterparts.....	41
13.15	Waiver of Punitive and Other Damages and Jury Trial.....	41

This MEMBERSHIP INTEREST PURCHASE AGREEMENT, dated as of October 8, 2012, is made and entered into by and between (i) Appalachian Broadband, LLC, a Virginia limited liability company ("Purchaser"), and (ii) LENOWISCO District Planning Commission, an instrumentality of Commonwealth of Virginia ("LPDC" or "Seller"). Capitalized terms not otherwise defined herein have the meanings set forth in Section 1.01.

WHEREAS, Seller owns one hundred percent of the limited liability company membership interests of LENOWISCO, LLC, a Virginia limited liability company (the "Company") (such membership interests being referred to herein as the "Shares"); and

WHEREAS, Seller desires to sell, and Purchaser desires to purchase, the Shares on the terms and subject to the conditions set forth in this Agreement;

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

## ARTICLE I

### DEFINITIONS

(a) Defined Terms. As used in this Agreement, the following defined terms have the meanings indicated below:

"Actions or Proceedings" means any action, suit, proceeding, arbitration or Governmental or Regulatory Authority investigation or audit.

"Affiliate" means any Person that directly, or indirectly through one of more intermediaries, controls or is controlled by or is under common control with the Person specified. For purposes of this definition, control of a Person means the power, direct or indirect, to direct or cause the direction of the management and policies of such Person whether by Contract or otherwise and, in any event and without limitation of the previous sentence, any Person owning ten percent (10%) or more of the voting securities of another Person shall be deemed to control that Person.

"Agreement" means this Membership Interest Purchase Agreement and the Exhibits, the Disclosure Schedule and the Schedules hereto and the certificates delivered in accordance with Sections 7.03 and 8.03, as the same shall be amended from time to time.

"Assets and Properties" of any Person means all assets and properties of every kind, nature, character and description (whether real, personal or mixed, whether tangible or intangible, whether absolute, accrued, contingent, fixed or otherwise and wherever situated), including the goodwill related thereto, operated, owned or leased by such Person, including without limitation cash, cash equivalents, accounts and notes receivable, chattel paper, documents, instruments, general intangibles, real estate, equipment, inventory, goods and Intellectual Property.

“Audited Financial Statement Date” means the last day of the most recent fiscal year of the Company for which Financial Statements are delivered to Purchaser pursuant to Section 3.09.

“Audited Financial Statements” means the Financial Statements for the most recent fiscal year of the Company delivered to Purchaser pursuant to Section 3.09.

“Benefit Plan” means any employment agreement and any bonus, incentive compensation, deferred compensation, pension, profit sharing, retirement, stock purchase, stock option, restricted stock, deferred stock, stock ownership, stock appreciation rights, phantom stock, equity-related, leave of absence, layoff, vacation, day or dependent care, legal services, cafeteria, life, health, accident, disability, workmen’s compensation or other insurance, change in control, retention, severance, separation or other employee benefit plan, practice, policy or arrangement of any kind, whether written or oral, including, but not limited to, any “employee benefit plan” within the meaning of Section 3(3) of ERISA.

“Board of Directors” means (a) with respect to a corporation, the board of directors of the corporation, (b) with respect to a partnership, the board of directors or similar governing body of the general partner, and (c) with respect to any other Person, the governing body of such Person exercising the authority or serving a similar function as the board of directors of a corporation.

“Books and Records” means all files, documents, instruments, papers, books and records relating to the Business or Condition of the Company, including without limitation financial statements, Tax Returns and related work papers and letters from accountants, budgets, pricing guidelines, ledgers, journals, deeds, title policies, minute books, stock certificates and books, stock transfer ledgers, Contracts, Licenses, customer lists, computer files and programs, retrieval programs, operating data and plans and environmental studies and plans.

“Business Day” means a day other than Saturday, Sunday or any day on which banks located in the Commonwealth of Virginia are authorized or obligated to close.

“Business or Condition of the Company” means the business, condition (financial or otherwise), results of operations, Assets and Properties and prospects of the Company.

“Claim Notice” means written notification pursuant to Section 11.03(a) of a Third Party Claim as to which indemnity under Section 11.02 is sought by an Indemnified Party, enclosing a copy of all papers served, if any, and specifying the nature of and basis for such Third Party Claim and for the Indemnified Party’s claim against the Indemnifying Party under Section 11.02, together with the amount or, if not then reasonably determinable, the estimated amount, determined in good faith, of the Loss arising from such Third Party Claim.

“Closing” means the closing of the transactions contemplated by Section 2.03.

“Closing Balance Sheet” has the meaning ascribed to it in Section 2.05(a).

“Closing Date” means the date that is three Business Days following the date on which the last of the conditions set forth in Sections 7.05, 7.06, 7.09, 7.11(b) and (c), 8.05 and

8.06 have been satisfied or such other date as Purchaser and Seller mutually agree upon in writing.

“Closing Financial Statements Delivery Date” has the meaning ascribed to it in Section 2.05(a).

“Code” means the Internal Revenue Code of 1986, as amended, and the rules and regulations promulgated thereunder.

“Commission” means the Virginia Tobacco Community Indemnification and Revitalization Commission, a public body corporate and a political subdivision of the Commonwealth of Virginia.

“Company” has the meaning ascribed to it in the forepart of this Agreement.

“Company Intellectual Property” means all of the Intellectual Property that is owned by the Company or that the Company has the right to use pursuant to written license, sublicense, agreement or permission, that is used or useful in, related to, or arises out of the conduct of the business of the Company as of the Closing Date.

“Company Material Adverse Effect” shall mean a material adverse effect on the business, condition (financial or otherwise), Assets and Properties, liabilities, results of operations or prospects of the Company; provided, however, that none of the following shall be or will be at the Closing, deemed to constitute and shall not be taken into account in determining the occurrence of a Company Material Adverse Effect: (i) any effect or change that results from the announcement of the execution and delivery of this Agreement, and (ii) any effect or change that results from the taking of any action required pursuant to this Agreement or expressly permitted by the written consent of Purchaser pursuant to this Agreement.

“Contest” has the meaning ascribed to it in Section 11.01(b).

“Contract” means any agreement, lease, license, evidence of Indebtedness, mortgage, indenture, security agreement or other contract (whether written or oral).

“Disclosure Schedule” means the record delivered to Purchaser by Seller or to Seller by Purchaser, as applicable, herewith and dated as of the date hereof, containing all lists, descriptions, exceptions and other information and materials as are required to be included therein by Seller or Purchaser, as applicable, pursuant to this Agreement.

“Environmental Law” means any Law or Order, including all common and civil law, relating to pollution, the regulation or protection of human health, safety or the environment or the manufacture, processing, distribution, use, treatment, storage, disposal, transport, arrangement for disposal, handling or Release of, or exposure to, any pollutants, contaminants, chemicals or industrial, toxic or hazardous substances or wastes, each as amended and whenever in effect.

“Financial Statements” means the consolidated financial statements of the Company delivered to Purchaser pursuant to Section 3.09.



“GAAP” means generally accepted accounting principles, consistently applied throughout the specified period and in the immediately prior comparable period.

“Governmental or Regulatory Authority” means any court, tribunal, arbitrator, authority, agency, commission, official or other instrumentality of the United States, any foreign country or any domestic or foreign state, county, city or other political subdivision.

“Grant Agreements” means the agreements between the Commission, LPDC and/or the Company that are identified in Section 3.19(a) of the Disclosure Schedule.

“Grant-Funded Assets” means all Assets and Properties acquired, improved and/or funded with money obtained from the Commission under the Grant Agreements, and any proceeds therefrom.

“Hazardous Material” means (A) any petroleum or petroleum products, flammable explosives, radioactive materials, asbestos in any form or condition, urea formaldehyde foam insulation or polychlorinated biphenyls (PCBs); (B) any chemicals or other materials or substances that are now or hereafter become defined as or included in the definition of “hazardous substances,” “hazardous wastes,” “hazardous materials,” “extremely hazardous wastes,” “restricted hazardous wastes,” “toxic substances,” “toxic pollutants” or words of similar import under any Environmental Law; and (C) any other chemical or other material or substance, with respect to which liability or standards of conduct are imposed under any Environmental Law.

“Indebtedness” of any Person means all obligations of such Person (i) for borrowed money, (ii) evidenced by notes, bonds, debentures or similar instruments, (iii) for the deferred purchase price of goods or services (other than trade payables or accruals incurred in the ordinary course of business), (iv) under capital leases and (v) in the nature of guarantees of the obligations described in clauses (i) through (iv) above of any other Person.

“Indemnified Party” means any Person claiming indemnification under any provision of Article XI.

“Indemnifying Party” means any Person against whom a claim for indemnification is being asserted under any provision of Article XI.

“Indemnity Notice” means written notification pursuant to Section 11.03(b) of a claim for payment or indemnity under Article XI by an Indemnified Party, specifying the nature of and basis for such claim, together with the amount or, if not then reasonably determinable, the estimated amount, determined in good faith, of the Loss arising from such claim.

“Intellectual Property” means all intellectual property rights of any nature or form of protection of a similar nature, including, without limitation, copyrights, domain names, know-how, trade secrets, patents, patent applications, inventions, licenses, including software, software systems, databases, information systems or computer network systems, and all internet and world wide web content, sites and pages, and all HTML and other code related thereto.

“IRS” means the United States Internal Revenue Service.

“Knowledge of Seller” or “Known to Seller” means the actual knowledge after due inquiry, or knowledge that would have been reasonably expected after due inquiry, of Glen A. (“Skip”) Skinner (“Skinner”), Executive Director.

“Laws” means all laws, statutes, rules, regulations, ordinances and other pronouncements having the effect of law of the United States, any foreign country or any domestic or foreign state, county, city or other political subdivision or of any Governmental or Regulatory Authority.

“Liabilities” means all Indebtedness, obligations and other liabilities of a Person (whether absolute, accrued, contingent, fixed or otherwise, or whether due or to become due).

“Licenses” means all licenses, permits, certificates of authority, authorizations, approvals, registrations, franchises and similar consents granted or issued by any Governmental or Regulatory Authority.

“Liens” means any mortgage, pledge, assessment, security interest, lease, lien, adverse claim, levy, charge or other encumbrance of any kind, or any conditional sale Contract, title retention Contract or other Contract to give any of the foregoing.

“LLC Agreement” means the Operating Agreement of LENOWISCO, LLC dated as of June 3, 2009.

“Loss” means any and all damages, fines, fees, penalties, deficiencies, losses and expenses (including without limitation interest, court costs, fees of attorneys, accountants and other experts or other expenses of litigation or other proceedings or of any claim, default or assessment).

“Option” with respect to any Person means any security, right, subscription, warrant, option, “phantom” stock right or other Contract that gives the right to (i) purchase or otherwise receive or be issued any shares of capital interest of such Person or any security of any kind convertible into or exchangeable or exercisable for any shares of capital interest of such Person or (ii) receive or exercise any benefits or rights similar to any rights enjoyed by or accruing to the holder of shares of capital interest of such Person, including any rights to participate in the equity or income of such Person or to participate in or direct the election of any directors or officers of such Person or the manner in which any shares of capital interest of such Person are voted.

“Order” means any writ, judgment, decree, injunction or similar order of any Governmental or Regulatory Authority (in each such case whether preliminary or final).

“Permitted Lien” means (i) any Lien for Taxes not yet due or delinquent or being contested in good faith by appropriate proceedings for which adequate reserves have been established in accordance with GAAP, (ii) any statutory Lien arising in the ordinary course of business by operation of Law with respect to a Liability that is not yet due or delinquent and (iii) any minor imperfection of title or similar Lien which individually or in the aggregate with other such Liens does not materially impair the value of the property subject to such Lien or the use of such property in the conduct of the business of the Company.

“Person” means any natural person, corporation, limited liability company, general partnership, limited partnership, proprietorship, other business organization, trust, union, association or Governmental or Regulatory Authority.

“Pre-Closing Taxable Period” has the meaning ascribed to it in Section 9.01.

“Pre-Closing Taxes” has the meaning ascribed to it in Section 9.01.

“Purchase Price” has the meaning ascribed to it in Section 2.02.

“Purchaser” has the meaning ascribed to it in the forepart of this Agreement.

“Purchaser Indemnified Parties” means Purchaser and its officers, directors, employees, agents and Affiliates.

“Release” means any release, spill, emission, leaking, pumping, injection, deposit, disposal, discharge, dispersal, leaching or migration into the indoor or outdoor environment, including, without limitation, the movement of Hazardous Materials through ambient air, soil, surface water, ground water, wetlands, land or subsurface strata.

“Representatives” means the officers, directors, employees, agents, counsel, accountants, financial advisors, consultants and other representatives of a party.

“Rural Utility Service” means an instrumentality of the US Department of Agriculture.

“Resolution Period” means the period ending thirty (30) days following receipt by an Indemnified Party of a written notice from an Indemnifying Party stating that it disputes all or any portion of a claim set forth in a Claim Notice or an Indemnity Notice.

“Seller Indemnified Parties” means Seller and its respective officers, directors, employees, agents and Affiliates.

“Shares” has the meaning ascribed to it in the forepart of this Agreement.

“Standard Software” means all standard, off-the-shelf software generally available to the public, subject to a “shrink wrap” or “click wrap” license agreement pursuant to which Company has purchased a perpetual license or pursuant to which annual license fees do not exceed One Thousand and No/100 (\$1,000.00), per seat or license, on an annual basis.

“Sunset” means Sunset Digital Communications, Inc., a Virginia corporation, and its affiliates.

“Tax Return” means any return, declaration, report, claim for refund, or information return or statement relating to Taxes, including any schedule or attachment thereto, and including any amendment thereof.

“Taxes” or “Tax” means any federal, state, local, or foreign income, gross receipts, license, payroll, employment, excise, severance, stamp, occupation, premium, windfall profits, environmental (including taxes under Code Section 59A), customs duties, capital interest, franchise, profits, withholding, social security (or similar), unemployment, disability, real property, personal property, sales, use, transfer, registration, value added, alternative or add-on minimum, estimated, or other tax of any kind whatsoever, including any interest, penalty, or addition thereto, whether disputed or not and any expenses incurred in connection with the determination, settlement or litigation of any Tax liability.

“Third Party Claim” has the meaning ascribed to it in Section 11.03(a).

“Transfer Taxes” has the meaning ascribed to it in Section 9.03.

“Treasury Regulations” means regulations promulgated by the United States Treasury Department pursuant to the Code.

“Unaudited Financial Statement Date” means the last day of the most recent fiscal quarter of the Company for which Financial Statements are delivered to Purchaser pursuant to Section 3.09.

“Unaudited Financial Statements” means the Financial Statements for the most recent fiscal quarter of the Company delivered to Purchaser pursuant to Section 3.09.

“Virginia Coalfield Economic Development Authority” means a regional economic development organization created by the Virginia General Assembly in 1988 to enhance and diversify the economic base of the Southwest Virginia region it serves.

(b) Construction of Certain Terms and Phrases. Unless the context of this Agreement otherwise requires, (i) words of any gender include each other gender; (ii) words using the singular or plural number also include the plural or singular number, respectively; (iii) the term “or” is used in the sense of “and/or”; (iv) the terms “hereof,” “herein,” “hereby” and derivative or similar words refer to this entire Agreement; (v) the terms “Article” or “Section” refer to the specified Article or Section of this Agreement; (vi) the phrases “ordinary course of business” and “ordinary course of business consistent with past practice” refer to the business and practice of the Company; and (vii) the word “including” will be construed as “including without limitation.” Whenever this Agreement refers to a number of days, such number shall refer to calendar days unless Business Days are specified. All accounting terms used herein and not expressly defined herein shall have the meanings given to them under GAAP.

## ARTICLE II

### SALE OF SHARES AND CLOSING

2.01 Purchase and Sale. Effective as of the Closing Date, Seller agrees to sell to Purchaser, and Purchaser agrees to purchase from Seller, all of the right, title and interest entries found. of Seller in and to the Shares at the Closing on the terms and subject to the conditions set forth in this Agreement.

2.02 Purchase Price.

The aggregate purchase price for the Shares and for the covenant of Seller contained in Article V is Five Hundred Eighty-Six Thousand and No/100 Dollars (\$586,000.00) (the "Purchase Price"), payable as follows: (a) an earnest money deposit of \$86,000.00, paid by Purchaser to Seller in July of 2012 (the "Earnest Money Deposit"), shall be credited against the Purchase Price at Closing and (b) deliver a promissory note in the principal amount of \$500,000 in the form attached hereto at Exhibit A, representing the balance of the Purchase Price (the "Promissory Note"). \$25,000 of the Purchase Price is allocable to, and deemed to be in consideration of, the covenant of Seller contained in Article V and the remainder of which is allocable to, and deemed to be in consideration of, the Shares.

2.03 Closing. The Closing will take place at the offices of LeClairRyan located at Riverfront Plaza, East Tower, 951 East Byrd Street, Eighth Floor, Richmond, Virginia 23219 , or at such other place as Purchaser and Seller mutually agree, at 10:00 a.m. local time, on the Closing Date. At the Closing, Purchaser will pay to Seller \$10.00 and the Earnest Money Deposit shall be credited against the Purchase Price.

2.04 Further Assurances; Post-Closing Cooperation. Following the Closing, Purchaser will undertake to amend the LLC Agreement to authorize a board of managers for the Company, and appoint one (1) representative of Seller to such board of managers. Additionally, at any time or from time to time after the Closing, Seller shall execute and deliver to Purchaser such other documents and instruments, provide such materials and information and take such other actions as Purchaser may reasonably request more effectively to vest title to the Shares in Purchaser and, to the full extent permitted by Law, to put Purchaser in actual possession and operating control of the Company and its Assets and Properties and Books and Records, and otherwise to cause Seller to fulfill its obligations under this Agreement. Following the Closing, Seller will afford the Purchaser, its counsel and its accountants, during normal business hours, reasonable access to the books, records and other data relating to the Business or Condition of the Company in its possession with respect to periods prior to the Closing and the right to make copies and extracts therefrom, to the extent that such access may be reasonably required by the Purchaser in connection with (i) the preparation of Tax Returns, (ii) the determination or enforcement of rights and obligations under this Agreement, (iii) compliance with the requirements of any Governmental or Regulatory Authority, or (iv) in connection with any actual or threatened Action or Proceeding. Further, Seller agrees for a period extending three (3) years after the Closing Date not to destroy or otherwise dispose of any such books, records and other data unless Seller shall first offer in writing to surrender such books, records and other data to the other party and Purchaser shall not agree in writing to take possession thereof during the ten (10) day period after such offer is made.

(b) Following the Closing, Seller will fully cooperate, at its sole expense, with Purchaser in connection with any deliberation, hearing, proceeding or determination of the Commission, the Virginia Coalfield Economic Development Authority, the Rural Utility Service and any other governmental or quasi-governmental body funding, having an interest in, or cognizance over the fiber-optic cable network and associated equipment leased by the Company.

(c) Following the Closing, Seller will fully cooperate, at its sole expense, with Purchaser in connection with (i) any actual or threatened Action or Proceeding, including but not limited to (x) a pending action in the Circuit Court for Lee County brought against Company on behalf of Sunset in connection with a certain promissory note in the principal amount of \$86,000 and (y) a pending action in the Circuit Court for Lee County brought against Company on behalf of Sunset seeking to recover the amount of \$304,400.59, representing monies allegedly owed by Company for fiber optic construction costs plus finance charges and (z) a pending declaratory judgment action in the Circuit Court of Lee County brought against the Company on behalf of Sunset seeking a declaration of the extent of Sunset's ownership in the Company's fiber optic network; (ii) previous and future litigation matters involving Company and Sunset; and (iii) claims that Purchaser may decide to pursue against Sunset and/or its Affiliates in the future. Seller's cooperation shall not include a requirement on the Seller to engage consultants or attorneys to assist in any matter unless the Seller deems such engagement to be necessary to protect the interests of the Seller.

(d) In the event of the failure of Seller to fully cooperate with Purchaser as contemplated by Sections 2.04 (b) and/or (c) above, the obligation of Purchaser to fund the Economic Development Fund contemplated by Section 6.05 shall be suspended proportional to the period of Seller's failure to cooperate. Any amounts withheld by Purchaser pursuant to this Section 2.04 (d) shall be deemed liquidated damages and not a penalty.

(e) Notwithstanding anything to the contrary contained in this Section, if the parties are in an adversarial relationship in litigation or arbitration, the furnishing of information, documents or records in accordance with any provision of this Section shall be subject to applicable rules relating to discovery.

### ARTICLE III

#### REPRESENTATIONS AND WARRANTIES OF SELLER

Seller hereby represents and warrants to Purchaser that the statements contained in this Article III are correct and complete as of the date of this Agreement, except as set forth in the disclosure schedules that Seller has delivered to Purchaser with this Agreement (the "Disclosure Schedule") The Disclosure Schedule is arranged in sections that correspond to the numbered sections in this Article III, and the disclosure of any matter in one section of the Disclosure Schedule shall be treated as disclosed in the other parts of the Disclosure Schedule where it is reasonably apparent from the face of such disclosure that the disclosure is intended to apply to such other part.

3.01 Organization of Seller. Seller is a governmental agency validly existing and in good standing under the Laws of the Commonwealth of Virginia. Seller has the requisite power and authority to execute and deliver this Agreement and to perform its obligations hereunder and to consummate the transactions contemplated hereby, including without limitation to own, hold, sell and transfer (pursuant to this Agreement) the Shares.

3.02 Authority. The execution and delivery by Seller of this Agreement, and the performance by Seller of its obligations hereunder, have been duly and validly authorized by

its Board of Directors and no other action on the part of Seller is necessary. This Agreement has been duly and validly executed and delivered by Seller and constitutes, a legal, valid and binding obligations of Seller, enforceable against it in accordance with its terms.

3.03 Organization of the Company. The Company is a limited liability company duly organized, validly existing and in good standing under the Laws of the Commonwealth of Virginia, and has full limited liability company power and authority to conduct its business as and to the extent now conducted and to own, use and lease its Assets and Properties. Section 3.03 of the Disclosure Schedule lists all lines of business in which the Company is participating or engaged. The Company is duly qualified, licensed or admitted to do business in those jurisdictions specified in Section 3.03 of the Disclosure Schedule, which are the only jurisdictions in which the ownership, use or leasing of its Assets and Properties, or the conduct or nature of its business, makes such qualification, licensing or admission necessary, except for those jurisdictions in which the adverse effects of all such failures by the Company to be qualified, licensed or admitted can in the aggregate be eliminated without material cost or expense by the Company becoming qualified or admitted and in good standing. Seller has, prior to the execution of this Agreement, delivered to Purchaser true and complete copies of the certificate of organization and limited liability company operating agreement of the Company as in effect on the date hereof.

3.04 Capital Interest. Seller owns the Shares, beneficially and of record, free and clear of all Liens. Except for this Agreement and as disclosed in Section 3.04 of the Disclosure Schedule, there are no outstanding membership interests or Options with respect to the Company. The delivery of a certificate or certificates at the Closing representing the Shares will transfer to Purchaser good and valid title to the Shares, free and clear of all Liens. Neither Seller nor the Company are party to any agreement, other than the LLC Agreement, pursuant to which any of them has granted preemptive rights, rights of first refusal, registration rights and similar rights with respect to the Shares or any other shares of membership interest units of the Company or any agreement relating to voting of the Shares or any other shares of capital interest of the Company. The Company does not have any subsidiaries or own any equity interest in any other Person.

3.05 [Intentionally omitted.]

3.06 No Conflicts.To the Knowledge of Seller, the execution and delivery by Seller of this Agreement does not, and the performance by Seller of its obligations under this Agreement and the consummation of the transactions contemplated hereby will not:

(a) conflict with or result in a violation or breach of any of the terms, conditions or provisions of the certificate of organization or limited liability company operating agreement of Seller or the Company;

(b) subject to obtaining the consents, approvals and actions, making the filings and giving the notices disclosed in Section 3.07 of the Disclosure Schedule, conflict with or result in a violation or breach of any term or provision of any Law or Order applicable to either Seller, the Company or any of their respective Assets and Properties;

(c) except as disclosed in Section 3.06 of the Disclosure Schedule, (i) conflict with or result in a violation or breach of, (ii) constitute (with or without notice or lapse of time or both) a default under, (iii) require either Seller or the Company to obtain any consent, approval or action of, make any filing with or give any notice to any Person as a result or under the terms of, (iv) result in or give to any Person any right of termination, cancellation, acceleration or modification in or with respect to, (v) result in or give to any Person any additional rights or entitlement to increased, additional, accelerated or guaranteed payments under, or (vi) result in the creation or imposition of any Lien upon either Seller, the Company or any of their respective Assets and Properties under any Contract or License to which Seller or the Company is a party or by which any of their respective Assets and Properties are bound.

3.07 Governmental Approvals and Filings. To the Knowledge of Seller, except as disclosed in Section 3.07 of the Disclosure Schedule, no consent, approval or action of, filing with or notice to any Governmental or Regulatory Authority on the part of the Seller or the Company is required in connection with the execution, delivery and performance of this Agreement or the consummation of the transactions contemplated hereby.

3.08 Books and Records. The minute books and other similar records of the Company as made available to Purchaser prior to the execution of this Agreement contain a true and complete record, in all material respects, of all action taken at all meetings and by all written consents in lieu of meetings of the members, the Boards of Directors and committees of the Boards of Directors of the Company. The membership interest transfer ledgers and other similar records of the Company as made available to Purchaser prior to the execution of this Agreement accurately reflect all record transfers prior to the execution of this Agreement in the capital interest of the Company.

3.09 Financial Statements. Prior to the execution of this Agreement, Seller has delivered to Purchaser true and complete copies of the following financial statements:

(a) LENOWISCO Planning District Commission, Audit Report, year ended June 30, 2011, prepared by Thrower, Blanton & Associates, P.C. dated June 19, 2012; and

(b) the unaudited balance sheets, if any, of the Company, and the related unaudited statements of operations, members' equity and cash flows for the portion of the fiscal year then ended.

Except as disclosed in Section 3.09 of the Disclosure Schedule, all such financial statements (i) were prepared in accordance with GAAP applied consistently throughout the periods involved, except as disclosed therein, and (ii) fairly present the consolidated financial condition and results of operations of the Company as of the respective dates thereof and for the respective periods covered thereby.

3.10 Absence of Changes. Except for the execution and delivery of this Agreement and the transactions to take place pursuant hereto on or prior to the Closing Date, since the Unaudited Financial Statement Date the Company has operated in the ordinary course of business consistent with past practices and there has not been any Company Material Adverse



Effect, or any event or development which, individually or together with other such events, could reasonably be expected to result in a Company Material Adverse Effect.

3.11 No Undisclosed Liabilities. To the Knowledge of Seller, except as reflected or reserved against in the balance sheet included in the Audited Financial Statements, the Unaudited Financial Statements or in any of the notes thereto or as disclosed in Section 3.11 of the Disclosure Schedule, the Company has no outstanding Indebtedness and there are no Liabilities against, relating to or affecting the Company or any of its Assets and Properties, other than Liabilities incurred in the ordinary course of business consistent with past practice that are not material to the Company.

3.12 Taxes

Except as set forth in Section 3.12 of the Disclosure Schedule (with references to the applicable paragraph below):

(a) The Company has filed all Tax Returns required to be filed by applicable Law. All Tax Returns were (and, as to Tax Returns not filed as of the date hereof, will be) true, complete and correct and filed on a timely basis. The Company (i) has paid all Taxes that are due, or claimed or asserted by any taxing authority to be due, from the Company for the periods covered by the Tax Returns or (ii) has duly and fully provided reserves adequate to pay all Taxes in accordance with GAAP.

(b) The Company is and has been since the time of its organization a non-taxable entity;

(c) If necessary, the Company has in effect a valid Code section 754 election or has agreed to make such election on its tax return for the period ending on the Closing Date;

(d) the Company has established (and until the Closing Date will maintain) on its Books and Records reserves adequate to pay all Taxes not yet due and payable and such reserves are clearly identified as reserves for current Taxes;

(e) no audits or other administrative proceedings or court proceedings are presently pending or, to the Knowledge of Seller, threatened with regard to any Taxes or Tax Returns of the Company;

(f) the Company has not received any written ruling of a taxing authority relating to Taxes, or any other written and legally binding agreement with a taxing authority relating to Taxes; and

(g) no property of the Company is property that the Company or Purchaser is or will be required to treat as being owned by another Person pursuant to the provisions of Code Section 168(f)(8) (as in effect prior to its amendment by the Tax Reform Act of 1986) or is "tax-exempt use property" or "tax-exempt bond financed property" within the meaning of Code Section 168.

3.13 Legal Proceedings. To the Knowledge of Seller, except as disclosed in Section 3.13 of the Disclosure Schedule there are no Actions or Proceedings pending or, to the

Knowledge of Seller, threatened against, relating to or affecting the Seller or the Company that seeks to prohibit or materially and adversely restrict or delay the consummation of the transactions contemplated hereunder or which could reasonably be expected to cause a Company Material Adverse Effect.

3.14 Compliance with Laws. To the Knowledge of Seller, the Company has complied in a timely manner with all Laws and Orders that materially affect the Business or Condition of the Company and no notice, charge, claim, action or assertion has been received by the Company or has been filed, commenced or, to the Knowledge of Seller, threatened against the Company alleging any violation of any of the foregoing other than as set forth in Disclosure Schedule 3.13.

3.15 Benefit Plans.  
Section 3.15(a) of the Disclosure Schedule contains a true and complete list of each Benefit Plan. The Company has not scheduled or agreed upon future increases of benefit levels (or creations of new benefits) with respect to any Benefit Plan, and no such increases or creation of benefits have been proposed, made the subject of representations to employees or requested or demanded by employees under circumstances which make it reasonable to expect that such increases will be granted. Except as disclosed in Section 3.15(a) of the Disclosure Schedule, no loan is outstanding between the Company and any employee.

3.16 Real Property.

(a) Section 3.16(a) of the Disclosure Schedule contains a true and correct list of (i) each parcel of real property owned by the Company, (ii) each parcel of real property leased by the Company (as lessor or lessee) and (iii) all Liens (other than Permitted Liens) relating to or affecting any parcel of real property referred to in clause (i).

(b) Except as disclosed in Section 3.16(a) of the Disclosure Schedule, the Company has good and marketable fee simple title to each parcel of real property owned by it, free and clear of all Liens other than Permitted Liens. Except for the real property leased to others referred to in clause (ii) of paragraph (a) above, the Company is in possession of each parcel of real property owned by it, together with all buildings, structures, facilities, fixtures and other improvements thereon. The Company has adequate rights of ingress and egress with respect to the real property listed in Section 3.16(a) of the Disclosure Schedule and all buildings, structures, facilities, fixtures and other improvements thereon.

(c) The Company has a valid and subsisting leasehold estate in and the right to quiet enjoyment of the real properties leased by it for the full term of the lease thereof. Each lease referred to in clause (ii) of paragraph (a) above is a legal, valid and binding agreement, enforceable in accordance with its terms, of the Company and, to the Knowledge of Seller, of each other Person that is a party thereto, and except as set forth in Section 3.16(c) of the Disclosure Schedule, there is no, and neither Seller nor Company have received notice of any, default by the Company (or any condition or event which, after notice or lapse of time or both, would constitute a default thereunder.) The Company has no reason to believe that any lessor under any lease will not consent (where such consent is necessary) to the consummation of the

transactions contemplated by the Agreement without requiring any modification of the rights or obligations of the lessee thereunder. The Company does not owe any brokerage commissions with respect to any such leased space.

(d) Except as disclosed in Section 3.16(d) of the Disclosure Schedule, to the Knowledge of Seller, there are no condemnation or appropriation proceedings pending or threatened against any of such real property or the improvements thereon.

3.17 Tangible Personal Property. To the Knowledge of Seller, attached hereto as Section 3.17 of the Disclosure Schedule is a true, correct and complete list of all material tangible personal property the Company owns, holds in trust, controls or has any rights to or interest in. The Company is in possession of and has good title to, holds in trust, or has valid leasehold interests in or valid rights under Contract to use, all tangible personal property used in or reasonably necessary for the conduct of its business, including all tangible personal property reflected on the balance sheet included in the Unaudited Financial Statements and tangible personal property acquired since the Unaudited Financial Statement Date other than property disposed of since such date in the ordinary course of business consistent with past practice. All such tangible personal property is free and clear of all Liens, other than Permitted Liens and Liens disclosed in Section 3.17 of the Disclosure Schedule.

3.18 Intellectual Property Rights. To the Knowledge of Seller, the Company has interests in or uses only the Intellectual Property disclosed in Section 3.18 of the Disclosure Schedule, to each of which the Company either has all right, title and interest in or a valid and binding rights under Contract to use. No other Intellectual Property is used or necessary in the conduct of the business of the Company. To the Knowledge of Seller, the conduct of the business of the Company, including the use of any Company Intellectual Property, does not conflict with, violate or infringe upon any intellectual property or other proprietary right of any third party, nor is there any claim, suit, action or proceeding pending or threatened with respect thereto. Section 3.18 sets forth all Standard Software. The Company is in compliance with all Contracts related to the Standard Software

3.19 Contracts.

(a) To the Knowledge of Seller, Section 3.19(a) of the Disclosure Schedule contains a true and complete list of each Contract or other arrangement to which the Company is a party or by which any of its Assets and Properties is bound.

(b) To the Knowledge of Seller, each Contract required to be disclosed in Section 3.19(a) of the Disclosure Schedule is in full force and effect and constitutes a legal, valid and binding agreement, enforceable in accordance with its terms, of the Company and, to the Knowledge of Seller, each party thereto. To the Knowledge of Seller, except as disclosed in Section 3.19(b) of the Disclosure Schedule, Company is not in breach of any Contract to which it is a party. Except as disclosed in Section 3.19(b) of the Disclosure Schedule, the Company has not received notice of termination or notice that it is in violation or breach of or default under any such Contract (or with notice or lapse of time or both, would be in violation or breach of or default under any such Contract) in any material respect. There are no outstanding claims for indemnification under any such Contract.

3.20 Licenses.To the Knowledge of Seller, Section 3.20 of the Disclosure Schedule contains a true and complete list of all Licenses used in and material, individually or in the aggregate, to the business or operations of the Company (and all pending applications for any such Licenses), setting forth the grantor, the grantee, the function and the expiration and renewal date of each. Prior to the execution of this Agreement, Seller has delivered to Purchaser true and complete copies of all such Licenses. Except as disclosed in Section 3.20 of the Disclosure Schedule:

(i) the Company owns or validly holds all Licenses that are material, individually or in the aggregate, to its business or operations;

(ii) each License listed in Section 3.20 of the Disclosure Schedule is valid, binding and in full force and effect; and

(iii) the Company is not, nor has it received any notice that it is, in default (or with the giving of notice or lapse of time or both, would be in default) under any such License.

3.21 Insurance.Section 3.21 of the Disclosure Schedule contains a true and complete list of all liability, property, workers' compensation, directors' and officers' liability and other insurance policies currently in effect that insure the business, operations or employees of the Company or affect or relate to the ownership, use or operation of any of the Assets and Properties of the Company and that (i) have been issued to the Company or (ii) have been issued to any Person (other than the Company) for the benefit of the Company. The insurance coverage provided by any of the policies described in clause (i) above will not terminate or lapse by reason of the transactions contemplated by this Agreement. Each policy listed in Section 3.21 of the Disclosure Schedule is valid and binding and in full force and effect, no premiums due thereunder have not been paid and neither the Company nor the Person to whom such policy has been issued has received any notice of cancellation or termination in respect of any such policy or is in default thereunder. Neither the Company nor the Person to whom such policy has been issued has received notice that any insurer under any policy referred to in this Section is denying liability with respect to a claim thereunder or defending under a reservation of rights clause. There are no claims pending under any such policies that have not been paid in full by the applicable insurer.

3.22 Affiliate Transactions.Except as disclosed in Section 3.22(a) of the Disclosure Schedule, (i) there are no Liabilities between the Company and Seller, or any officer, director or Affiliate (other than the Company) of Seller or the Company, (ii) neither Seller nor any such officer, director or Affiliate provides or causes to be provided any assets, services or facilities to the Company and (iii) the Company does not provide or cause to be provided any assets, services or facilities to Seller or any such officer, director or Affiliate. Except as disclosed in Section 3.22(b) of the Disclosure Schedule, each of the Liabilities and transactions listed in Section 3.22(a) of the Disclosure Schedule was incurred or engaged in, as the case may be, on an arm's-length basis. Except as disclosed in Section 3.22(c) of the Disclosure Schedule, since the Audited Financial Statement Date, all settlements of intercompany Liabilities between the Company and Seller or any such officer, director or Affiliate have been made, and all

allocations of intercompany expenses have been applied, in the ordinary course of business consistent with past practice.

3.23 Employees; Labor Relations.

(a) Section 3.23 of the Disclosure Schedule contains a list of the name of each officer and employee of the Company as of the date hereof, together with each such person's position or function, annual base salary or wages and any incentive or bonus arrangement with respect to such person in effect on such date.

(b) Except as disclosed in Section 3.23 of the Disclosure Schedule, (i) no employee of the Company is presently a member of a collective bargaining unit and, to the Knowledge of Seller, there are no threatened or contemplated attempts to organize for collective bargaining purposes any of the employees of the Company, (ii) no unfair labor practice complaint has been brought against the Company since its organization before the National Labor Relations Board or any other Governmental or Regulatory Authority, (iii) no charge based on sex, age, race, national origin, disability or any other protected characteristic has been brought against the Company since its organization by or before the Equal Employment Opportunity Commission or any other Governmental or Regulatory Authority, and (iv) no other claims, charges or complaints have been brought by or on behalf of any employee against the Company since its organization arising out of or relating to such employee's employment or the termination of such employment. Since the Company's organization, there has been no work stoppage, strike or other concerted action by employees of the Company. During that period, the Company has complied in all material respects with all applicable Laws relating to the employment, including, without limitation those relating to wages, hours and collective bargaining.

3.24 Environmental Matters.

To the Knowledge of Seller, except as set forth in Section 3.24 of the Disclosure Schedule (with paragraph references corresponding to those set forth below):

(a) The Company is in compliance and has at all times complied with all Environmental Laws.

(b) The Company has obtained, maintains and is in compliance with, all permits, licenses and other authorizations that may be required pursuant to Environmental Laws for the occupation of its facilities and the operation of its businesses, and no proceedings or other actions are pending or, to the Knowledge of the Seller, threatened, to revoke, cancel, limit, terminate, challenge, amend or modify any such permits, licenses or other authorizations.

(c) The Company has not received any written or oral notice, report or other information regarding any actual or alleged violation of Environmental Laws, or any liabilities or potential liabilities, including any investigatory, remedial or corrective obligations, arising under any Environmental Laws and relating to any of its past or present facilities or operations.

(d) To the Knowledge of the Seller, none of the following exists at any property or facility owned or operated by the Company: (i) underground storage tanks; (ii)

asbestos-containing material in any form or condition; (iii) materials or equipment containing polychlorinated biphenyls; or (iv) landfills, surface impoundments, or other disposal areas.

(e) The Company has not (i) treated, stored, disposed of, arranged for or permitted the disposal of, transported, handled, or Released any Hazardous Material so as to give rise to any liabilities or any investigative, corrective or remedial obligations under any Environmental Law, or (ii) either expressly, by operation of law or otherwise, assumed or undertaken any liability, including without limitation any obligation for corrective or remedial action, of any other Person under any Environmental Laws.

(f) There are no environmental investigations, studies, audits, tests, reviews or other analyses that are in the possession or control of the Company in relation to any site or facility now or previously owned, operated or leased by the Company that have not been delivered to Purchaser prior to the execution of this Agreement.

3.25 [Intentionally omitted].

3.26 Brokers. All negotiations relative to this Agreement and the transactions contemplated hereby have been carried out by Seller directly with Purchaser without the intervention of any Person on behalf of Seller in such manner as to give rise to any valid claim by any Person against Purchaser, the Company for a finder's fee, brokerage commission or similar payment.

3.27 Disclosure. All material facts relating to the Business or Condition of the Company have been disclosed to Purchaser in or in connection with this Agreement. No representation or warranty contained in this Agreement, and no statement contained in the Disclosure Schedule or in any certificate, list or other writing furnished to Purchaser pursuant to any provision of this Agreement (including without limitation the Financial Statements), contains any untrue statement of a material fact or omits to state a material fact necessary in order to make the statements herein or therein, in the light of the circumstances under which they were made, not misleading.

## ARTICLE IV

### REPRESENTATIONS AND WARRANTIES OF PURCHASER

Purchaser hereby represents and warrants to Seller that the statements contained in this Article IV are correct and complete as of the date of this Agreement.

4.01 Organization. Purchaser is a limited liability company duly organized, validly existing and in good standing under the Laws of the Commonwealth of Virginia. Purchaser has full corporate power and authority to execute and deliver this Agreement and to perform its obligations hereunder and to consummate the transactions contemplated hereby.

4.02 Authority. The execution and delivery by Purchaser of this Agreement, and the performance by Purchaser of its obligations hereunder, have been duly and validly authorized by the Board of Directors of Purchaser, no other corporate action on the part of Purchaser or its

members being necessary. This Agreement has been duly and validly executed and delivered by Purchaser and constitutes legal, valid and binding obligations of Purchaser enforceable against Purchaser in accordance with its terms.

4.03 No Conflicts. The execution and delivery by Purchaser of this Agreement do not, and the performance by Purchaser of its obligations under this Agreement and the consummation of the transactions contemplated hereby will not:

(a) conflict with or result in a violation or breach of any of the terms, conditions or provisions of the Declaration of Operations of Appalachian Broadband, LLC of Purchaser;

(b) subject to obtaining the consents, approvals and actions, making the filings and giving the notices disclosed pursuant to Section 4.04 of the Disclosure Schedule, conflict with or result in a violation or breach of any term or provision of any Law or Order applicable to Purchaser or any of its Assets and Properties; or

(c) except as disclosed pursuant to Section 4.03(c) of the Disclosure Schedule, (i) conflict with or result in a violation or breach of, (ii) constitute (with or without notice or lapse of time or both) a default under, (iii) require Purchaser to obtain any consent, approval or action of, make any filing with or give any notice to any Person as a result or under the terms of, or (iv) result in the creation or imposition of any Lien upon Purchaser or any of its Assets or Properties under, any Contract or License to which Purchaser is a party or by which any of its Assets and Properties is bound.

4.04 Governmental Approvals and Filings. Except as disclosed in Section 4.04 of the Disclosure Schedule, no consent, approval or action of, filing with or notice to any Governmental or Regulatory Authority on the part of Purchaser is required in connection with the execution, delivery and performance of this Agreement or the consummation of the transactions contemplated hereby.

4.05 Legal Proceedings. There are no Actions or Proceedings pending or, to the knowledge of Purchaser, threatened against, relating to or affecting Purchaser or any of its Assets and Properties which could reasonably be expected to result in the issuance of an Order restraining, enjoining or otherwise prohibiting or making illegal the consummation of any of the transactions contemplated by this Agreement.

4.06 Further Assurances. Purchaser will use its commercially reasonable efforts to cause the Company to (a) fully perform all of its duties and obligations under any agreements with the Commission; and (b) operate, maintain and protect from loss or waste all Grant-Funded Assets. Further, Purchaser acknowledges and agrees that it is stepping into the shoes of the Seller for purposes of the Grant Agreements with the Commission, and Purchaser is therefore bound by and obligated under such Grant Agreements to the same extent that the Seller is bound by and obligated under such Grant Agreements prior to the Closing Date.

## ARTICLE V

### COVENANTS OF SELLER

Seller covenants and agrees with Purchaser that, at all times from and after the date hereof until the Closing and, with respect to any covenant or agreement by its terms to be performed in whole or in part after the Closing, for the period specified therein, Seller will comply with all covenants and provisions of this Article V, except to the extent Purchaser may otherwise consent in writing.

5.01 Regulatory and Other Approvals. Seller will, and will cause the Company to, as promptly as practicable (a) take all commercially reasonable steps necessary to obtain all consents, approvals or actions of, make all filings with and give all notices to Governmental or Regulatory Authorities or any other Person required of such Seller to consummate the transactions contemplated hereby and by the Operative Agreements, including without limitation those described in Section 3.07 of the Disclosure Schedule, (b) provide such other information and communications to such Governmental or Regulatory Authorities or other Persons as Purchaser or such Governmental or Regulatory Authorities or other Persons may reasonably request in connection therewith and (c) cooperate with Purchaser in connection with the performance of its obligations under Sections 9.01 and 9.02. Seller will provide prompt notification to Purchaser when any such consent, approval, action, filing or notice referred to in clause (a) above is obtained, taken, made or given, as applicable, and will advise Purchaser of any communications (and, unless precluded by Law, provide copies of any such communications that are in writing) with any Governmental or Regulatory Authority or other Person regarding any of the transactions contemplated by this Agreement or any of the Operative Agreements

5.02 Investigation by Purchaser. Seller will, and will cause the Company to, (a) provide Purchaser and its officers, directors, employees, agents, counsel, accountants, financial advisors, consultants and other representatives (together "Representatives") with full access, upon reasonable prior notice and during normal business hours, to all officers, employees and the bookkeeper of the Company and their Assets and Properties and Books and Records, and (b) furnish Purchaser and its Representatives with all such information and data (including without limitation copies of Contracts, Benefit Plans and other Books and Records) concerning the business and operations of the Company as Purchaser or its Representatives reasonably may request in connection with such investigation. As promptly as possible between the date hereof and the Closing Date, Seller will provide Purchaser with a copy of all notices and/or communications received from Sunset.

5.03 Non-Solicitation/Non-Competition.

(a) Seller will, for a period of five (5) years from the Closing Date, refrain from, either alone or in conjunction with any other Person, or directly or indirectly through its present or future Affiliates:

(i) engaging in the business of building and/or operating a fiberoptic network or selling or leasing fiberoptic network cable or equipment to a third party anywhere in the geographic footprint of the LENOWISCO Planning District; or



(ii) causing, or attempting to cause (A) the Commission, the Coalfield Authority, RUS and/or the US EDA to provide grants to it relating to the business of building and/or operating a fiberoptic network or selling or leasing fiberoptic network cable or equipment to a third party, provided that the provisions of this Section in no way restrict Seller in assisting third parties in applying for such grants, provided further that such grants will be used for the purpose of creating end user connectivity to a fiberoptic network and will not be used for the purpose of building and/or operating a fiberoptic network or (B) causing, or attempting to cause the Commission, the Coalfield Authority, RUS and/or the US EDA to deny Purchaser grant funding relating to the business of building and/or operating a fiberoptic network or selling or leasing fiberoptic network cable or equipment to a third party; or

(iii) disclosing (unless compelled by judicial or administrative process) or using any confidential or secret information relating to the Company or any of its respective clients, customers or suppliers.

(iv) participating or engaging in (other than through the ownership of five percent (5%) or less of any class of securities registered under the Securities Exchange Act of 1934, as amended), or otherwise lending assistance (financial or otherwise) to any Person participating or engaged in, any of the lines of business in which the Company is participating or engaged on the Closing Date anywhere within the geographic footprint of the LENOWISCO Planning District.

(b) The parties hereto recognize that the Laws and public policies of the various states of the United States may differ as to the validity and enforceability of covenants similar to those set forth in this Section. It is the intention of the parties that the provisions of this Section be enforced to the fullest extent permissible under the Laws and policies of each jurisdiction in which enforcement may be sought, and that the unenforceability (or the modification to conform to such Laws or policies) of any provisions of this Section shall not render unenforceable, or impair, the remainder of the provisions of this Section. Accordingly, if any provision of this Section shall be determined to be invalid or unenforceable, such invalidity or unenforceability shall be deemed to apply only with respect to the operation of such provision in the particular jurisdiction in which such determination is made and not with respect to any other provision or jurisdiction.

(c) The parties hereto acknowledge and agree that any remedy at Law for any breach of the provisions of this Section would be inadequate, and Sellers hereby consent to the granting by any court of an injunction or other equitable relief, without the necessity of actual monetary loss being proved, in order that the breach or threatened breach of such provisions may be effectively restrained.

5.04 Conduct of Business. Seller will cause the Company to conduct business only in the ordinary course consistent with past practice. Without limiting the generality of the foregoing, the Seller will:

(a) cause the Company to use commercially reasonable efforts to (i) preserve intact the present business organization and reputation of the Company, (ii) keep available (subject to dismissals and retirements in the ordinary course of business consistent with past

practice) the services of the present officers, employees and consultants of the Company, (iii) maintain the Assets and Properties of the Company in good working order and condition, ordinary wear and tear excepted, and (iv) maintain the good will of Persons with whom the Company otherwise has significant business relationships;

(b) except to the extent required by applicable Law, (i) cause the Books and Records to be maintained in the usual, regular and ordinary manner, (ii) not permit any material change in (A) any accounting, financial reporting, inventory or Tax practice or policy of the Company, or (B) any method of calculating any bad debt, contingency or other reserve of the Company for accounting, financial reporting or Tax purposes and (iii) not permit any change in the fiscal year of the Company;

(c) (i) use, and will cause the Company to use, commercially reasonable efforts to maintain in full force and effect until the Closing substantially the same levels of coverage as the insurance afforded under the Contracts listed in Section 3.21 of the Disclosure Schedule, (ii) to the extent requested by Purchaser prior to the Closing Date, use all commercially reasonable efforts to cause such insurance coverage held by any Person (other than the Company) for the benefit of the Company to continue to be provided at the expense of the Company for at least thirty (30) days after the Closing on substantially the same terms and conditions as provided on the date of this Agreement and (iii) cause any and all benefits paid or payable (whether before or after the date of this Agreement) under the Contracts listed in Section 3.21 of the Disclosure Schedule with respect to the business, operations, employees or Assets and Properties of the Company to be paid to the Company; and

(d) comply, and cause the Company to comply with all Laws and Orders applicable to the business and operations of the Company, and promptly following receipt thereof to give Purchaser copies of any notice received from any Governmental or Regulatory Authority or other Person alleging any violation of any such Law or Order.

5.05 Financial Statements and Reports; Filing. As promptly as practicable and in any event no later than fifteen (15) days after the end of each fiscal month ending after the date hereof and before the Closing Date, forty-five (45) days after the end of each fiscal quarter ending after the date hereof and before the Closing Date (other than the fourth quarter) or ninety (90) days after the end of each fiscal year ending after the date hereof and before the Closing Date, as the case may be, the Seller will deliver to Purchaser true and complete copies of (in the case of any such fiscal year) the audited and (in the case of any such fiscal month or quarter) the unaudited consolidated balance sheet, and the related audited or unaudited consolidated statements of operations, stockholders' equity and cash flows, of the Company, in each case as of and for the fiscal year then ended or as of and for each such fiscal quarter or fiscal month and the portion of the fiscal year then ended, as the case may be, together with the notes, if any, relating thereto, which financial statements shall be prepared on a basis consistent with the Audited Financial Statements.

(b) As promptly as practicable, the Seller will deliver to Purchaser true and complete copies of such other financial statements, reports and analyses as may be prepared or received by the Seller or the Company relating to the business or operations of the Company or as Purchaser may otherwise reasonably request.

(c) As promptly as practicable, the Seller will deliver copies of all License applications and other filings made by the Company after the date hereof and before the Closing Date with any Governmental or Regulatory Authority (other than routine, recurring filings made in the ordinary course of business consistent with past practice

5.06 Employee Matters. Except as may be required by Law, the Seller will cause the Company to refrain from directly or indirectly:

(a) making any representation or promise, oral or written, to any officer, employee or consultant of the Company concerning any material term or condition of employment or any Benefit Plan, except for statements as to the rights or accrued benefits of any officer, employee or consultant under the terms of any Benefit Plan existing as of the date hereof;

(b) making any increase in the salary, wages or other compensation of any officer, employee or consultant of the Company;

(c) adopting, entering into or becoming bound by any Benefit Plan, employment-related Contract or collective bargaining agreement, or amending, modifying or terminating (partially or completely) any Benefit Plan, employment-related Contract or collective bargaining agreement, except to the extent required by applicable Law and, in the event compliance with legal requirements presents options, only to the extent that the option which the Company reasonably believes to be the least costly is chosen;

(d) establishing or modifying any (i) targets, goals, pools or similar provisions in respect of any fiscal year under any Benefit Plan, employment-related Contract or other employee compensation or benefit arrangement or (ii) salary ranges, increase guidelines or similar provisions in respect of any Benefit Plan, employment-related Contract or other employee compensation arrangement;

(e) granting, funding, or accelerating the vesting of any payment or benefit award to any officer, employee or consultant; or

(f) take any action, or fail to take action, that would expose the Company to liability under the Worker Adjustment and Retraining Notification Act or any similar state or local Law.

5.07 Certain Restrictions. The Seller will cause the Company to refrain from:

(a) amending the certificates or articles of organization or operating agreement (or other comparable limited liability company documents) or taking any action with respect to any such amendment or any recapitalization, reorganization, liquidation or dissolution of any such entity;

(b) authorizing, issuing, selling or otherwise disposing of any shares of capital interest of or any Option with respect to the Company, or modifying or amending any right of any holder of outstanding shares of capital interest of or Option with respect to the Company;

(c) declaring, setting aside, paying or receiving any dividend or other distribution in respect of the capital interest of the Company not wholly owned by the Company, or directly or indirectly redeeming, purchasing, otherwise acquiring or receiving payment in respect of a redemption or other acquisition of, any capital interest of or any Option with respect to the Company not wholly owned by the Company;

(d) acquiring or disposing of, or incurring any Lien (other than a Permitted Lien) on, any Assets and Properties of the Company, other than in the ordinary course of business consistent with past practice;

(e) (i) entering into, amending, modifying, terminating (partially or completely), granting any waiver under or giving any consent with respect to (A) any Contract that would, if in existence on the date of this Agreement, be required to be disclosed pursuant to Section 3.19(a) of the Disclosure Schedule or (B) any material License held or used by the Company or (ii) granting any irrevocable powers of attorney;

(f) violating, breaching or defaulting under in any material respect, or taking or failing to take any action that (with or without notice or lapse of time or both) would constitute a material violation or breach of, or default under, any term or provision of any License held or used by the Company or any Contract to which the Company is a party or by which any of their respective Assets and Properties is bound;

(g) (i) incurring Indebtedness or (ii) voluntarily purchasing, canceling, prepaying or otherwise providing for a complete or partial discharge in advance of a scheduled payment date with respect to, or waiving any right of the Company under, any Indebtedness of or owing to the Company;

(h) engaging with any Person in any merger or other business combination;

(i) making capital expenditures or commitments for additions to property, plant or equipment constituting capital assets;

(j) making any change in the lines of business in which it participates or is engaged;

(k) writing off or writing down any of its Assets and Properties outside the ordinary course of business consistent with past practice; or

(l) entering into any Contract to do or engage in any of the foregoing.

5.08 Affiliate Transactions. Except as set forth in Section 3.22 of the Disclosure Schedule, immediately prior to the Closing, all Indebtedness and other amounts owing under Contracts between the Seller, any officer, director or Affiliate (other than the Company) of the Seller, on the one hand, and the Company, on the other, will be paid in full, and the Seller will terminate and will cause any such officer, director or Affiliate to terminate each Contract with the Company. Prior to the Closing, the Company will not enter into any Contract or amend or modify any existing Contract, and will not engage in any transaction outside the ordinary course of business consistent with past practice or not on an arm's-length basis (other

than pursuant to Contracts disclosed pursuant to Section 3.19 of the Disclosure Schedule), with the Seller or any such officer, director or Affiliate.

5.09 Books and Records. On the Closing Date, the Seller will make available to Purchaser at the offices of the Company all of the Books and Records, and if at any time after the Closing a Seller discovers in its possession or under its control any other Books and Records, it will forthwith make available such Books and Records to Purchaser.

5.10 Notice and Cure. The Seller will notify Purchaser in writing (where appropriate, through updates to the Disclosure Schedule) of, and contemporaneously will provide Purchaser with true and complete copies of any and all information or documents relating to, and will use all commercially reasonable efforts to cure before the Closing, any event, transaction or circumstance, as soon as practicable after it becomes Known to the Seller, occurring after the date of this Agreement that causes or will cause any covenant or agreement of the Seller under this Agreement to be breached or that renders or will render untrue any representation or warranty of the Seller contained in this Agreement as if the same were made on or as of the date of such event, transaction or circumstance. No notice given pursuant to this Section shall have any effect on the representations, warranties, covenants or agreements contained in this Agreement for purposes of determining satisfaction of any condition contained herein or shall in any way limit Purchaser's right to seek indemnity under Article XI.

5.11 Fulfillment of Conditions. The Seller will, and will cause the Company to (a) execute and deliver at the Closing each Operative Agreement that the Seller or the Company, as applicable, is required hereby to execute and deliver as a condition to the Closing and (b) take all commercially reasonable steps necessary and proceed diligently and in good faith to satisfy each other condition to the obligations of Purchaser contained in this Agreement and will not, and will not permit the Company to, take or fail to take any action that could reasonably be expected to result in the nonfulfillment of any such condition.

## ARTICLE VI

### COVENANTS OF PURCHASER

Purchaser covenants and agrees with the Seller that, at all times from and after the date hereof until the Closing, Purchaser will comply with all covenants and provisions of this Article VI, except to the extent the Seller may otherwise consent in writing.

6.01 Regulatory and Other Approvals. Purchaser will as promptly as practicable (a) take all commercially reasonable steps necessary to obtain all consents, approvals or actions of, make all filings with and give all notices to Governmental or Regulatory Authorities or any other Person required of Purchaser to consummate the transactions contemplated hereby and by the Operative Agreements, including without limitation those described in Sections 4.03 and 4.04 of the Disclosure Schedule, (b) provide such other information and communications to such Governmental or Regulatory Authorities or other Persons as the Seller or such Governmental or Regulatory Authorities or other Persons may reasonably request in connection therewith and (c) cooperate with the Seller and the Company in connection with the performance of their obligations under Sections 5.01 and 4.02. Purchaser

will provide prompt notification to the Seller when any such consent, approval, action, filing or notice referred to in clause (a) above is obtained, taken, made or given, as applicable, and will advise the Seller of any communications (and, unless precluded by Law, provide copies of any such communications that are in writing) with any Governmental or Regulatory Authority or other Person regarding any of the transactions contemplated by this Agreement or any of the Operative Agreements.

6.02 Notice and Cure. Purchaser will notify the Seller in writing of, and, to the extent not prohibited pursuant to confidentiality or other agreements, contemporaneously will provide the Seller with true and complete copies of any and all information or documents relating to, and will use all commercially reasonable efforts to cure before the Closing, any event, transaction or circumstance, as soon as practicable after it becomes known to Purchaser, occurring after the date of this Agreement that causes or will cause any covenant or agreement of Purchaser under this Agreement to be breached or that renders or will render untrue any representation or warranty of Purchaser contained in this Agreement as if the same were made on or as of the date of such event, transaction or circumstance. No notice given pursuant to this Section shall have any effect on the representations, warranties, covenants or agreements contained in this Agreement for purposes of determining satisfaction of any condition contained herein or shall in any way limit the Seller's right to seek indemnity under Article XI.

6.03 Fulfillment of Conditions. Purchaser will execute and deliver at the Closing each Operative Agreement that Purchaser is hereby required to execute and deliver as a condition to the Closing, will take all commercially reasonable steps necessary and proceed diligently and in good faith to satisfy each other condition to the obligations of the Seller contained in this Agreement and will not take or fail to take any action that could reasonably be expected to result in the nonfulfillment of any such condition.

6.04 Name Change. Immediately upon Closing, Purchaser will change the name of the Company to a name that does not include "LENOWISCO."

6.05 Economic Development Fund Override. Purchaser agrees to cause the Company to fund annually with an amount equal to Two Percent (2%) of the gross revenue received by the Company post-Closing through the operation of the fiber optic network controlled by the Company an economic development fund (the "Economic Development Fund"). Purchaser and Seller shall jointly discuss the most effective use of the Economic Development Fund for the benefit of the region served by the LENOWISCO Planning District Commission and such funds shall be disbursed each year in accordance with those discussions. Payments by the Company into the Economic Development Fund shall continue for a period of fifteen (15) years following the Closing.

## ARTICLE VII

### CONDITIONS TO OBLIGATIONS OF PURCHASER

The obligations of Purchaser hereunder to purchase the Shares are subject to the fulfillment, at or before the Closing, of each of the following conditions (all or any of which may be waived in whole or in part by Purchaser in its sole discretion):

7.01 Representations and Warranties. Each of the representations and warranties made by the Seller in this Agreement (other than those made as of a specified date earlier than the Closing Date) shall be true and correct in all material respects on and as of the Closing Date as though such representation or warranty was made on and as of the Closing Date, and any representation or warranty made as of a specified date earlier than the Closing Date shall have been true and correct in all material respects on and as of such earlier date; provided that to the extent that any representation or warranty is qualified as to materiality pursuant to the terms of such representation or warranty, such representation or warranty shall be true and correct in all respects (under its terms) as of the Closing Date unless such representation or warranty was made as of a specified date earlier than the Closing Date in which case such representation shall be true and correct in all respects (under its terms) on and as of such earlier date.

7.02 Performance. Seller shall have performed and complied with, in all material respects, each agreement, covenant and obligation required by this Agreement to be so performed or complied with by the Seller at or before the Closing.

7.03 Closing Certificates. Seller shall have delivered to Purchaser a certificate, dated the Closing Date and executed in the name and on behalf of Seller, by an officer of Seller, substantially in the form and to the effect of Exhibit B hereto, and a certificate, dated the Closing Date and executed by the Manager of Company, substantially in the form and to the effect of Exhibit C hereto.

7.04 Orders and Laws. There shall not be in effect on the Closing Date any Order or Law restraining, enjoining or otherwise prohibiting or making illegal the consummation of any of the transactions contemplated by this Agreement or any of the Operative Agreements, and there shall not be pending or threatened on the Closing Date any Action or Proceeding in, before or by any Governmental or Regulatory Authority which could reasonably be expected to result in the issuance of any such Order or the enactment, promulgation or deemed applicability to Purchaser, the Company or the transactions contemplated by this Agreement or any of the Operative Agreements of any such Law.

7.05 Regulatory Consents and Approvals. All consents, approvals and actions of, filings with and notices to any Governmental or Regulatory Authority necessary to permit Purchaser and the Seller to perform their obligations under this Agreement and the Operative Agreements and to consummate the transactions contemplated hereby and thereby (a) shall have been duly obtained, made or given, (b) shall be in form and substance reasonably satisfactory to Purchaser, (c) shall not be subject to the satisfaction of any condition that has not been satisfied or waived and (d) shall be in full force and effect, and all terminations or expirations of waiting periods imposed by any Governmental or Regulatory Authority necessary for the consummation

of the transactions contemplated by this Agreement and the Operative Agreements shall have occurred.

7.06 Third Party Consents. All consents (or in lieu thereof waivers) to the performance by the Seller of their obligations under this Agreement and the Operative Agreements or to the consummation of the transactions contemplated hereby and thereby as are required under any Contract to which the Seller or the Company is a party or by which any of their respective Assets and Properties are bound (a) shall have been obtained, (b) shall be in form and substance reasonably satisfactory to Purchaser, (c) shall not be subject to the satisfaction of any condition that has not been satisfied or waived and (d) shall be in full force and effect, where the failure to obtain any such consent (or in lieu thereof waiver) could not reasonably be expected, individually or in the aggregate with other such failures, to materially adversely affect Purchaser or the Business or Condition of the Company or otherwise result in a material diminution of the benefits of the transactions contemplated by this Agreement and the Operative Agreements to Purchaser.

7.07 Resignations of Directors and Officers. The Manager of Company shall have tendered to Purchaser, effective at the Closing, his resignation as a Manager of Company in the form attached hereto as Exhibit D.

7.08 Reserved.

7.09 Environmental Survey If Seller possesses any phase II environmental surveys and assessments ("Environmental Surveys"), then Seller shall provide such Environmental Surveys to the Purchaser.

7.10 Proceedings. All required actions to be taken on the part of the Seller and the Company in connection with the transactions contemplated by this Agreement and all documents incident thereto shall be reasonably satisfactory in form and substance to Purchaser, and Purchaser shall have received copies of all such documents and other evidences as Purchaser may reasonably request in order to establish the consummation of such transactions and the taking of all limited liability company actions in connection therewith.

7.11 Additional Deliverables At or before the Closing, there shall also be delivered to Purchaser the following:

(a) An assignment agreement relating to the Shares and, to the extent certificated, certificates representing the Shares duly endorsed in blank;

(b) An assignment agreement, in the form reasonably satisfactory to Purchaser, whereby Sellers assigns to Company that certain Memorandum of Understanding dated March 15, 2010 by and between Seller, Wise County Industrial Development Authority, Town of Appalachia, Virginia and the Town of Big Stone Gap.



## ARTICLE VIII

### CONDITIONS TO OBLIGATIONS OF SELLER

The obligations of the Seller hereunder to sell the Shares are subject to the fulfillment, at or before the Closing, of each of the following conditions (all or any of which may be waived in whole or in part by the Seller in its sole discretion):

8.01 Representations and Warranties. Each of the representations and warranties made by Purchaser in this Agreement (other than those made as of a specified date earlier than the Closing Date) shall be true and correct in all material respects on and as of the Closing Date as though such representation or warranty was made on and as of the Closing Date and any representation or warranty made as of a specified date earlier than the Closing Date shall have been true and correct in all material respects as of such date; provided that to the extent that any representation or warranty is qualified as to materiality pursuant to the terms of such representation or warranty, such representation or warranty shall be true and correct in all respects as of the Closing Date unless such representation or warranty was made as of a specified date earlier than the Closing Date in which case such representation shall be true and correct in all respects on and as of such earlier date.

8.02 Performance. Purchaser shall have performed and complied with, in all material respects, each agreement, covenant and obligation required by this Agreement to be so performed or complied with by Purchaser at or before the Closing.

8.03 Officers' Certificates. Purchaser shall have delivered to the Seller a certificate, dated the Closing Date and executed in the name and on behalf of Purchaser by the Manager of Purchaser, substantially in the form and to the effect of Exhibit E hereto, and a certificate, dated the Closing Date and executed by the Manager of Purchaser, substantially in the form and to the effect of Exhibit F hereto.

8.04 Orders and Laws. There shall not be in effect on the Closing Date any Order or Law that became effective after the date of this Agreement restraining, enjoining or otherwise prohibiting or making illegal the consummation of any of the transactions contemplated by this Agreement or any of the Operative Agreements.

8.05 Regulatory Consents and Approvals. All consents, approvals and actions of, filings with and notices to any Governmental or Regulatory Authority necessary to permit the Seller and Purchaser to perform their obligations under this Agreement and the Operative Agreements and to consummate the transactions contemplated hereby and thereby (a) shall have been duly obtained, made or given, (b) shall not be subject to the satisfaction of any condition that has not been satisfied or waived and (c) shall be in full force and effect, and all terminations or expirations of waiting periods imposed by any Governmental or Regulatory Authority necessary for the consummation of the transactions contemplated by this Agreement and the Operative Agreements shall have occurred.

8.06 Third Party Consents. All consents (or in lieu thereof waivers) to the performance by Seller of its obligations hereunder and to the consummation of the transactions

contemplated hereby as are required under the Contracts listed in Section 8.07 of the Disclosure Schedule (a) shall have been obtained, (b) shall not be subject to the satisfaction of any condition that has not been satisfied or waived and (c) shall be in full force and effect.

8.07 Proceedings..All limited liability company action to be taken on the part of Purchaser in connection with the transactions contemplated by this Agreement and all documents incident thereto shall be reasonably satisfactory in form and substance to the Seller, and the Seller shall have received copies of all such documents and other evidences as the Seller may reasonably request in order to establish the consummation of such transactions and the taking of all limited liability company action in connection therewith.

## ARTICLE IX

### TAX MATTERS AND POST-CLOSING TAXES

#### 9.01 Tax Filings.

(a) Seller shall prepare (or cause to be prepared) and timely file all Tax Returns of the Company with respect to any taxable periods (or portions thereof) ending on or before the Closing Date ("Pre-Closing Taxable Period") and shall pay any Taxes ("Pre-Closing Taxes") due in respect of such Tax Returns.

(b) Purchaser shall prepare (or cause to be prepared) and file or cause to be filed when due all Tax Returns that are required to be filed by or with respect to the Company after the Closing Date and shall remit any Taxes due in respect of such Tax Returns. With respect to Tax Returns that are required to be filed by or with respect to the Company for any Tax Period that begins before and ends after the Closing Date (such periods "Straddle Periods" and such Tax Returns "Straddle Returns"), such Straddle Returns shall be prepared in a manner consistent with past practice (unless otherwise required by Law), and Seller shall be responsible for Taxes due in respect of that portion of such Straddle Returns as ends on the Closing Date ("Straddle Pre-Closing Taxes"), calculated as provided in the next paragraph. Purchaser shall notify Seller of any amounts due from Seller in respect of any Straddle Return no later than ten (10) Business Days prior to the date on which such Straddle Return is due, and Seller shall remit such payment to Purchaser no later than five (5) Business Days prior to the date such Straddle Return is due. Purchaser shall deliver any Straddle Return to Seller for their review at least thirty (30) days prior to the date on which such Tax Return is required to be filed. If either Seller disputes any item on such Tax Return, it shall notify Purchaser of such disputed item (or items) and the basis for its objection and Purchaser shall consider such objections in good faith.

(c) In the case of any Taxes of the Company that are payable with respect to Straddle Periods, the portion of any such Taxes that are attributable to the portion of the Straddle Period that ends on the Closing Date shall (i) in the case of Taxes that are based upon or related to income or receipts or imposed on a transactional basis, be deemed equal to the amount that would be payable if the Tax year or period ended on the Closing Date; and (ii) in the case of other Taxes, be allocated pro rata per day between the period ending on the Closing Date and the period beginning after the Closing Date. For purposes of clause (i) of the preceding sentence, any exemption, deduction, credit or other item that is calculated on an annual basis shall be

allocated pro rata per day between the period ending on the Closing Date and the period beginning after the Closing Date. The parties hereto will, to the extent permitted by applicable Law, elect with the relevant Tax authority to treat a portion of any Straddle Period as a short taxable period ending as of the close of business on the Closing Date.

9.02 Tax Cooperation. After the Closing Date, the parties will cooperate with each other in the preparation of all Tax Returns and will provide (or cause to be provided) any records and other information reasonably requested by the other party, and will provide access to, and the cooperation of its auditors. The parties will cooperate with each other in connection with any Tax investigation, audit or other proceeding.

9.03 Transfer Taxes. Seller shall pay all sales, use, transfer, real property transfer, recording, gains, stock transfer and other similar taxes and fees ("Transfer Taxes") arising out of or in connection with the transactions effected pursuant to this Agreement, and shall indemnify, defend, and hold harmless Purchaser and the Company on an after-Tax basis with respect to such Transfer Taxes. Seller shall file all necessary documentation and Returns with respect to such Transfer Taxes.

9.04 Tax Treatment of Indemnity Payments. It is the intention of the parties to treat any indemnity payment made under this Agreement as an adjustment to the Purchase Price for all federal, state, local and foreign Tax purposes, and the parties agree to file their Tax Returns accordingly.

## ARTICLE X

### SURVIVAL OF REPRESENTATIONS, WARRANTIES, COVENANTS AND AGREEMENTS

10.01 Survival of Representations, Warranties, Covenants and Agreements. Notwithstanding any right of Purchaser (whether or not exercised) to investigate the affairs of the Company or any right of any party (whether or not exercised) to investigate the accuracy of the representations and warranties of the other party contained in this Agreement, Seller and Purchaser have the right to rely fully upon the representations, warranties, covenants and agreements of the other contained in this Agreement. The representations, warranties, covenants and agreements of Seller and Purchaser contained in this Agreement will survive the Closing (a) indefinitely with respect to (i) the representations and warranties contained in Sections 3.02, 3.04 and 4.02 and (ii) the covenants and agreements contained in Sections 2.04, 13.03 and 13.05; (b) until sixty (60) days after the expiration of all applicable statutes of limitation (including all periods of extension, whether automatic or permissive) with respect to matters covered by Sections 3.12, 3.15 and 3.24; or (c) until one (1) year following the Closing Date in the case of all other representations and warranties and any covenant or agreement to be performed in whole or in part on or prior to the Closing; provided that any representation, warranty, covenant or agreement that would otherwise terminate in accordance with clause (b) or (c) above will continue to survive if a Claim Notice or Indemnity Notice (as applicable) shall have been timely given under Article XI on or prior to such termination date, until the related claim for indemnification has been satisfied or otherwise resolved as provided in Article XI.

10.02 Obligations to the Commission. Purchaser hereby ratifies and confirms the continuing enforceability of all Grant Agreements with the Commission and the Company's continuing obligations thereunder. Further, Purchaser hereby ratifies and confirms that the Grant-Funded Assets are held in trust for the Commission and the Commission maintains a continuing reversionary interests in such Grant-Funded Assets. Finally, notwithstanding anything to the contrary in this Agreement, Seller and Purchaser hereby ratify and confirm that the Purchaser's acquisition of the membership interests in the Company contemplated by this Agreement does not in any way alter, affect or impair the enforceability of the Grant Agreements or the Commission's continuing rights to and interest in the Grant-Funded Assets.

## ARTICLE XI INDEMNIFICATION

### 11.01 Tax Indemnification.

(a) After the Closing Date, Seller will indemnify and hold harmless the Purchaser and the Company from and against any and all claims, actions, causes of action, liabilities, losses, damages, and reasonable out-of-pocket expenses and costs resulting from, arising out of or relating to (i) any Taxes of the Company relating to (x) any periods ending on or before the Closing Date and (y) that portion of any Straddle Period that ends on the Closing Date (calculated as set forth in Section 9.01 hereof) in excess, in each case, of amounts paid prior to the Closing Date or specifically reserved on the Company's Books and Records as of the Closing Date as a liability for Taxes and (ii) without duplication of amounts included in clause (i), any Taxes resulting from a breach of the representations and warranties contained in Section 3.12 hereof. The indemnity provided in the foregoing sentence shall include, without limitation, any Tax liability arising by reason of the Company being liable for any Taxes of another person by contract as a transferee or otherwise and any Tax liability incurred in connection with the transactions contemplated by this Agreement.

(b) After the Closing, Purchaser and Seller shall promptly notify the other party in writing of any demand, claim or notice of the commencement of an audit received by such party or the Company from any Tax authority or any other person with respect to Taxes for which such other party is liable pursuant to the terms of this Agreement; provided, however, that a failure to give such notice will not affect such other party's rights to indemnification under Section 11.01(a) hereof, except to the extent that such party is actually prejudiced thereby. At Seller's request, Purchaser shall contest any asserted Tax Liability for which Seller may have an indemnity obligation and shall request any Tax refund to which Seller shall be entitled. Purchaser shall control the conduct, through counsel of its own choosing at its own expense, of any audit, claim for refund, or administrative or judicial proceeding involving any asserted Tax liability or refund with respect to the Company (any such audit, claim for refund, or proceeding relating to an asserted Tax liability or Tax refund referred to herein as a "Contest") relating to Taxes for which Seller have any indemnification obligation pursuant to Section 11.01(a) or a right to the refund pursuant to Section 9.01. Notwithstanding the foregoing, Seller may participate, at its own expense, in any such Contest relating to Taxes for which Seller has an indemnification obligation pursuant to Section 11.01(a) or a right to a refund pursuant to Section 9.01.

11.02 Other Indemnification.

(a) Subject to paragraph (c) of this Section and the other Sections of this Article XI, Seller shall indemnify the Purchaser Indemnified Parties in respect of, and hold each of them harmless from and against, any and all Losses suffered, incurred or sustained by any of them or to which any of them becomes subject, resulting from, arising out of or relating to any breach of representation or warranty or nonfulfillment of or failure to perform any covenant or agreement on the part of Seller contained in this Agreement.

(b) Subject to the other Sections of this Article XI, Purchaser shall indemnify the Seller Indemnified Parties in respect of, and hold each of them harmless from and against, any and all Losses suffered, incurred or sustained by any of them or to which any of them becomes subject, resulting from, arising out of or relating to any breach of representation or warranty or nonfulfillment of or failure to perform any covenant or agreement on the part of Purchaser contained in this Agreement.

(c) Seller shall have no liability to any Purchaser Indemnified Party under Section 11.02(a) until, the Losses of such Purchaser Indemnified Parties exceed \$10,000.00 in the aggregate, at which point the Seller will indemnify the Purchaser Indemnified Parties for the full amount of such Losses; provided that this paragraph (c) shall not apply to a breach of a representation or warranty contained in Sections 3.02, 3.04, 3.06, 3.07 or 3.12 or to a breach of a covenant contained in Sections 2.04, 5.11, 13.03 or 13.05.

(d) Except in the case of actual fraud, the aggregate amount of all payment obligations and other liabilities of the Seller pursuant to this Agreement, including without limitation for (i) all Losses for which the Seller may be liable (or for which the Seller must otherwise provide indemnification) pursuant to Section 11.02(a), and (ii) the post-closing adjustment pursuant to Section 2.04, shall not exceed Five Hundred Eighty-Six Thousand Dollars (\$586,000.00) (the "Aggregate Cap"). Purchaser shall have the right of offset against the Promissory Note for claims for indemnification asserted against Seller pursuant to this Article XI. For avoidance of doubt, the Seller shall have no liability to the Purchaser or the Purchaser Indemnified Parties for Losses, or any other payment obligation whatsoever pursuant to this Agreement over and above the Aggregate Cap, except in the case of actual fraud.

11.03 Method of Asserting Claims. All claims for indemnification by any Indemnified Party under Section 11.02 will be asserted and resolved as follows:

(a) In the event any claim or demand in respect of which an Indemnified Party might seek indemnity under Section 11.02 is asserted against or sought to be collected from such Indemnified Party by a Person other than a Seller or any Affiliate of a Seller or of Purchaser (a "Third Party Claim"), the Indemnified Party shall deliver a Claim Notice with reasonable promptness to the Indemnifying Party. If the Indemnified Party fails to provide the Claim Notice with reasonable promptness after the Indemnified Party receives notice of such Third Party Claim, the Indemnifying Party will not be obligated to indemnify the Indemnified Party with respect to such Third Party Claim to the extent that the Indemnifying Party's ability to defend has been irreparably prejudiced by such failure of the Indemnified Party.

(i) The Indemnifying Party will have the right to defend, with counsel reasonably satisfactory to the Indemnified Party, at the sole cost and expense of the Indemnifying Party, such Third Party Claim by all appropriate proceedings, which proceedings will be vigorously and diligently prosecuted by the Indemnifying Party to a final conclusion or will be settled at the discretion of the Indemnifying Party (but only with the consent of the Indemnified Party, which consent will not be unreasonably withheld, in the case of any settlement that provides for any relief other than the payment of monetary damages as to which the Indemnified Party will be indemnified in full). The Indemnifying Party will have full control of such defense and proceedings, including any settlement thereof; provided, however, that the Indemnified Party may, at the sole cost and expense of the Indemnified Party, at any time prior to the Indemnifying Party's delivery of the notice referred to in the first sentence of this clause (i), file any motion, answer or other pleadings or take any other action that the Indemnified Party reasonably believes to be necessary or appropriate to protect its interests; and provided further, that if requested by the Indemnifying Party, the Indemnified Party will, at the sole cost and expense of the Indemnifying Party, provide reasonable cooperation to the Indemnifying Party in contesting any Third Party Claim that the Indemnifying Party elects to contest. The Indemnified Party may retain separate counsel to represent it in, but not control, any defense or settlement of any Third Party Claim controlled by the Indemnifying Party pursuant to this clause, and the Indemnified Party will bear its own costs and expenses with respect to such separate counsel, except as provided in the preceding sentence and except that the Indemnifying Party will pay the costs and expenses of such separate counsel if the named parties to such Third Party Claim include both the Indemnifying Party and the Indemnified Party and the Indemnified Party determines in good faith, based on advice of counsel, that it is advisable for the Indemnified Party to be represented by separate counsel because a conflict or potential conflict exists between the Indemnifying Party and the Indemnified Party which makes representation of both parties inappropriate under applicable standards of professional conduct. If the Indemnifying Party fails to prosecute vigorously and diligently or settle the Third Party Claim, then the Indemnified Party will have the right to defend, at the sole cost and expense of the Indemnifying Party, the Third Party Claim by all appropriate proceedings, which proceedings will be prosecuted by the Indemnified Party in good faith or will be settled at the discretion of the Indemnified Party (with the consent of the Indemnifying Party, which consent will not be unreasonably withheld).

(b) In the event any Indemnified Party should have a claim under Section 11.02 against any Indemnifying Party that does not involve a Third Party Claim, the Indemnified Party shall deliver an Indemnity Notice with reasonable promptness to the Indemnifying Party. The failure by any Indemnified Party to give the Indemnity Notice shall not impair such party's rights hereunder except to the extent that an Indemnifying Party demonstrates that it has been irreparably prejudiced thereby. If the Indemnifying Party has timely disputed its liability with respect to such claim, the Indemnifying Party and the Indemnified Party will proceed in good faith to negotiate a resolution of such dispute, and if not resolved through negotiations within the Resolution Period, such dispute shall be resolved by litigation in a court of competent jurisdiction in accordance with Section 13.11.

#### 11.04 Exclusive Remedy; Mitigation; Etc.

(a) Except in the case of actual fraud, each party's sole and exclusive remedy for all claims, whether in contract, tort, statutory claim or otherwise, resulting from, arising out of or relating to any breach or inaccuracy, or any alleged breach or inaccuracy, of any representation, warranty or covenant in this Agreement, or otherwise relating to the transactions contemplated hereby, shall be indemnification pursuant to this Article XI.

(b) Each Indemnified Party shall use commercially reasonable efforts (as it shall determine in good faith) to mitigate, to the extent practical, the amount of any Losses for which it is entitled to seek indemnification hereunder. Without limiting the generality of the foregoing, in the event any Losses are potentially covered by insurance, the Indemnified Party agrees to use commercially reasonable efforts to seek recovery under such insurance and any such insurance recovery, as reduced to reflect the impact of any reasonably expected increases in premiums resulting from the payment of such insurance recovery shall reduce the amount of Losses payable by the Indemnified Party.

(c) Any calculation of Losses shall not include any indirect, special, incidental, consequential or punitive damages incurred (or alleged to have been incurred) by the indemnified party, and the indemnifying party shall in no event have any liability for the same hereunder.

## ARTICLE XII

### TERMINATION

12.01 Termination. This Agreement may be terminated, and the transactions contemplated hereby may be abandoned:

(a) at any time before the Closing, by mutual written agreement of the Seller and Purchaser;

(b) at any time before the Closing, by the Seller or Purchaser, in the event (i) of a material breach hereof by the non-terminating party if such non-terminating party fails to cure such breach within five (5) Business Days following notification thereof by the terminating party or (ii) upon notification of the non-terminating party by the terminating party that the satisfaction of any condition to the terminating party's obligations under this Agreement becomes impossible or impracticable with the use of commercially reasonable efforts if the failure of such condition to be satisfied is not caused by a breach hereof by the terminating party; or

(c) at any time after October 31, 2012 by the Seller, on the one hand, or Purchaser, on the other, upon notification of the non-terminating party by the terminating party if the Closing shall not have occurred on or before such date and such failure to consummate is not caused by a breach of this Agreement by the terminating party.

12.02 Effect of Termination. If this Agreement is validly terminated pursuant to Section 12.01, this Agreement will forthwith become null and void, and there will be no liability or obligation on the part of the Seller or Purchaser (or any of their respective officers, directors, employees, agents or other representatives or Affiliates), except as provided in the next

succeeding sentence and except that the provisions with respect to expenses in Section 13.03 and confidentiality in Section 13.05 will continue to apply following any such termination. Notwithstanding any other provision in this Agreement to the contrary, upon termination of this Agreement pursuant to Section 12.01(b) or (c), the Seller will remain liable to Purchaser for any breach of this Agreement by the Seller existing at the time of such termination, and Purchaser will remain liable to the Seller for any breach of this Agreement by Purchaser existing at the time of such termination, and the Seller or Purchaser may seek such remedies, including damages and fees of attorneys, against the other with respect to any such breach as are provided in this Agreement or as are otherwise available at Law or in equity.

### ARTICLE XIII

#### MISCELLANEOUS

13.01 Notices. All notices, requests, demands and other communications under this Agreement shall be in writing and shall be deemed to have been duly given: (a) on the date of service if served personally on the party to whom notice is to be given; (b) on the day of transmission if sent via facsimile transmission to the facsimile number given below, and telephonic confirmation of receipt is obtained promptly after completion of transmission; (c) on the day after delivery to Federal Express or similar overnight courier or the Express Mail service maintained by the United States Postal Service; or (d) on the fifth day after mailing, if mailed to the party to whom notice is to be given, by first class mail, registered or certified, postage prepaid and properly addressed, to the party as follows:

If to Purchaser, to:

Appalachian Broadband, LLC  
Post Office Box 487  
Gate City, VA 24251  
Facsimile No.:  
Attn.: William J. Franklin

with a copy to:

LeClairRyan  
Riverfront Plaza, East Tower  
951 East Byrd Street, Eighth Floor  
Richmond, Virginia 23219  
Facsimile No.: 804-783-7674  
Attn: Vernon E. Inge, Jr.

If to Seller, to:

LENOWISCO Planning District Commission  
Post Office Box 366



Duffield, VA 24224-0366  
Facsimile No.: 276-431-2208  
Attn.: Mr. Glen A. ("Skip") Skinner

with a copy to:

Hunton & Williams LLP  
Riverfront Plaza, East Tower  
951 East Byrd Street  
Richmond, Virginia 23219  
Facsimile No.: 804-343-4525  
Attn.: Richard Gary

Any party from time to time may change its address, facsimile number or other information for the purpose of notices to that party by giving notice specifying such change to the other party hereto.

13.02 Entire Agreement. This Agreement superseded all prior discussions and agreements between the parties with respect to the subject matter hereof, including without limitation that certain letter of intent between the parties dated July 9, 2012, and contain the sole and entire agreement between the parties hereto with respect to the subject matter hereof and thereof.

13.03 Expenses. Except as otherwise expressly provided in this Agreement, whether or not the transactions contemplated hereby are consummated, each party will pay its own costs and expenses, and Seller shall pay the costs and expenses of the Company, incurred in connection with the negotiation, execution and closing of this Agreement and the transactions contemplated hereby.

13.04 Public Announcements. At all times at or before the Closing, Seller and Purchaser will not, and Seller will cause the Company not to, issue or make any reports, statements or releases to the public or generally to the employees, customers, suppliers or other Persons to whom the Company sells goods or provides services or with whom the Company otherwise has significant business relationships with respect to this Agreement or the transactions contemplated hereby without the consent of the other, which consent shall not be unreasonably withheld. If either party is unable to obtain the approval of its public report, statement or release from the other party and such report, statement or release is, in the opinion of legal counsel to such party, required by Law in order to discharge such party's disclosure obligations, then such party may make or issue the legally required report, statement or release and promptly furnish the other party with a copy thereof. Seller and Purchaser will also obtain the other party's prior approval of any press release to be issued immediately following the Closing announcing the consummation of the transactions contemplated by this Agreement.

13.05 Confidentiality. Each party hereto will hold, and will use its best efforts to cause its Affiliates, and their respective Representatives to hold, in strict confidence from any Person (other than any such Affiliate or Representative), unless (i) compelled to disclose by judicial or administrative process (including without limitation in connection with obtaining the

necessary approvals of this Agreement and the transactions contemplated hereby of Governmental or Regulatory Authorities) or by other requirements of Law or (ii) disclosed in an Action or Proceeding brought by a party hereto in pursuit of its rights or in the exercise of its remedies hereunder, all documents and information concerning the other party or any of its Affiliates furnished to it by the other party or such other party's Representatives in connection with this Agreement or the transactions contemplated hereby, except to the extent that such documents or information can be shown to have been (a) previously known by the party receiving such documents or information, (b) in the public domain (either prior to or after the furnishing of such documents or information hereunder) through no fault of such receiving party or (c) later acquired by the receiving party from another source if the receiving party is not aware that such source is under an obligation to another party hereto to keep such documents and information confidential; provided that following the Closing the foregoing restrictions will not apply to Purchaser's use of documents and information concerning the Company furnished by Seller hereunder.

13.06 Waiver. Any term or condition of this Agreement may be waived at any time by the party that is entitled to the benefit thereof, but no such waiver shall be effective unless set forth in a written instrument duly executed by or on behalf of the party waiving such term or condition. No waiver by any party of any term or condition of this Agreement, in any one or more instances, shall be deemed to be or construed as a waiver of the same or any other term or condition of this Agreement on any future occasion. All remedies, either under this Agreement or by Law or otherwise afforded, will be cumulative and not alternative.

13.07 Amendment. This Agreement may be amended, supplemented or modified only by a written instrument duly executed by or on behalf of each party hereto.

13.08 Third Party Beneficiaries. The terms and provisions of this Agreement are intended for the benefit of each party hereto and their respective successors or permitted assigns, and it is not the intention of the parties to confer third-party beneficiary rights upon any other Person other than any Person entitled to indemnity under Article XI. Notwithstanding the foregoing, the Commission is an intended third party beneficiary with respect to the terms of this Agreement that references, relates to or implicates the Commission, any Grant Agreements or agreements with the Commission, and/or any Grant-Funded Assets. Although the Commission is an intended third party beneficiary of this Agreement and has enforceable rights thereunder, the Commission is not a signatory to this Agreement and has no obligations under this Agreement.

13.09 No Assignment; Binding Effect. Neither this Agreement nor any right, interest or obligation hereunder may be assigned by any party hereto without the prior written consent of the other party hereto and any attempt to do so will be void, except (a) for assignments and transfers by operation of Law; (b) that Purchaser may assign any or all of its rights, interests and obligations hereunder (including without limitation its rights under Article XI) to any post-Closing purchaser of all of the issued and outstanding shares of membership interest of the Company or a substantial part of its assets or any financial institution providing purchase money or other financing to Purchaser or the Company from time to time as collateral security for such financing, but no such assignment shall relieve Purchaser of its obligations hereunder. Subject to the preceding sentence, this Agreement is binding upon, inures

to the benefit of and is enforceable by the parties hereto and their respective successors and assigns.

13.10 Headings. The headings used in this Agreement have been inserted for convenience of reference only and do not define or limit the provisions hereof.

13.11 Consent to Jurisdiction and Service of Process. Each party hereby irrevocably submits to the non-exclusive jurisdiction of the United States District Court for the Western District of Virginia or any court of the Commonwealth of Virginia located in Scott County in any action, suit or proceeding arising out of or relating to this Agreement or any of the transactions contemplated, provided, however, that such consent to jurisdiction is solely for the purpose referred to in this Section 13.11 and shall not be deemed to be a general submission to the jurisdiction of said courts or in the Commonwealth of Virginia other than for such purpose. Each party hereby irrevocably waives, to the fullest extent permitted by Law, any objection that it may now or hereafter have to the laying of the venue of any such action, suit or proceeding brought in such a court and any claim that any such action, suit or proceeding brought in such a court has been brought in an inconvenient forum. Each of the parties hereto agrees that a final judgment in any such action, suit or proceeding shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. The costs and expenses (including, but not limited to attorneys' fees) of the prevailing party in any such action, suit or proceeding shall be borne by the non-prevailing party. Nothing herein shall affect the right of any party to serve process in any other manner permitted by Law or to commence legal proceedings or otherwise proceed against the other in any other jurisdiction.

13.12 Invalid Provisions. If any provision of this Agreement is held to be illegal, invalid or unenforceable under any present or future Law, and if the rights or obligations of any party hereto under this Agreement will not be materially and adversely affected thereby, (a) such provision will be fully severable, (b) this Agreement will be construed and enforced as if such illegal, invalid or unenforceable provision had never comprised a part hereof, and (c) the remaining provisions of this Agreement will remain in full force and effect and will not be affected by the illegal, invalid or unenforceable provision or by its severance herefrom.

13.13 Governing Law. This Agreement shall be governed by and construed in accordance with the Laws of the Commonwealth of Virginia applicable to a Contract executed and performed in such Commonwealth, without giving effect to the conflicts of laws principles thereof.

13.14 Counterparts. This Agreement may be executed in any number of counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

13.15 Waiver of Punitive and Other Damages and Jury Trial. THE PARTIES TO THIS AGREEMENT EXPRESSLY WAIVE AND FOREGO ANY RIGHT TO RECOVER PUNITIVE, EXEMPLARY, LOST PROFITS, CONSEQUENTIAL OR SIMILAR DAMAGES IN ANY ARBITRATION, LAWSUIT, LITIGATION OR PROCEEDING ARISING OUT OF OR RESULTING FROM ANY CONTROVERSY OR CLAIM ARISING OUT OF OR

RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY.

EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES, AND THEREFORE IT HEREBY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY.

EACH PARTY CERTIFIES AND ACKNOWLEDGES THAT (i) NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE EITHER OF THE FOREGOING WAIVERS, (ii) IT UNDERSTANDS AND HAS CONSIDERED THE IMPLICATIONS OF SUCH WAIVERS, (iii) IT MAKES SUCH WAIVERS VOLUNTARILY, AND (iv) IT HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION 13.15.

*[Remainder of page intentionally left blank]*

EXECUTION VERSION

IN WITNESS WHEREOF, this Agreement has been duly executed and delivered by the duly authorized officer of each party hereto as of the date first above written.

PURCHASER:

APPALACHIAN BROADBAND, LLC

By: William Franklin  
William Franklin, Manager

SELLER:

LENOWISCO PLANNING DISTRICT  
COMMISSION

By: \_\_\_\_\_  
Name:  
Title:

EXECUTION VERSION

IN WITNESS WHEREOF, this Agreement has been duly executed and delivered by the duly authorized officer of each party hereto as of the date first above written.

PURCHASER:

APPALACHIAN BROADBAND, LLC

By: \_\_\_\_\_  
William Franklin, Manager

SELLER:

LENOWISCO PLANNING DISTRICT  
COMMISSION

By: Glen A. Skinner  
Name: Glen. A. Skinner  
Title: Executive Director

**Attachment 7**

MOU and Agreement  
between  
Scott County Telephone Cooperative  
and  
Powell Valley Electric Cooperative

## **Memorandum of Understanding (MOU)**

Whereas Powell Valley Electric Cooperative (PVEC) and Scott County Telephone Cooperative (SCTC) wish to cooperate to design, construct, and operate additions to the existing SCTC fiber optic network for purposes of providing Automated Meter Infrastructure (AMI) capability to every PVEC member.

Whereas PVEC is recognized as having extensive and longstanding experience in line construction and maintenance.

Whereas SCTC is recognized as a leader in rural fiber optic broadband deployment.

PVEC hereby coordinates with SCTC for the expansion of fiber lines to the homes and businesses of PVEC members to meet the goal of providing AMI to every PVEC member as appropriate and providing communications for PVEC's other electrical needs.

**PVEC RESPONSIBILITIES:** PVEC will be responsible for:

- Construction of backbone fiber, drop fiber, installation of member premise electronics, and splicing.
- PVEC will work with SCTC to verify materials are compatible to SCTC's existing network.
- Maintenance on all fiber in the PVEC footprint and this maintenance charge will be at PVEC cost and billed to SCTC monthly.

**FINANCIAL RESPONSIBILITIES:** PVEC will finance any or all of PVEC's costs (including both capital and construction) associated with its responsibilities listed above in PVEC RESPONSIBILITIES. These costs will be accrued through the PVEC work order system and a running total of its Project Costs will be maintained by PVEC. All PVEC work order costs, which are not offset by grant funding, will be reimbursed by SCTC at a monthly rate of \$40.00 per member connected and serviced on the broadband network. These member revenues will be tabulated monthly and the amounts paid to PVEC. All applicable payments will be deducted from the running Project total owed to PVEC by SCTC.

**AUDIT RIGHTS:** SCTC will have the right to audit project-related portions of PVEC's work order system at any time to determine total accumulated costs. PVEC will have the right to audit SCTC's collections of project-related revenue and all other SCTC expenditures pursuant to this initiative.

**SCTC RESPONSIBILITIES:** SCTC will be responsible for

- Providing light to the fiber,



- Provisioning services, monitoring equipment, engineering, material specifications,
- Identifying target areas in conjunction with PVEC,
- Quality control, training on installation of electronics, and training for splicing.

**NETWORK OWNERSHIP:** PVEC, at its sole discretion, may declare an area materially complete and, SCTC will then start paying Joint Use pole attachment rent to PVEC for poles in that area. The designated areas will be determined by PVEC. When 100% of the fiber network is paid in full, ownership of the fiber network will be transferred "AS IS" from PVEC to SCTC.

SCTC will provide, free of charge, network connectivity and communications to all installed PVEC Demarc equipment indefinitely, including downline devices, substations, radios, etc.

**DEFINITIVE AGREEMENT:** This Memorandum of Understanding sets forth the understanding of the parties regarding the transactions described herein. The parties shall exercise definitive agreements, including but not limited to, an operating agreement for Project by January 1, 2019, unless otherwise agreed by the parties.

If the foregoing is acceptable to you, please sign and date this Memorandum of Understanding in the space provided below.

**SCOTT COUNTY TELEPHONE COOPERATIVE**

BY: Bill Franklin  
Bill Franklin, General Manager/CEO

Date 1-14-19

**POWELL VALLEY ELECTRIC COOPERATIVE**

BY: Randell Meyers  
Randell Meyers, General Manager/CEO

Date 1/14/2019

**Fiber Lease Agreement  
between  
Scott County Telephone Cooperative  
and  
Powell Valley Electric Cooperative, Inc.**

This Agreement, made and entered into this the first day of January, 2019 between Scott County Telephone Cooperative of Gate City, Virginia (hereinafter called "SCTC"), and Powell Valley Electric Cooperative, Inc., with headquarters at New Tazewell, Tennessee (hereinafter called "PVEC") and collectively called "Parties."

**WITNESSETH:**

WHEREAS, the PVEC's service area includes all or parts of Claiborne, Hancock, Union, Grainger and Hawkins Counties in Tennessee, and parts of Lee, Scott and Wise Counties in Virginia (hereinafter called "Service Area") and, in an effort to modernize its electric grid, PVEC proposes to deploy fiber throughout its service area to meet the current and future needs of its electrical system; and

WHEREAS, in addition to improving communications with its offices, substations, down line devices, radios, and other equipment, PVEC plans to replace its existing antiquated metering system with real time metering (called AMI) by deploying fiber throughout its Service Area; and

WHEREAS, SCTC recognizes that Sunset Digital Communications, LLC currently provides PVEC with communications to its offices, substations, down line devices, radios, etc. under a long term agreement and

understands the need to coordinate its fiber deployment accordingly; and

WHEREAS, to ensure the success and timelines of PVEC's grid moderation project, PVEC plans to construct fiber and associated equipment to each home and business within its service area (hereinafter called "Buildout") and lease the excess fiber to SCTC, it being the objective of PVEC to provide the fiber deployment at zero net cost to its members.

NOW THEREFORE, for and in consideration of the premises and the mutual covenants set forth, the parties hereto covenant and agree to the following terms:

- I. Training: SCTC will provide, at SCTC's expense, adequate training for PVEC's personnel in all aspects of fiber installation and related equipment installation. SCTC will also provide, to PVEC at SCTC's expense, training in splicing, fiber allocation, and related training.
- II. Engineering and Design: PVEC will have full control of all design and construction of facilities it builds under this Agreement. SCTC may advise and consult but must, upon PVEC's request, provide all engineering. SCTC must determine, for PVEC and at no cost to PVEC, if materials that PVEC specifies are compatible with SCTC's network.
- III. Construction ("Buildout"):
  - A. Non-grant: PVEC will provide, install and splice dark fiber and provide and install associated hardware, enclosures, etc. (but will not provide or install pop sites or associated electronics) to every home and business without Broadband within PVEC's service area to meet

the PVEC's current and future electrical needs and will initially own the facilities that it constructs. SCTC may also construct (at its expense) and own facilities within PVEC's Service Area. To ensure compatibility, SCTC will purchase and provide all electronics.

B. Grant/Loan: SCTC and PVEC may jointly or individually apply for grants and/or loans to fund Broadband projects within PVEC's Service Area. The parties may negotiate separate unit prices and payment arrangements for such projects.

C. Fiber Lighting: In either case (Non-Grant or Grant/Loan), SCTC will light all fiber and incorporate it into SCTC's Network. SCTC shall offer Broadband Services to each prospective PVEC member.

IV. Maintenance: PVEC, at SCTC's expense, will, to the extent that it is able to do so, perform maintenance on the Buildout and SCTC's Network located within PVEC's service area. Said maintenance costs are not to be considered part of the Buildout Project costs.

V. Buildout Costs, Lease and Reimbursement:

A. Buildout costs incurred by the Cooperative will be accumulated utilizing the Cooperative's standard work order system and will include applicable overheads. In addition, Buildout costs will be increased to reflect PVEC's costs for any 3<sup>rd</sup> party joint-use pole rents paid for non-PVEC owned poles and for property taxes hereinafter described. All accumulated net buildout costs will be increased monthly by a 1/12 of 5% finance charge. All costs will be

accumulated and totaled on an ongoing basis to reflect PVEC's current Buildout Project costs.

B. SCTC will pay to PVEC a monthly lease fee equal to the following:

(a) For Residential Internet Service; 66.67% of SCTC's share of its revenue, and

(b) For Residential Dial Tone Service; 50.00% of SCTC's share of its net revenue, and

(c) For all services sold to businesses; 50.00% of SCTC's share of its net revenue, and

(d) For all video services, 0.00% of SCTC's share of its revenue.

These payments will be based on each customer connected and serviced from the Network (regardless of which party provided the construction), commencing January 1, 2019, and will continue until the sum of all monthly lease payments made hereunder equals PVEC's current total Buildout Project costs, including its finance charge, plus an accrued sum of 1/12 of 0.57% per month of PVEC's Gross Buildout Project Costs to cover its associated property taxes on the Buildout Project. Work performed by PVEC after this point is reached will be billed to and paid by SCTC on a "per job basis."

C. SCTC will promptly reimburse PVEC for any payments due it under any grant/loan projects. These reimbursements will be in addition to any monthly lease fee payments. Facility ownership will be in accordance with each applicable grant/loan.

VI. Communication Services Provided: SCTC will provide perpetually, at no cost to PVEC, all of the PVEC's communication requirements throughout its entire service area including but not limited to, its offices, substations, line equipment, radios and meters.

VII. The term of this agreement is perpetual and infinite. Either Party reserves the right to cancel this Agreement at any time subject to the following:

A. SCTC must continue making the monthly fiber lease payment, as provided above, until such time as the total fiber lease payments made hereunder equals PVEC's total Buildout Project costs, all 3<sup>rd</sup> party joint-use pole rents; all finance charges and all accrued property tax amounts, or pay all amounts due herein in full lump sum; and

B. SCTC must continue providing to PVEC the communication services set forth in VI above free of charge perpetually. In the event that SCTC or its successors assigns fail to adequately provide these free communications, SCTC (or its successors or assigns) herein grants PVEC an irrevocable right to use (IRU) 4 dark fibers within its entire network in Virginia and Tennessee to continue meeting its communication needs.

VIII. Customer Service/Payment Collections: Both Parties herein agree to mutually explore such means and methods by which PVEC may collect bill payments for and/or handle service requests for SCTC and negotiate a corresponding price per service/collection fee payable by SCTC to PVEC for such services rendered.

- IX. Transfer of Ownership/Joint Use rents/Taxes: When the total lease payments made, (as provided in Article V.B above) equals PVEC's total Buildout Projects costs including the accrued property tax amount, accrued finance charges and any 3<sup>rd</sup> party joint-use pole rents, PVEC will sell its Buildout fiber facilities to SCTC for the sum of \$1.00 and other considerations as listed in Article VI and Article VII.B. Transfer of ownership will be "AS IS." PVEC, at its sole discretion, may also declare an area materially complete. SCTC must then start paying pole rent as provided under its current joint use pole agreement with PVEC for the additional attachments made to PVEC owned poles during the Buildout. Each party is responsible to the applicable taxing authority for the payment of taxes due on the fiber Buildout facilities that it owns. During the Buildout, SCTC is responsible for any joint use pole rents due PVEC for only SCTC owned facilities attached to PVEC owned poles.
- X. 3<sup>rd</sup> Party: SCTC recognizes that some buildout facilities will be attached to 3<sup>rd</sup> party poles. For facilities constructed outside of PVEC's service area, PVEC will only serve as a subcontractor and SCTC will be responsible to PVEC for all of its costs. SCTC will own the facilities and be responsible for securing any 3<sup>rd</sup> party joint-use agreements. For facilities constructed within PVEC's service area, SCTC will be responsible for securing any applicable 3<sup>rd</sup> party joint-use agreements prior to the transfer of ownership from PVEC to SCTC.
- XI. Audit Rights: SCTC will have the right to audit project related portions of PVEC's work order system at any time to determine total accumulated costs. PVEC will have the right to audit SCTC

collections of project related revenue pursuant to this Agreement.

XII. Power Space: SCTC recognizes that the Buildout facilities may include some fiber facilities being located in PVEC's power space and that such facilities require special qualifications and training for personnel working in such power space.

XIII. Assignment: This Agreement is not assignable by either party unless specifically approved by the other party.

XIV. Hold Harmless:

A. SCTC agrees to indemnify and hold harmless PVEC from and against any and all liability, costs, attorneys' fees incurred, expenses, claims and demands, including payment under any workman's compensation laws or under any plan for employee's disability and death benefits, for damage to property, and/or injury to or death of persons, including but not limited to, injuries to and death of employees of SCTC when such damage to property or injury to or death of persons arises out of, results from, or is caused by the negligence or intentional act of SCTC or its employees.

B. PVEC agrees to indemnify and hold harmless SCTC from and against any and all liability, costs, attorneys' fees incurred, expenses, claims and demands, including payment under any workman's compensation laws or under any plan for employee's disability and death benefits, for damage to property, and/or injury to or death of persons, including but not limited to, injuries to and death of employees of PVEC when such damage to property or injury to or death of



persons arises out of, results from, or is caused by the negligence or intentional act of PVEC or its employees.

- XV. Relationship between the Parties: It is understood and agreed that the relationship between the Parties created by this Agreement is that of independent lessor and independent lessee. The Parties agree to comply with all state and federal laws regarding employment of their own employees (if any) including, but not limited to: (a) unemployment insurance, (b) worker compensation (c) withholding of taxes, (d) social security, (e) pension and retirement plans, and (f) medical insurance, and any and all other such regulations and laws, and to further forever save and hold harmless the other party from any and all liability resulting from their failure to so perform.

*(Signatures appear on following page.)*

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their respective officers thereunto duly authorized, as of the day and year first written above.

**SCOTT COUNTY TELEPHONE  
COOPERATIVE**

William J. Franklin  
William J. Franklin, CEO

ATTEST:

Charles "B" Good

**POWELL VALLEY ELECTRIC  
COOPERATIVE, INC.**

Randell W. Meyers  
Randell W. Meyers  
General Manager/CEO

ATTEST:

Charles "B" Good

**Attachment 7**

Pole Attachment Agreement between  
SCTC  
and  
Old Dominion Power Company

ATTACHMENT AGREEMENT

THIS AGREEMENT, made this 2nd day of March,  
1987 by and between SCOTT COUNTY TELEPHONE COOPERATIVE,  
hereinafter called "Permittee", party of the first part, and the  
OLD DOMINION POWER COMPANY, a corporation of the State of  
Virginia, hereinafter called "ODP", party of the second part,

W I T N E S S E T H:

WHEREAS, pursuant to the provisions of this Agreement and  
attached Schedules A, B, and C, which are hereby made a part of  
this Agreement, Permittee desires to cause the installation of  
the facilities described in Schedule A on the poles of ODP  
likewise described in such Schedule in the area as shown on such  
Schedule; and,

WHEREAS, ODP is willing to permit, to the extent it may  
law-fully do so, the attachment of the described facilities, to  
its poles where, in its judgment, such use will not interfere  
with its own use of the facilities and of all other licensees  
using ODP's poles,

NOW, THEREFORE, in consideration of the mutual covenants,  
terms and conditions herein contained, the parties hereto do  
hereby mutually covenant and agree as follows:

1. PERMITTED ATTACHMENTS. ODP agrees to permit Permittee  
to attach and maintain the facilities described in the Schedule A  
attached to this Agreement to ODP's poles and other facilities  
likewise described in the attached Schedule and designated on the  
attached print, in the manner set out and pursuant to the

provisions of this Agreement. Permittee agrees to pay ODP any fees established by and pursuant to the attached Schedule B. All attachments made pursuant to this Agreement shall be at such points and in such manner as ODP or its agents may direct.

2. CONSTRUCTION AND MAINTENANCE REQUIREMENTS AND SPECIFICATIONS. All facilities attached pursuant to this Agreement shall be erected and maintained in accordance with the requirements and specifications of the National Electrical Safety Code, current edition, ODP's construction practices, or any amendments or revisions of said Code; in compliance with any rules, orders, or regulations now in effect or that hereinafter may be issued by the State Corporation Commission of Virginia; in compliance with all applicable federal, state or local laws, rules, regulations and/or ordinances and in compliance with all applicable rules, orders, or regulations issued by any federal, state or local authority. In the event any of Permittee's construction does not meet ODP's specifications, Permittee will correct same in fifteen (15) work days after written notification. If Permittee fails to correct same within fifteen (15) days, ODP may make such corrections and bill Permittee for the total costs incurred. Permittee, at all times, warrants legal compliance as set out above and assumes all responsibility for insuring such compliance and for any damages, fines or penalties resulting from any noncompliance. ODP undertakes no duty with respect to such compliance by requiring Permittee to meet any specifications or by requiring or failing to require any

corrections, modifications, additions or deletions to any work or planned work by Permittee.

3. MAINTENANCE OF ATTACHMENTS. At all times, Permittee shall, at its own expense, make and maintain said attachments in safe condition and in thorough repair, and in a manner suitable to ODP and so as not to conflict with the use of said poles by ODP, or by any other parties, firms, corporations, governmental units, etc., using said poles, pursuant to any license or permit by ODP, or interfere with the working use of facilities thereon or which may, from time to time, be placed thereon. ODP in no way insures the continuance of Permittee's facilities at their original location or placement of ODP's poles or other facilities. If ODP determines, at its sole discretion to relocate, replace, enlarge, add to, modify or in any manner alter its poles or other facilities, even for ODP's sole convenience, Permittee shall, at its expense, remove and/or relocate its own facilities in a manner directed by ODP. Permittee shall promptly, at any time, at its own expense, upon written notice from ODP, at ODP's sole discretion, relocate, replace or renew the facilities placed on said poles, and transfer them to substituted poles, or perform any other work in connection with said facilities that may be required by ODP. In case of emergency, ODP may arrange to relocate, replace or renew the facilities placed on said poles, transfer them to substituted poles or perform any other work in connection with said facilities that may be required in the maintenance, replacement, removal or relocation of said poles, the facilities thereon or which may be placed thereon, or for the service needs of ODP, or

its other licensees, and Permittee shall, on demand, reimburse ODP for the expense thereby incurred. ODP undertakes no duty however to inspect or insure the repair of any facilities.

4. MAINTENANCE AND OPERATION OF ODP'S FACILITIES. ODP reserves to itself, its successors and assigns, the right to maintain its poles and to operate its facilities thereon in such manner as will, in its own judgment, best enable it to fulfill its own service requirements, but in accordance with the specifications hereinbefore referred to. ODP shall not be liable to Permittee for any interference with the operation of Permittee's facilities arising in any manner out of the use of ODP's poles hereunder.

5. EASEMENTS. Permittee must secure its own easement rights on private property. ODP's approval of attachments shall not constitute any representation or warranty by ODP to Permittee regarding Permittee's right to occupy or use any public or private right-of-way.

6. INSPECTION OF FACILITIES. ODP reserves the right to inspect at any time the facilities described in the attached Schedule. Permittee shall, on demand, reimburse ODP for the expense of any such inspections at ODP's prevailing wage rate per manhour plus associated expenses and applicable overheads. Such inspections, made or not, shall not operate to relieve Permittee of any responsibility, obligation or liability assumed under this

Agreement. ODP undertakes no duty to inspect such facilities or insure that no damage or loss occurs by reason of such facilities.

7. PRECAUTIONS TO AVOID FACILITY DAMAGE. Permittee shall not damage any facilities of ODP or of others supported on ODP's poles and facilities. Permittee shall not interfere with ODP's operation; and hereby assumes all responsibility for any and all loss for such damage and for interference. Permittee shall make an immediate report to ODP of any damage or interference and hereby agrees to reimburse ODP for the expense incurred in making repairs.

8. INDEMNITIES. Permittee agrees to protect, defend, indemnify and save harmless ODP from any and all damage, loss, claim, demand, suit, liability, penalty or forfeiture of every kind nature, including but not limited to costs and expenses of defending against the same, payment of any settlement or judgment therefore and reasonable attorney's fees, by reason of (a) injuries or deaths to persons, (b) damages to or destructions of properties, (c) pollutions, contaminations of or other adverse effects on the environment or (d) violations of governmental laws, regulations or orders whether suffered directly by ODP itself or indirectly by reason of claims, demands or suits against it by third parties, resulting or alleged to have resulted from acts or omissions of Permittee, its employees, agents, or other representatives or from their presence on the premises of ODP or otherwise from performance of this Agreement,



or from or in connection with the construction, installation, operation, maintenance, presence, replacement, enlargement, use or removal of any facilities of Permittee attached or in the process of being attached or removed from any poles of ODP.

9. ATTACHMENT REMOVAL AND NOTICES. Permittee may voluntarily remove its attachments from any pole or poles of ODP, but shall give ODP prior written notice of any such removal. Any such removal shall be undertaken in a manner consistent with Paragraph 7 of this Agreement. No refund of any rental will be due on account of such voluntary removal.

10. NONCOMPLIANCE. If Permittee fails to comply with any of the provisions of this Agreement or defaults in any of its obligations under this Agreement and fails to correct such default or noncompliance within thirty (30) days after written notice from ODP, ODP may, at its option, forthwith terminate this Agreement by giving written notice to Permittee of said termination. No refund of any rental will be due on account of such termination.

11. BILLING. Bills for inspections, expenses and other charges under this Agreement shall be payable within thirty (30) days after presentation. Nonpayment of bills shall constitute a default of this Agreement.

12. WAIVERS. Failure to enforce or insist upon compliance with any of the terms or conditions of this Agreement shall not constitute a general waiver or relinquishment of any such terms or conditions, but the same shall be and remain at all times in full force and effect.

13. USE OF ODP'S FACILITIES BY OTHERS. Nothing herein contained shall be construed as affecting the rights or privileges previously conferred by ODP, by contract or otherwise, to others, not parties to this Agreement, to use any poles covered by this Agreement; and ODP shall have the right to continue and to extend such rights and privileges. The attachment privileges herein granted shall at all times be subject to such previously conferred privileges.

14. ASSIGNMENT. Permittee shall not assign, transfer or sublet the privileges hereby granted without the prior written consent of ODP. Any attempt to so assign without such written consent shall be void.

15. PROPERTY RIGHTS. No use, however extended, of ODP poles or other facilities under this Agreement shall create or vest in Permittee any ownership or property rights in said poles; rights herein contained shall be and remain a mere permission. Nothing herein contained shall be construed to compel ODP to maintain any of said poles for a period longer than demanded by its own service requirements.

16. TERM. This Agreement shall become effective upon its execution and if not terminated in accordance with the provisions of Paragraph 10 shall continue in effect for a term of not less than one (1) year. Either party may terminate the Agreement at the end of said year or at any time thereafter by giving to the other party at least six (6) months' written notice. Upon termination of the Agreement in accordance with any of its terms, Permittee shall immediately remove all its facilities attached to ODP's poles or other facilities pursuant to this contract. All

costs of such removal will be borne by Permittee. Permittee shall exercise precautions to avoid damage to facilities of ODP in so removing and assumes all responsibility for any and all such damage. If Permittee's facilities attached to ODP's pole and other facilities pursuant to this contract are not promptly removed, ODP shall have the right to remove them at the cost and expense of Permittee and without any liability therefore.

17. NOTICES. Any notice or request required by this Agreement shall be deemed properly given if mailed, postage prepaid, to the General Manager, Old Dominion Power Company, P.O. Drawer 658, Norton, VA 24273, in the case of ODP; and to:

Manager, SCOTT COUNTY Telephone Co-op, P.O. Box 487  
Gate City, Va. 24251

in the case of Permittee. The designation of the person to be notified, and/or his address may be changed by ODP or Permittee at any time, or from time to time, by similar notice.

18. ACCESS. At all times, Permittee shall maintain, operate and/or construct all facilities in such manner to insure that ODP has full and free access to all of its facilities described in the Schedule attached to this Agreement for the

purpose of repairing, rebuilding, replacing, maintaining and operating such facilities.

19. ADJUSTMENTS. Nothing contained herein shall be construed as affecting in any way the right of ODP, and ODP shall at all times have the right, to unilaterally make a change in the rental charge for attachment to poles, other charges as provided for, any rule, regulation, condition or any other change required. Such change or changes to become effective as provided for in this Agreement after written notification or changes in applicable regulations or statutes.

20. SUCCESSORS AND ASSIGNS. Unless to the provisions of Section 15 hereof, this Agreement shall extend to and bind the successors and assigns of the parties hereto.

21. INSURANCE. Unless otherwise specified in the attached Schedule C, Permittee shall maintain in force during the term of this Agreement at its expense public liabilities insurance, with deductible provisions and in a minimum amount satisfactory ODP as provided in Schedule C. Upon request, Permittee shall provide ODP with certificates or other evidence of any insurance coverage required herein. Every contract of insurance providing the coverages required herein shall contain the following or equivalent clause: "No reduction, cancellation, or expiration of the policy shall become effective until ten (10) days from the date written notice thereof is actually received by Permittee and ODP as appropriate."


22. ENTIRE AGREEMENT. This Agreement and attached Schedules constitute the entire Agreement between ODP and Permittee and all previous representations relative thereto, either written or oral, are hereby annulled and superseded. No modification shall be binding on ODP and Permittee unless it shall be in writing and signed by both parties. Nothing contained in this Agreement or attached Schedules shall be construed as having any effect in any future agreement or contemplated future agreement between the parties.

23. HEADINGS. Paragraph headings are for the convenience of the parties only and are not to be construed as part of Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed the day and year first above written.

ATTEST:

  
Secretary

By:   
President

ATTEST:

  
Secretary

OLD DOMINION POWER COMPANY

By:  <sup>W.E.B.</sup>  
Vice President

**Attachment 8**

**Letters  
of  
Support**



## Lee County Board of Supervisors

LEE COUNTY  
P.O. Box 367  
Jonesville, Virginia 24263-0367

COUNTY ADMINISTRATOR  
Telephone 276-346-7714  
Fax 276-346-7712  
www.leecova.org

August 28, 2019

Ms. Tammy L. Breski  
Telecommunications and Broadband Specialist  
Virginia Department of Housing and Community Development  
600 E Main Street, Suite 300  
Richmond, VA 23219

RE: LENOWISCO Regional Broadband Expansion Phase I

Dear Ms. Breski:

I am writing in support of the LENOWISCO Planning District Commission's application for a Virginia Telecommunications Initiative (VATI) grant through the Virginia Department of Housing and Community Development (DHCD). This regional initiative, in cooperation with Scott County Telephone Cooperative (SCTC) and Powell Valley Electric Cooperative (PVEC), will generate an immediate and self-sustaining benefit to southwest Virginia. I would like to offer my strong support of the project.

The goal is to construct a Fiber-to-the-Premises project that will provide a broadband G-PON connection to support up to ten (10) gigabit of bandwidth to each customer site. If approved, the availability of broadband service will enhance Lee County's ability to operate more efficiently and attract new businesses, thus promoting economic development, improving the educational opportunities for all students and teachers, as well as improving the quality of life for each individual in the areas to be served. This VATI grant will be vital to the Fleenortown, Ocoonita, and Right Poor Valley communities in Lee County, and will pass 387 total residential locations.

I feel all partners involved are dedicated to meet the goals of the VATI Program in the vital deployment of broadband. I strongly support the application of the LENOWISCO Planning District and urge favorable consideration by the DHCD. Please feel free to contact anytime with questions.

Thank you for your time and consideration of these comments.

Sincerely,

D. Dane Poe  
County Administrator

cc: Mr. William J. Franklin, Scott County Telephone Cooperative  
Mr. Randell Meyers, Powell Valley Electric Cooperative  
Mr. Duane A. Miller, LENOWISCO



Lee County Industrial Development Authority  
P.O. Box 912  
Jonesville, VA 24263  
276-346-7766

August 29, 2019

Ms. Tammy L. Breski  
Telecommunications and Broadband Specialist  
Virginia Department of Housing and Community Development  
600 E Main Street, Suite 300  
Richmond, VA 23219

RE: LENOWISCO Regional Broadband Expansion Phase I

Dear Ms. Breski:

I am writing in support of the LENOWISCO Planning District Commission's application for a Virginia Telecommunications Initiative (VATI) grant through the Virginia Department of Housing and Community Development (DHCD). This regional initiative, in cooperation with Scott County Telephone Cooperative (SCTC) and Powell Valley Electric Cooperative (PVEC), will generate an immediate and self-sustaining benefit to southwest Virginia. I would like to offer my strong support of the project.

The goal is to construct a Fiber-to-the-Premises project that will provide a broadband G-PON connection to support up to ten (10) gigabit of bandwidth to each customer site. If approved, the availability of broadband service will enhance Lee County's ability to operate more efficiently and attract new businesses, thus promoting economic development, improving the educational opportunities for all students and teachers, as well as improving the quality of life for each individual in the areas to be served. This VATI grant will be vital to the Fleenortown, Ocoonita, and Right Poor Valley communities in Lee County, and will pass 387 total residential locations.

I feel all partners involved are dedicated to meet the goals of the VATI Program in the vital deployment of broadband. I strongly support the application of the LENOWISCO Planning District and urge favorable consideration by the DHCD. Please feel free to contact anytime with questions.

Thank you for your time and consideration of these comments.



Sincerely,

A handwritten signature in blue ink that reads "Aaron Fee". The signature is written in a cursive style with a large initial 'A' and a stylized 'F'.

Aaron Fee  
Economic Development Director

cc: Mr. William J. Franklin, Scott County Telephone Cooperative  
Mr. Randell Meyers, Powell Valley Electric Cooperative  
Mr. Duane A. Miller, LENOWISCO

# Town Of Pennington Gap

528 Industrial Drive  
Pennington Gap, Virginia 24277  
www.townofpenningtonva.gov  
Phone 276-546-1177 • Fax 276-546-6328

MAYOR  
Larry W. Holbrook

COUNCIL  
Jill Carson  
Gary McElyea  
Jeff Martin  
Terry K. Pope  
Jimmy Warner



TOWN MANAGER  
Keith Harless  
keith.harless@townofpenningtonva.gov

TREASURER  
Tina Rowe  
treasurer@townofpenningtonva.gov

CLERK  
Karen Maggard  
info@townofpenningtonva.gov

August 23, 2019

Ms. Tammy L. Breski  
Telecommunications and Broadband Specialist  
Virginia Department of Housing and Community Development  
600 E Main Street, Suite 300  
Richmond, VA 23219

RE: LENOWISCO Regional Broadband Expansion Phase I

Dear Ms. Breski:

I am writing in support of the LENOWISCO Planning District Commission's application for a Virginia Telecommunications Initiative (VATI) grant through the Virginia Department of Housing and Community Development (DHCD). This regional initiative, in cooperation with Scott County Telephone Cooperative (SCTC) and Powell Valley Electric Cooperative (PVEC), will generate an immediate and self-sustaining benefit to southwest Virginia. I would like to offer my strong support of the project.

The goal is to construct a Fiber-to-the-Premises project that will provide a broadband G-PON connection to support up to ten (10) gigabit of bandwidth to each customer site. If approved, the availability of broadband service will enhance Lee County's ability to operate more efficiently and attract new businesses, thus promoting economic development, improving the educational opportunities for all students and teachers, as well as improving the quality of life for each individual in the areas to be served. This VATI grant will be vital to the Fleenortown, Ocoonita, and Right Poor Valley communities in Lee County, and will pass 387 total residential locations.

I feel all partners involved are dedicated to meet the goals of the VATI Program in the vital deployment of broadband. I strongly support the application of the LENOWISCO Planning District and urge favorable consideration by the DHCD. Please feel free to contact anytime with questions.

Thank you for your time and consideration of these comments.

Sincerely,

A handwritten signature in blue ink, appearing to read 'K. Harless', with a long horizontal stroke extending to the right.

Keith Harless  
Town of Pennington

cc: Mr. William J. Franklin, Scott County Telephone Cooperative  
Mr. Randell Meyers, Powell Valley Electric Cooperative  
Mr. Duane A. Miller, LENOWISCO

COMMONWEALTH OF VIRGINIA

HOUSE OF DELEGATES

RICHMOND



**TERRY G. KILGORE**

FIRST DISTRICT

COMMITTEE ASSIGNMENTS:  
COMMERCE AND LABOR (CHAIRMAN)  
COURTS OF JUSTICE  
RULES

August 23, 2019

Ms. Tammy L. Breski  
Telecommunications and Broadband Specialist  
Virginia Department of Housing and Community Development  
600 E Main Street, Suite 300  
Richmond, VA 23219

RE: LENOWISCO Regional Broadband Expansion Phase I

Dear Ms. Breski:

I am writing in support of the LENOWISCO Planning District Commission's application for a Virginia Telecommunications Initiative (VATI) grant through the Virginia Department of Housing and Community Development (DHCD). This regional initiative, in cooperation with Scott County Telephone Cooperative (SCTC) and Powell Valley Electric Cooperative (PVEC), will generate an immediate and self-sustaining benefit to southwest Virginia. I would like to offer my strong support of the project.

The goal is to construct a Fiber-to-the-Premises project that will provide a broadband G-PON connection to support up to ten (10) gigabit of bandwidth to each customer site. If approved, the availability of broadband service will enhance Lee County's ability to operate more efficiently and attract new businesses, thus promoting economic development, improving the educational opportunities for all students and teachers, as well as improving the quality of life for each individual in the areas to be served. This VATI grant will be vital to the Fleenortown, Ocoonita, and Right Poor Valley communities in Lee County, and will pass 387 total residential locations.

Ms. Tammy L. Breski  
August 23, 2019  
Page 2

I feel all partners involved are dedicated to meet the goals of the VATI Program in the vital deployment of broadband. I strongly support the application of the LENOWISCO Planning District and urge favorable consideration by the DHCD. Please feel free to contact anytime with questions.

Thank you for your time and consideration of these comments.

Sincerely,

A handwritten signature in black ink that reads "Terry G. Kilgore". The signature is written in a cursive style with a loop at the end of the last name.

TERRY G. KILGORE, MEMBER  
VIRGINIA HOUSE OF DELEGATES  
FIRST DISTRICT

cc: Mr. William J. Franklin, Scott County Telephone Cooperative  
Mr. Randell Meyers, Powell Valley Electric Cooperative  
Mr. Duane A. Miller, LENOWISCO



COMMONWEALTH OF VIRGINIA  
HOUSE OF DELEGATES  
RICHMOND

DR. TODD E. PILLION  
851 FRENCH MOORE JR. BLVD.  
SUITE 178  
ABINGDON, VIRGINIA 24210

FOURTH DISTRICT

COMMITTEE ASSIGNMENTS:  
TRANSPORTATION  
APPROPRIATIONS  
SCIENCE AND TECHNOLOGY

August 23, 2019

Ms. Tammy L. Breski  
Virginia Department of Housing and Community Development  
600 E Main Street, Suite 300  
Richmond, VA 23219

RE: LENOWISCO Regional Broadband Expansion Phase I

Dear Ms. Breski:

I am writing in support of the LENOWISCO Planning District Commission's application for a Virginia Telecommunications Initiative (VATI) grant through the Virginia Department of Housing and Community Development (DHCD). This regional initiative, in cooperation with Scott County Telephone Cooperative (SCTC) and Powell Valley Electric Cooperative (PVEC), will generate an immediate and self-sustaining benefit to southwest Virginia. I would like to offer my strong support of the project.

The goal is to construct a Fiber-to-the-Premises project that will provide a broadband G-PON connection to support up to ten (10) gigabit of bandwidth to each customer site. If approved, the availability of broadband service will enhance Lee County's ability to operate more efficiently and attract new businesses, thus promoting economic development, improving the educational opportunities for all students and teachers, as well as improving the quality of life for each individual in the areas to be served. This VATI grant will be vital to the Fleenortown, Ocoonita, and Right Poor Valley communities in Lee County, and will pass 387 total residential locations.

I feel all partners involved are dedicated to meet the goals of the VATI Program in the vital deployment of broadband. I strongly support the application of the LENOWISCO Planning District and urge favorable consideration by the DHCD. Please feel free to contact anytime with questions.

Sincerely,

A handwritten signature in cursive script that reads "Todd".

Todd Pillion  
Delegate, 4<sup>th</sup> District

cc: Mr. William J. Franklin, Scott County Telephone Cooperative  
Mr. Randell Meyers, Powell Valley Electric Cooperative  
Mr. Duane A. Miller, LENOWISCO

Attachment 9

Commitment of Matching Funds from Scott County Telephone Cooperative

*I hereby certify that \$526,976.00 in funds are available  
from Scott County Telephone Cooperative  
for the  
Lenowisco Planning District Commission's  
Virginia Telecommunications Initiative Grant Application  
thru the Virginia Department of Housing and Community Development  
(DHCD) for the Lenowisco Regional Broadband Expansion Phase I  
located in Lee County, Virginia.*

VATI Requested Amount:	\$	790,464.00
SCTC Cash on-Hand:	\$	<u>526,976.00</u>
	\$	1,317,440.00



*William J. Franklin*  
Chief Executive Officer  
Scott County Telephone Cooperative

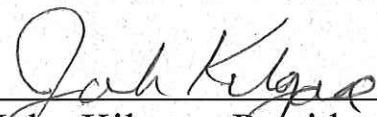
8-29-19


Date

## BOARD RESOLUTION

The Board of Directors of the Scott County Telephone Cooperative do hereby resolve to apply for **Virginia Department of Housing and Community Development Grants** in cooperation with the LENOWISCO Planning District and authorize Scott County Telephone Cooperative Chief Executive Officer William J. Franklin to sign on behalf of the corporation and accept responsibility for the accuracy of the application and for the appropriate use of funds, should they be granted.

This resolution was approved upon a motion by Director Bradford Bowen and duly seconded by Director William Johnson on August 12, 2019. The motion carried unopposed.

  
\_\_\_\_\_  
John Kilgore, President

  
\_\_\_\_\_  
John Ferguson, Secretary



## Attachment 10

### VATI FUNDING SOURCES TABLE

Please fill in the chart below with a description of the project funding source (local, federal, state, private, other), the amount from that source, the percentage of total project funding that source represents, and a description of the current status of the funds (pending, secured, etc.).

Source	Amount	%	Status
REQUESTED VATI	\$ 790,464.00	60%	Pending
Scott County Telephone Cooperative	\$ 526,976.00	40%	MATCHING FUNDS CASH ON HAND (SECURED)
	\$		
	\$		
	\$		
	\$		
	\$		
<b>TOTAL</b>	<b>\$1,317,440.000</b>	<b>100 %</b>	

CDBG Derivation of Cost

Product	Total	VATI	Non-VATI	Source of Estimate	Date
<b>EXAMPLE</b>					
<b>Construction</b>					
<i>200 LF of fiber @\$150/LF</i>	\$30,000	\$15,000	\$15,000	Company A	9/5/2016
<i>Tower</i>	\$100,000	\$80,000	\$20,000	Company B	9/5/2016
<i>Engineering</i>	\$20,000	\$0	\$20,000	ABC Engineering Firm	9/5/2016

Product	Total	VATI	Non-VATI	Source of Estimate	Date
Service Areas 1, 2, & 3	\$ -	\$ -	\$ -		
Outside Plant Construction Costs	\$ 900,740	\$ 540,444	\$ 360,296	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
Make-Ready Costs (Utility Poles)	\$ 90,200	\$ 54,120	\$ 36,080	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
Engineering	\$ 181,000	\$ 108,600	\$ 72,400	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
Central Office Electronics	\$ 46,600	\$ 27,960	\$ 18,640	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
PON Splitters	\$ 29,000	\$ 17,400	\$ 11,600	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
Customer Premise Electronics and Installation	\$ 69,900	\$ 41,940	\$ 27,960	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
<b>Total</b>	<b>\$ 1,317,440</b>	<b>\$ 790,464</b>	<b>\$ 526,976</b>	<b>W. Metts Engineering</b>	<b>8/29/2019</b>
	\$ -	\$ -	\$ -		

## **Attachment 12**

# **Documentation of Supporting Costs**

**SERVICE AREA 1 - RIGHT POOR VALLEY COST ESTIMATE**  
**COST ESTIMATE**  
**8/29/2019**

LOCATION	OSP COST	CO ELECTRONICS	CPE ELECTRONICS AND INSTALLATION	MAKE READY	ENGINEERING	PON Splitters	TOTAL
RIGHT POOR VALLEY	\$389,480.00	\$22,200.00	\$33,300.00	\$57,200.00	\$77,000.00	\$11,000.00	\$590,180.00

**NOTES:**

- 185 Customers
- 111
- OSP COST INCLUDES ALL MATERIAL AND LABOR TO INSTALL FIBER OPTIC CABLE AS SHOWN IN ATTACHMENT 1
- CO AND CPE ELECTRONICS REPRESENT 60% OF CUSTOMERS
- CPE and In-Home Install \$300
- CO Electronics Cost - \$200/Sub
- 400' Drop Average
- 60% Customer Take Rate
- 15.5 Miles Fiber
- \$0.45/ft for COAX Removal for 15,000' - \$7000
- 75-WC-1 Pole Rearrangements -ODP Poles - Contingency
- 5' Screw Anchors
- AFL-Style Clevis/Cushions
- 2 PON Cabinet/Site Prep
- Make Ready -\$200/Pole

**SERVICE AREA 2 - OCOONITA  
COST ESTIMATE  
8/29/2019**

LOCATION	OSP COST	CO ELECTRONICS	CPE ELECTRONICS AND INSTALLATION	MAKE READY	ENGINEERING	PON Splitters	TOTAL
Ocoonita	\$272,207.00	\$12,800.00	\$19,200.00	\$0.00	\$51,000.00	\$8,000.00	\$363,207.00

**NOTES:**

106 Customers

64

OSP COST INCLUDES ALL MATERIAL AND LABOR TO INSTALL FIBER OPTIC CABLE AS SHOWN IN ATTACHMENT 1

CO AND CPE ELECTRONICS REPRESENT 60% OF CUSTOMERS

CPE and In-Home Install \$300

CO Electronics Cost - \$200/Sub

400' Drop Average

60% Customer Take Rate

12 Miles Fiber

5' Screw Anchors

AFI-Style Clevis/Cushions

3 PON Cabinet/Site Prep

NO Anchors/Guys Proposed

**SERVICE AREA 3 - FLEENORTOWN  
COST ESTIMATE  
8/29/2019**

LOCATION	OSP COST	CO ELECTRONICS	CPE ELECTRONICS AND INSTALLATION	MAKE READY	ENGINEERING	PON Splitters	TOTAL
Fleenor Town	\$239,053.00	\$11,600.00	\$17,400.00	\$33,000.00	\$53,000.00	\$10,000.00	\$364,053.00

**NOTES:**

96 Customers

58

OSP COST INCLUDES ALL MATERIAL AND LABOR TO INSTALL FIBER OPTIC CABLE AS SHOWN IS ATTACHMENT 1

CO AND CPE ELECTRONICS REPRESENT 60% OF CUSTOMERS

CPE and In-Home Install \$300

CO Electronics Cost - \$200/Sub

400' Drop Average

60% Customer Take Rate

7.5 Miles Fiber

\$0.45/ft for COAX Removal for 15,000' - \$7000

75-WC-1 Pole Rearrangements -ODP Poles - Contingency

5' Screw Anchors

AFL-Style Clevis/Cushions

1 PON Cabinet/Site Prep

Make Ready \$200/Pole - ODP

**Attachment 13**

**Supporting Documentation of  
Cost Estimates**

Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

		Shanks Gap Equipment				
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price	
	<b>E7</b>					
000-00372	E7-2 Field Install Package (CO & ODC/RT): Shelf with Blank Card, FTA, and Field installation Kit		\$796.00	1	\$796.00	
	<b>E7-2 AXOS</b>					
100-04665	E7-2 GPON-8 r2 card	BVL3BA5FAA	\$9,096.50	1	\$9,096.50	
	<b>OIM 10GE Transport</b>					
100-01903	10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	2	\$2,396.00	
	<b>OIM GPON AXOS</b>					
100-05148	GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, I-Temp, AXOS	BVL3BAFFAA	\$696.50	4	\$2,786.00	

					<b>Shanks Gap Equipment Total</b>	\$15,074.50
--	--	--	--	--	-----------------------------------	-------------

		Shanks Gap Spares				
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price	
	<b>E7-2 AXOS</b>					
100-04665	E7-2 GPON-8 r2 card	BVL3BA5FAA	\$9,096.50	1	\$9,096.50	
	<b>OIM 10GE Transport</b>					
100-01903	10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	1	\$1,198.00	
	<b>OIM GPON AXOS</b>					
100-05148	GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, I-Temp, AXOS	BVL3BAFFAA	\$696.50	1	\$696.50	

					<b>Shanks Gap Spares Total</b>	\$10,991.00
--	--	--	--	--	--------------------------------	-------------

					<b>Shanks Gap Grand Total</b>	\$26,065.50
--	--	--	--	--	-------------------------------	-------------

**Package Details:**

000-00372 package consists of the following:

100-01449	E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card	1
100-01830	E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	1
100-03590	E7-2 Fan Tray Assembly 2 - FTA2	1



Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

Shanks Gap		Optional Items				
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price	
<b>Extended Warranty</b>						
110-01162	Extended Warranty - Upfront - 5 years for 100-04665		\$274.80	2	\$549.60	
110-01164	Extended Warranty - Upfront - 5 years for 100-01449		\$100.20	1	\$100.20	
<b>Shanks Gap Optional Items Total</b>					<b>\$649.80</b>	

Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

CO - Surgoinville Equipment					
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price
000-00372	<b>E7</b> E7-2 Field Install Package (CO & ODC/RT): Shelf with Blank Card, FTA, and Field installation Kit		\$796.00	3	\$2,388.00
100-04636	<b>E7-2 10G AXOS</b> E7-2 NGPON2-4 card	BVL3A95FAA	\$9,415.00	1	\$9,415.00
100-04665	<b>E7-2 AXOS</b> E7-2 GPON-8 r2 card	BVL3BA5FAA	\$9,096.50	3	\$27,289.50
100-01424	<b>OIM 10GE Transport</b> Direct Attach SFP/SFP+ copper cable, 0.5 m, 30AWG, I-Temp	BVPQAE5UAA	\$93.75	1	\$93.75
100-01903	<b>OIM 10G PON</b> 10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	2	\$2,396.00
100-04482	<b>OIM GPON AXOS</b> XGS-PON XFP, 10G/10G, 1577/1270nm, Single Fiber Transceiver, 20km, C-Temp (CO), OLT	BVL3A8DFAA	\$1,365.00	1	\$1,365.00
100-05148	GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, I-Temp, AXOS	BVL3BAFFAA	\$696.50	17	\$11,840.50
<b>CO - Surgoinville Equipment Total</b>					<b>\$54,787.75</b>
CO - Surgoinville Spares					
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price
100-04636	<b>E7-2 10G AXOS</b> E7-2 NGPON2-4 card	BVL3A95FAA	\$9,415.00	1	\$9,415.00
100-01424	<b>OIM 10GE Transport</b> Direct Attach SFP/SFP+ copper cable, 0.5 m, 30AWG, I-Temp	BVPQAE5UAA	\$93.75	1	\$93.75
100-01903	<b>OIM 10G PON</b> 10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	1	\$1,198.00
100-04482	XGS-PON XFP, 10G/10G, 1577/1270nm, Single Fiber Transceiver, 20km, C-Temp (CO), OLT	BVL3A8DFAA	\$1,365.00	1	\$1,365.00
<b>CO - Surgoinville Spares Total</b>					<b>\$12,071.75</b>
<b>CO - Surgoinville Grand Total</b>					<b>\$66,859.50</b>

Package Details:

000-00372 package consists of the following:

- 100-01449 E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card 1
- 100-01830 E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc) 1

## Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

100-03590 E7-2 Fan Tray Assembly 2 - FTA2

1

Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

CO - Surgoinsville Optional Items					
Calix Part #	Part Description	GLEI	Price	Qty	Extended Price
<b>Extended Warranty</b>					
110-01162	Extended Warranty - Upfront - 5 years for 100-04636		\$274.80	2	\$549.60
110-01162	Extended Warranty - Upfront - 5 years for 100-04665		\$274.80	3	\$824.40
110-01164	Extended Warranty - Upfront - 5 years for 100-01449		\$100.20	3	\$300.60
<b>CO - Surgoinsville Optional Items Total</b>					<b>\$1,674.60</b>

Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

Horton Rd(EXST) Equipment					
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price
	<b>OIM 10GE Transport</b>				
100-01903	10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	2	\$2,396.00
<b>Horton Rd(EXST) Equipment Total</b>					<b>\$2,396.00</b>
Horton Rd(EXST) Spares					
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price
	<b>OIM 10GE Transport</b>				
100-01903	10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	1	\$1,198.00
<b>Horton Rd(EXST) Spares Total</b>					<b>\$1,198.00</b>
<b>Horton Rd(EXST) Grand Total</b>					<b>\$3,594.00</b>

Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

Calix Part #	Part Description	ONTs and premises Equipment GLEI	Price	Qty	Extended Price
	<b>700GE-I ONT</b>				
100-05170	716GE-I Indoor ONT, 2 POTS, 4 GE -02	BVMHU00DRB	\$193.55	631	\$122,130.05
	<b>800 GigaPoint</b>				
100-04797	803Gv2 GigaPoint, 1 GE, 1 POTS -AM Type A Power Adapter	BVMCY10ARA	\$97.50	631	\$61,522.50
	<b>800 SG</b>				
000-00866	844E-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB -AM Type A Power Adapter		\$109.00	631	\$68,779.00
	<b>EXOS GigaCenter</b>				
100-05093	GS2026E GigaSPIRE MAX, Dual 11ax Wi-Fi, IoT and Voice Recognition -AM Type Power Adapter	BVMH200DRA	\$299.00	1	\$299.00
100-05147	GM1020 GigaMesh, Dual Wi-Fi, AM Power Adapter	BVMH500DRA	\$89.00	1	\$89.00
100-05202	GS2020E GigaSPIRE BLAST, Dual 11ax WiFi - AM Type Power Adapter	BVMH400DRA	\$199.00	1	\$199.00
	<b>ONT</b>				
100-04068	Indoor UPS, Wall Mount or Desktop, 12V 7.2AH 36W, Black - AM Type B Grounded		\$51.00	1	\$51.00
<b>ONTs and premises Equipment Total</b>					<b>\$253,069.55</b>
<b>ONTs and premises Grand Total</b>					<b>\$253,069.55</b>

Package Details:

000-00866 package consists of the following:

100-04015	844E-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB -Power Adapter Interface	1
100-04036	Power Adapter CPA5 12V 2.5Amp - AM Type A	1

Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

Calix Part #	Part Description	ONTs and premises Optional Items CLEI	Price	Qty	Extended Price
<b>Extended Warranty</b>					
110-01164	Extended Warranty - Upfront - 4 years for 100-05093		\$95.04	1	\$95.04
110-01164	Extended Warranty - Upfront - 4 years for 100-05202		\$95.04	1	\$95.04
110-01165	Extended Warranty - Upfront - 4 years for 100-04015		\$20.16	631	\$12,720.96
110-01165	Extended Warranty - Upfront - 4 years for 100-04797		\$20.16	631	\$12,720.96
110-01165	Extended Warranty - Upfront - 4 years for 100-05147		\$20.16	1	\$20.16
110-01165	Extended Warranty - Upfront - 4 years for 100-05170		\$20.16	631	\$12,720.96
<b>ONTs and premises Optional Items Total</b>					<b>\$38,373.12</b>

## Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

Equipment Summary					
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price
	<b>700GE-I ONT</b>				
100-05170	716GE-I Indoor ONT, 2 POTS, 4 GE -02	BVMHU00DRB	\$193.55	631	\$122,130.05
	<b>800 GigaPoint</b>				
100-04797	803Gv2 GigaPoint, 1 GE, 1 POTS -AM Type A Power Adapter	BVMCY10ARA	\$97.50	631	\$61,522.50
	<b>800 SG</b>				
000-00866	844E-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB -AM Type A Power Adapter		\$109.00	631	\$68,779.00
	<b>E7</b>				
000-00372	E7-2 Field Install Package (CO & ODC/RT): Shelf with Blank Card, FTA, and Field installation Kit		\$796.00	4	\$3,184.00
	<b>E7-2 10G AXOS</b>				
100-04636	E7-2 NGPON2-4 card	BVL3A95FAA	\$9,415.00	1	\$9,415.00
	<b>E7-2 AXOS</b>				
100-04665	E7-2 GPON-8 r2 card	BVL3BA5FAA	\$9,096.50	4	\$36,386.00
	<b>EXOS GigaCenter</b>				
100-05093	GS2026E GigaSPIRE MAX, Dual 11ax Wi-Fi, IoT and Voice Recognition -AM Type Power Adapter	BVMH200DRA	\$299.00	1	\$299.00
100-05147	GM1020 GigaMesh, Dual Wi-Fi, AM Power Adapter	BVMH500DRA	\$89.00	1	\$89.00
100-05202	GS2020E GigaSPIRE BLAST, Dual 11ax WiFi - AM Type Power Adapter	BVMH400DRA	\$199.00	1	\$199.00
	<b>EXOS ONT</b>				
100-04647	GP1000X GigaPointX, 1 10GE -AM Type Power Adapter	BVMGL00ARA	\$276.25	1	\$276.25
100-04810	GH3200X GigaHubX, 2 POTS, 1 10GE, 2 GE -AM Type Power Adapter	BVMGU00ARA	\$321.75	1	\$321.75
	<b>OIM 10GE Transport</b>				
100-01424	Direct Attach SFP/SFP+ copper cable, 0.5 m, 30AWG, I-Temp	BVPQAE5UAA	\$93.75	1	\$93.75
100-01903	10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	6	\$7,188.00
	<b>OIM 10G PON</b>				
100-04482	XGS-PON XFP, 10G/10G, 1577/1270nm, Single Fiber Transceiver, 20km, C-Temp (CO), OLT	BVL3A8DFAA	\$1,365.00	1	\$1,365.00
	<b>OIM GPON AXOS</b>				
100-05148	GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, I-Temp, AXOS ONT	BVL3BAFFAA	\$696.50	21	\$14,626.50



## Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

100-02042	PS 700GE-I Indoor 12V 100-240VAC 50/60Hz - 9 pin DIN - AM Type A Level VI C-temp RoHS	\$12.00	1	\$12.00
100-04068	Indoor UPS, Wall Mount or Desktop, 12V 7.2AH 36W, Black - AM Type B Grounded	\$51.00	1	\$51.00

**Equipment Total**      \$325,937.80

Spares Summary					
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price
	<b>E7-2 10G AXOS</b>				
100-04636	E7-2 NGPON2-4 card	BVL3A95FAA	\$9,415.00	1	\$9,415.00
	<b>E7-2 AXOS</b>				
100-04665	E7-2 GPON-8 r2 card	BVL3BA5FAA	\$9,096.50	1	\$9,096.50
	<b>OIM 10GE Transport</b>				
100-01424	Direct Attach SFP/SFP+ copper cable, 0.5 m, 30AWG, I-Temp	BVPQAE5UAA	\$93.75	1	\$93.75
100-01903	10GE SFP+, Single Mode dual fiber transceiver, 20Km, 1310nm, LC, I-Temp	BVL3AMCFAA	\$1,198.00	3	\$3,594.00
	<b>OIM 10G PON</b>				
100-04482	XGS-PON XFP, 10G/10G, 1577/1270nm, Single Fiber Transceiver, 20km, C-Temp (CO), OLT	BVL3A8DFAA	\$1,365.00	1	\$1,365.00
	<b>OIM GPON AXOS</b>				
100-05148	GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, I-Temp, AXOS	BVL3BAFFAA	\$696.50	1	\$696.50

**Spares Total**      \$24,260.75

Subscription Summary				
Calix Part #	Part Description	Quantity	Price	Extended Price
	<b>AXOS</b>			
110-01168	AXOS Software Maintenance (1 YR)			\$1,569.12
130-00402	AXOS Access Framework - Perpetual license	1001	\$8.43	\$8,438.43
130-00417	AXOS Aggregation Framework - Perpetual license	2002	\$1.01	\$2,022.02
	<b>EXOS</b>			
130-00419	EXOS Perpetual License - Perpetual License	50	\$30.00	\$1,500.00
	<b>null</b>			
110-01369	Annual Calix Smart Home and Business Subscription			\$225.00

**Subscription Total**      \$13,754.57

**Grand Total**      \$363,953.12

### Package Details:

000-00372 package consists of the following:

100-01449	E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card	1
-----------	---	---

## Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

100-01830	E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	1
100-03590	E7-2 Fan Tray Assembly 2 - FTA2	1
000-00866	package consists of the following:	
100-04015	844E-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB -Power Adapter Interface	1
100-04036	Power Adapter CPA5 12V 2.5Amp - AM Type A	1

### Notes & Optional Equipment and Services

All prices are being quoted in US \$ (Dollars).

Due to rounding, some totals may not correspond with the sum of the separate figures.

Unless specifically listed above, the order total shown does not reflect any charges related to shipping, taxes, insurance, customs duties or tariffs, which are the customer's sole responsibility. Unless specifically listed above, the actual freight charges incurred and related taxes will be added to your order at the time of shipping and will be reflected on your invoice. Equipment purchases are subject to our standard terms and conditions of sale, a copy of which can be found at the <https://www.calix.com/pages/terms-of-sale.html>, or (if applicable) the terms and conditions of a previously executed written sales agreement between us.

#### Calix Warranty Summary

With the exception of Premises Products (e.g. Optical Network Terminal equipment), Calix warrants its Products for five (5) years from the date of shipment. The warranty for Premises Products is one (1) year from date of shipment. Certain 3rd party products are not warranted by Calix. For these items we "pass-through" the manufacturer's warranty. For the complete Calix warranty policy please visit the Customer Service Page inside your Calix Customer Center and look for the RMA and Warranty information module. For a list of the 3rd party equipment and applicable warranties, please contact your Calix account manager.

#### Important Ordering Instructions:

Please include the Calix quote number (found in the upper right hand corner) on your PO. You may also provide an internal PO number to be used with your order. Orders received without an internal PO number will use the Calix quote number by default.

Include contact information (Name, Email & Tel) for the person who will receive the order acknowledgements and shipping notifications as well as the required billing and shipping addresses for your order.

Send Purchase Orders to Calix Order Management:

Email: [om@calix.com](mailto:om@calix.com)

Fax: 707-283-3771

You may check the status of your order at any time on our website. ([www.calix.com](http://www.calix.com), click Login)

## Calix Network Configuration & Quotation

Customer Name:	SCOTT COUNTY TELEPHONE COOP (VA)	Quote Reference Number:	612767A - 1
Project Name:	ERPS ring	Quote Type:	Access
Quote Description:	ERPS ring	Date Created:	February 14, 2019
Author Name:	Jonathan Shand	Date Modified:	February 19, 2019
Contact Name:		Quote Expiration:	March 16, 2019

Optional Items Summary						
Calix Part #	Part Description	CLEI	Price	Qty	Extended Price	
<b>Extended Warranty</b>						
110-01162	Extended Warranty - Upfront - 5 years for 100-04636		\$274.80	2	\$549.60	
110-01162	Extended Warranty - Upfront - 5 years for 100-04665		\$274.80	5	\$1,374.00	
110-01164	Extended Warranty - Upfront - 5 years for 100-01449		\$100.20	4	\$400.80	
110-01164	Extended Warranty - Upfront - 4 years for 100-05093		\$95.04	1	\$95.04	
110-01164	Extended Warranty - Upfront - 4 years for 100-05202		\$95.04	1	\$95.04	
110-01165	Extended Warranty - Upfront - 4 years for 100-04810		\$20.16	1	\$20.16	
110-01165	Extended Warranty - Upfront - 4 years for 100-04015		\$20.16	631	\$12,720.96	
110-01165	Extended Warranty - Upfront - 4 years for 100-04647		\$20.16	1	\$20.16	
110-01165	Extended Warranty - Upfront - 4 years for 100-04797		\$20.16	631	\$12,720.96	
110-01165	Extended Warranty - Upfront - 4 years for 100-05147		\$20.16	1	\$20.16	
110-01165	Extended Warranty - Upfront - 4 years for 100-05170		\$20.16	631	\$12,720.96	
<b>Optional Items Total</b>					<b>\$40,737.84</b>	

# SURGOINSVILLE FTTP PROJECT BID SHEET

## CONTRACTOR COMPARISON SHEET 10-15-2018

UNIT	DESCRIPTION	QTY	ERVIN CABLE		NICHOLS		APPALACHIAN UTILITIES	
			LABOR	LABOR EXTENDED	LABOR	LABOR EXTENDED	LABOR	LABOR EXTENDED
A35-4	35' POLE CLASS 4	15	\$390.00	\$5,850.00	\$325.00	\$4,875.00	\$400.00	\$6,000.00
A40-4	40' POLE CLASS 4	15	\$450.00	\$6,750.00	\$400.00	\$6,000.00	\$450.00	\$6,750.00
A45-3	45' POLE CLASS 3	15	\$490.00	\$7,350.00	\$425.00	\$6,375.00	\$520.00	\$7,800.00
BA3	Stub Pole	25	\$165.00	\$4,125.00	\$195.00	\$4,875.00	\$35.00	\$875.00
BDO4	8" PED Stake Mounted	25	\$75.00	\$1,875.00	\$110.00	\$2,750.00	\$75.00	\$1,875.00
BF012R	Buried 12 Fiber	920	\$7.70	\$7,084.00	\$5.25	\$4,830.00	\$3.00	\$2,760.00
BF012RLoop	Buried 12 Fiber Loop	32	\$1.00	\$32.00	\$1.80	\$57.60	\$3.00	\$96.00
BF024R	Buried 24 Fiber	1132	\$7.70	\$8,716.40	\$5.50	\$6,226.00	\$3.00	\$3,396.00
BF024RLoop	Buried 24 Fiber Loop	50	\$1.00	\$50.00	\$1.80	\$90.00	\$3.00	\$150.00
BF0288R	Buried 288 Fiber	654	\$7.70	\$5,035.80	\$6.50	\$4,251.00	\$3.00	\$1,962.00
BF0288R Loop	Buried 288 Fiber Loop	50	\$1.00	\$50.00	\$2.20	\$110.00	\$3.00	\$150.00
BF048R	Buried 48 Fiber	2535	\$7.70	\$19,519.50	\$5.75	\$14,576.25	\$3.00	\$7,605.00
BF048R Loop	Buried 48 Fiber Loop	50	\$1.00	\$50.00	\$2.00	\$100.00	\$3.00	\$150.00
BF096R	Buried 96 Fiber	3129	\$7.70	\$24,093.30	\$6.25	\$19,556.25	\$3.00	\$9,387.00
BF096R Loop	Buried 96 Fiber Loop	50	\$1.00	\$50.00	\$1.80	\$90.00	\$3.00	\$150.00
BM71	Rock Adder	150	\$35.00	\$5,250.00	\$22.00	\$3,300.00	\$10.00	\$1,500.00
BM60-(2)P	2" CASING BORE	1500	\$12.00	\$18,000.00	\$14.50	\$21,750.00	\$10.00	\$15,000.00
BM61(1) Drops	DRY BORE	150	\$5.50	\$825.00	\$14.50	\$2,175.00	\$8.00	\$1,200.00
BM53	FIBER MARKER	10	\$30.00	\$300.00	\$22.50	\$225.00	\$25.00	\$250.00

BM2	GROUND ROD	25	\$35.00	\$875.00	\$32.00	\$800.00	\$20.00	\$500.00
BM2A	GROUND ASSEMBLY	25	\$35.00	\$875.00	\$32.00	\$800.00	\$14.00	\$350.00
BM80	1" RISER GUARD	370	\$25.00	\$9,250.00	\$55.00	\$20,350.00	\$16.00	\$5,920.00
BM83	DROP RISER GUARD	317	\$15.00	\$4,755.00	12.5	\$3,962.50	\$8.00	\$2,536.00
CO12 (E)	AE 12 FIBER OPTIC CA (E)	90	\$0.80	\$72.00	1.05	\$94.50	\$1.10	\$99.00
CO12 10M	AE 10M 12 FIBER OPTIC CA	9982	\$1.40	\$13,974.80	1.5	\$14,973.00	\$1.90	\$18,965.80
CO12LOOP	AERIAL LOOP	2076	\$0.80	\$1,660.80	0.98	\$2,034.48	\$1.10	\$2,283.60
CO12R 10M	AE 10M 12 FIBER OPTIC RIBBON CA	62597	\$1.40	\$87,635.80	1.5	\$93,895.50	\$1.90	\$118,934.30
CO12RLOOP	AERIAL LOOP	14360	\$0.80	\$11,488.00	0.98	\$14,072.80	\$1.10	\$15,796.00
CO144R (E)	AE 144 FIBER OPTIC RIBBON CA	1131	\$0.80	\$904.80	0.98	\$1,108.38	\$1.10	\$1,244.10
CO144R 10M	AE 10M 144 FIBER OPTIC RIBBON CA	26723	\$1.40	\$37,412.20	1.75	\$46,765.25	\$1.90	\$50,773.70
CO144RLOOP	AERIAL LOOP	6457	\$0.80	\$5,165.60	0.98	\$6,327.86	\$1.10	\$7,102.70
CO216R (E)	AE 216 FIBER OPTIC RIBBON CA	150	\$0.80	\$120.00	1.3	\$195.00	\$1.10	\$165.00
CO216R 10M	AE 10M 216 FIBER OPTIC RIBBON CA	22275	\$1.40	\$31,185.00	1.75	\$38,981.25	\$1.90	\$42,322.50
CO216RLOOP	AERIAL LOOP	3806	\$0.80	\$3,044.80	0.98	\$3,729.88	\$1.10	\$4,186.60
CO24R 10M	AE 10M 24 FIBER OPTIC RIBBON CA	15296	\$1.40	\$21,414.40	1.55	\$23,708.80	\$1.90	\$29,062.40
CO24RLOOP	AERIAL LOOP	3814	\$0.80	\$3,051.20	0.98	\$3,737.72	\$1.10	\$4,195.40
CO288R (E)	AE 288 FIBER OPTIC RIBBON CA (E)	313	\$0.80	\$250.40	1.6	\$500.80	\$1.10	\$344.30
CO288R 10M	AE 10M 288 FIBER OPTIC RIBBON CA	20460	\$1.40	\$28,644.00	1.75	\$35,805.00	\$1.90	\$38,874.00
CO288RLOOP	AERIAL LOOP	4424	\$0.80	\$3,539.20	0.98	\$4,335.52	\$1.10	\$4,866.40
CO48R 10M	AE 10M 48 FIBER OPTIC RIBBON CA	25458	\$1.40	\$35,641.20	1.45	\$36,914.10	\$1.90	\$48,370.20
CO48RLOOP	AERIAL LOOP	4296	\$0.80	\$3,436.80	1.1	\$4,725.60	\$1.10	\$4,725.60
CO96 10M	AE 10M 96 FIBER OPTIC CA	174	\$1.40	\$243.60	1.65	\$287.10	\$1.90	\$330.60

CO96R (E)	AE 96 FIBER OPTIC RIBBON CA (E)	826	\$0.80	\$660.80	1.25	\$1,032.50	\$1.10	\$908.60
CO96R 10M	AE 10M 96 FIBER OPTIC RIBBON CA	38341	\$1.40	\$53,677.40	1.5	\$57,511.50	\$1.10	\$42,175.10
CO96R LOOP	AERIAL LOOP	8534	\$0.80	\$6,827.20	0.98	\$8,363.32	\$1.10	\$9,387.40
CO12R (A)	ADDITIONAL CO12R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	0.5	\$250.00	\$1.10	\$550.00
CO24R (A)	ADDITIONAL CO24R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	0.55	\$275.00	\$1.10	\$550.00
CO216R (A)	ADDITIONAL CO216R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	0.72	\$360.00	\$1.10	\$550.00
CO144R (A)	ADDITIONAL CO144R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	0.75	\$375.00	\$1.10	\$550.00
CO288R (A)	ADDITIONAL CO288R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	0.85	\$425.00	\$1.10	\$550.00
CO48R (A)	ADDITIONAL CO48R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	\$0.60	\$300.00	\$1.10	\$550.00
CO96R (A)	ADDITIONAL CO96R FIBER OPTIC RIBBON LASHED TO STRAND	500	\$0.40	\$200.00	\$0.68	\$340.00	\$1.10	\$550.00
HACO-6X17	PLP FIBER CLOSURE 6X17	209	\$150.00	\$31,350.00	2.45	\$51,205.00	\$205.00	\$42,845.00

HACO-6X22	PLP FIBER CLOSURE	153	\$150.00	\$22,950.00	210	\$32,130.00	\$208.00	\$31,824.00
HACO-9.5X28	PLP FIBER CLOSURE 9.5X28	90	\$150.00	\$13,500.00	175	\$15,750.00	\$215.00	\$19,350.00
	FIBER SPLICE	444	\$25.50	\$11,322.00	35	\$15,540.00	\$26.00	\$11,544.00
HO-1-D	FIBER SPLICE DROP	1271	\$27.50	\$34,952.50	32	\$40,672.00	\$65.00	\$82,615.00
	RIBBON SPLICE	374	\$150.00	\$56,100.00	169	\$63,206.00	\$130.00	\$48,620.00
PE1-3	DOWN GUY 10M	764	\$27.50	\$21,010.00	25	\$19,100.00	\$115.00	\$87,860.00
PE2-3	OVERHEAD GUY 10M	1411	\$75.00	\$105,825.00	82	\$115,702.00	\$140.00	\$197,540.00
PF1-5	10M ROD AND ANCHOR	750	\$150.00	\$112,500.00	165	\$123,750.00	\$250.00	\$187,500.00
PF5-3 (30")	5/8IN DIA. ROCK ANCHOR	25	\$145.00	\$3,625.00	250	\$6,250.00	\$300.00	\$7,500.00
	5/8IN DIA. ROCK ANCHOR	25	\$180.00	\$4,500.00	350	\$8,750.00	\$300.00	\$7,500.00
PF5-3 (84")	5/8IN DIA. ROCK ANCHOR	25	\$205.00	\$5,125.00	450	\$11,250.00	\$300.00	\$7,500.00
PM88 (1/2)	(1/2) SNOW SHOE PAIR	442	\$85.00	\$37,570.00	110	\$48,620.00	\$100.00	\$44,200.00
	GUY GUARD	1411	\$15.00	\$21,165.00	12.5	\$17,637.50	\$18.00	\$25,398.00
PM2	GROUND ROD	335	\$30.00	\$10,050.00	22.5	\$7,537.50	\$39.00	\$13,065.00
PM2A	GROUNDING ASSEMBLY	335	\$16.00	\$5,360.00	22.5	\$7,537.50	\$14.00	\$4,690.00
R3-1	TREE TRIMMING (3 Directional - 1')	25000	\$2.10	\$52,500.00	2.25	\$56,250.00	\$1.50	\$37,500.00
	TREE TRIMMING (1 Side - 5' to Ground)	10000	\$2.80	\$28,000.00	2.75	\$27,500.00	\$2.00	\$20,000.00
SEAF2	AERIAL 2 FIBER DROP	158007	\$0.80	\$126,405.60	\$0.95	\$150,106.65	\$1.00	\$158,007.00
SEAF2-10M	STRANDED AERIAL 2 FIBER DROP	7361	\$1.40	\$10,305.40	\$1.20	\$8,833.20	\$1.90	\$13,985.90

SEAF2-CLT	AERIAL 2 FIBER DROP CLEATED TO HOUSE	16000	\$1.00	\$16,000.00	\$0.98	\$15,680.00	\$1.00	\$16,000.00
SEAF2-E	LASHED 2 FIBER AERIAL DROP	18898	\$0.80	\$15,118.40	\$0.98	\$18,520.04	\$1.00	\$18,898.00
SEAF2Loop	2 FIBER DROP LOOP	70450	\$0.80	\$56,360.00	\$0.98	\$69,041.00	\$1.00	\$70,450.00
SEAF2Loop-HSE	2 FIBER DROP LOOP AT HSE	16000	\$0.80	\$12,800.00	\$0.98	\$15,680.00	\$1.00	\$16,000.00
SEBF2	BURIED 2 FIBER DROP	30647	\$2.50	\$76,617.50	\$2.15	\$65,891.05	\$1.00	\$30,647.00
SEBF2 Aerial	BURIED FIBER PLACED AERIALLY	24513	\$0.80	\$19,610.40	\$1.05	\$25,738.65	\$1.00	\$24,513.00
SEBF2 AerialLoop	BURIED FIBER PLACED AERIALLY LOOP	16168	\$0.80	\$12,934.40	\$0.98	\$15,844.64	\$1.00	\$16,168.00
SEBF2Loop	2 FIBER BURIED DROP LOOP	640	\$0.80	\$512.00	\$0.98	\$627.20	\$1.00	\$640.00
SEBF2-10M	STRANDED BURIED 2 FIBER DROP	2265	\$1.40	\$3,171.00	\$1.55	\$3,510.75	\$1.90	\$4,303.50
SEBF2-6M	STRANDED BURIED 2 FIBER DROP	12399	\$1.40	\$17,358.60	\$1.55	\$19,218.45	\$1.90	\$23,558.10
SEBF2-CLT	BURIED 2 FIBER DROP CLEATED TO HOUSE	3200	\$1.00	\$3,200.00	\$1.10	\$3,520.00	\$1.25	\$4,000.00
SEBF2-E	LASHED BURIED 2 FIBER DROP	5025	\$0.80	\$4,020.00	\$0.88	\$4,422.00	\$1.00	\$5,025.00
SEBF2Loop-HSE	2 FIBER DROP LOOP AT HSE	3200	\$0.80	\$2,560.00	\$0.88	\$2,816.00	\$1.00	\$3,200.00
W-C	CABLE REARRANGEMENT	1200	\$85.00	\$102,000.00	\$92.00	\$110,400.00	\$105.00	\$126,000.00
W-SAG	RESAG SPAN (EACH)	75	\$175.00	\$13,125.00	\$85.00	\$6,375.00	\$95.00	\$7,125.00
W-PE	REARRANGE GUY	50	\$75.00	\$3,750.00	\$45.00	\$2,250.00	\$75.00	\$3,750.00
W-RELASH	RELASH SPAN (FT)	5000	\$0.60	\$3,000.00	\$0.75	\$3,750.00	\$1.00	\$5,000.00



XX-PE2-2	REMOVE OVERHEAD GUY	10	\$75.00	\$750.00	\$45.00	\$450.00	\$28.00	\$280.00
XX-PE1-3	REMOVE DOWN GUY	10	\$70.00	\$700.00	\$25.00	\$250.00	\$28.00	\$280.00
XX-A35-4	REMOVE 35' POLE	10	\$110.00	\$1,100.00	\$95.00	\$950.00	\$130.00	\$1,300.00
XX-A40-4	REMOVE 40' POLE	10	\$110.00	\$1,100.00	\$95.00	\$950.00	\$130.00	\$1,300.00
XX-A45-3	REMOVE 45' POLE	10	\$110.00	\$1,100.00	\$95.00	\$950.00	\$130.00	\$1,300.00
XX-PF1-3	REMOVE ANCHOR	25	\$110.00	\$2,750.00	\$45.00	\$1,125.00	\$28.00	\$700.00
<b>TOTAL</b>				<b>\$1,565,963.80</b>		<b>\$1,744,836.59</b>		<b>\$1,954,806.80</b>



(RETAIN FOR YOUR RECORDS)  
Form 477 Filing Summary

FRN: 0002069862 | Data as of: Dec 31, 2018 | Operations: ILEC | Submission Status: Original - Submitted | Last Updated: Mar 6, 2019 17:14:28

**Filer Identification**

Section	Question	Response
Filer Information	Provider Name	Scott County Telephone Cooperative
	Holding Company Name	Scott County Telephone Cooperative
	SAC ID	190248
	499 ID	804426
Data Contact Information	Data Contact Name	Rebecca McDavid
	Data Contact Phone Number	(276) 452-7238
	Data Contact E-mail	rmcdavid@sctc.org
Emergency Operations Contact Information	Emergency Operations Name	Roger Fraysler
	Emergency Operations Phone Number	(423) 416-0649
	Emergency Operations E-mail	rfraysler@sctc.org
Certifying Official Contact Information	Certifying Official Name	Daniel Odom
	Certifying Official Phone Number	(276) 452-9119
	Certifying Official E-mail	dano@sctc.org

**Data Submitted**

Form Section	File Name	Date & Time	Number of Rows
Fixed Broadband Deployment	Fixed broadband census block.csv	Mar 6, 2019 16:58:14	1388
Fixed Broadband Subscription	SCTC broadband census subscriptions.csv	Mar 6, 2019 16:41:01	204
Fixed Voice Subscription	ILEC bus res access line count.csv	Mar 6, 2019 16:13:37	15

**Fixed Broadband Deployment**

Census Block Counts by State, DBA Name and Technology

State	DBA Name	Technology	Blocks
Tennessee	Scott County Telephone Cooperative	Asymmetric xDSL	2
		Optical Carrier/Fiber to the End User	69

State	DBA Name	Technology	Blocks
		Asymmetric xDSL	402
		Optical Carrier/Fiber to the End User	895
<b>Total</b>			<b>1368</b>

**Fixed  
Broadband  
Subscription**

Fixed Broadband Subscriptions by State, Technology and End-user Type

State	Technology	Census Tracts	Subscriptions		
			Consumer	Business / Govt	Total
Tennessee	Asymmetric xDSL	2	2	0	2
	Optical Carrier/Fiber to the End User	32	511	12	523
Virginia	Asymmetric xDSL	37	3316	79	3395
	Optical Carrier/Fiber to the End User	133	6268	529	6797
<b>Total</b>		<b>204</b>	<b>10097</b>	<b>620</b>	<b>10717</b>

Fixed Broadband Subscriptions by Bandwidths and End-user Type

Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
3.000	0.768	3005	275	3280
5.000	1.000	1099	68	1167
10.000	1.000	4060	66	4128
10.000	2.000	159	52	211
25.000	5.000	1675	115	1780
30.000	5.000	24	0	24
50.000	10.000	69	12	81
100.000	20.000	6	32	38
<b>Total</b>		<b>10097</b>	<b>620</b>	<b>10717</b>

Fixed Broadband Subscriptions by Technology, Bandwidths and End-user Type

Technology	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
Asymmetric xDSL	3.000	0.768	1250	39	1289
	5.000	1.000	500	11	511
	10.000	1.000	1448	18	1466
	10.000	2.000	79	4	83
	25.000	5.000	41	4	45
	100.000	20.000	0	3	3
Optical Carrier/Fiber to the End User	3.000	0.768	1755	236	1991

Technology	Downstream Bandwidth (In Mbps)	Upstream Bandwidth (In Mbps)	Consumer	Business / Govt	Total
	5.000	1.000	599	57	656
	10.000	1.000	2612	48	2660
	10.000	2.000	80	48	128
	25.000	5.000	1634	111	1745
	30.000	5.000	24	0	24
	50.000	10.000	69	12	81
	100.000	20.000	6	29	35
<b>Total</b>			<b>10097</b>	<b>620</b>	<b>10717</b>

**Fixed Voice Subscription**

VGE Lines and VoIP Subscriptions by State and End-user Type

State	Total VGE Lines	Consumer VGE Lines	Total VoIP Subscriptions	Consumer VoIP Subscriptions
Tennessee	68	68	0	0
Virginia	4913	4187	0	0
<b>Total</b>	<b>4981</b>	<b>4255</b>	<b>0</b>	<b>0</b>

**Fixed Voice Subscription (VGE Lines)**

VGE Lines Provided to Unaffiliated Providers by State

State	Wholesale	UNE-L
Tennessee	68	0
Virginia	4913	0
<b>Total</b>	<b>4981</b>	<b>0</b>

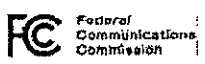
VGE Lines Provided to End Users by State, Bundle and Product Type

State	Total	by Bundle		by Product Type			
		Sold w/ Internet	Sold w/o Internet	Consumer		Bus-Govt	
				& No PIC	& PIC	& No PIC	& PIC
Tennessee	68	40	28	15	53	0	0
Virginia	4913	3023	1890	573	3614	358	388
<b>Total</b>	<b>4981</b>	<b>3063</b>	<b>1918</b>	<b>588</b>	<b>3667</b>	<b>358</b>	<b>388</b>

VGE Lines Provided to End Users by State, Ownership and Last-mile Medium

State	Total	by Ownership			by Last-mile Medium			
		Owned	UNE-L	Resale	FTTP	Coax	Fixed Wireless	Copper
Tennessee	68	68	0	0	61	0	0	7
Virginia	4913	4913	0	0	1756	0	0	3157

State	Total	by Ownership			by Last-mile Medium			
		Owned	UNE-L	Resale	FTP	Coax	Fixed Wireless	Copper
Total	4981	4981	0	0	1817	0	0	3164



(RETAIN FOR YOUR RECORDS)  
Form 477 Filing Summary

FRN: 0002069862 | Data as of: Jun 30, 2018 | Operations: ILEC | Submission Status: Original - Submitted | Last Updated: Aug 31, 2018 17:10:42

**Filer Identification**

Section	Question	Response
Filer Information	Provider Name	Scott County Telephone Cooperative
	Holding Company Name	Scott County Telephone Cooperative
	SAC ID	190248
	499 ID	804426
Data Contact Information	Data Contact Name	Rebecca McDavid
	Data Contact Phone Number	(276) 452-7238
	Data Contact E-mail	rmcdavid@sctc.org
Emergency Operations Contact Information	Emergency Operations Name	Roger Fraysier
	Emergency Operations Phone Number	(423) 416-0649
	Emergency Operations E-mail	rfraysier@sctc.org
Certifying Official Contact Information	Certifying Official Name	Daniel Odom
	Certifying Official Phone Number	(276) 452-9119
	Certifying Official E-mail	dano@sctc.org

**Data Submitted**

Form Section	File Name	Date & Time	Number of Rows
Fixed Broadband Deployment	Fixed Broadband Census Blocks June 2018.csv	Aug 31, 2018 17:08:49	1301
Fixed Broadband Subscription	Fixed Broadband subscription June 2018 .csv	Aug 31, 2018 16:04:52	193
Fixed Voice Subscription	Access Line Count June 2018.csv	Aug 31, 2018 15:37:28	15

**Fixed Broadband Deployment**

Census Block Counts by State, DBA Name and Technology

State	DBA Name	Technology	Blocks
Tennessee	Scott County Telephone Cooperative	Asymmetric xDSL	2
		Optical Carrier/Fiber to the End User	66

State	DBA Name	Technology	Blocks
		Asymmetric xDSL	404
		Optical Carrier/Fiber to the End User	829
<b>Total</b>			<b>1301</b>

**Fixed Broadband Subscription**

**Fixed Broadband Subscriptions by State, Technology and End-user Type**

State	Technology	Census Tracts	Subscriptions		
			Consumer	Business / Govt	Total
Tennessee	Asymmetric xDSL	2	2	0	2
	Optical Carrier/Fiber to the End User	30	501	9	510
Virginia	Asymmetric xDSL	37	3341	89	3430
	Optical Carrier/Fiber to the End User	124	6116	480	6596
<b>Total</b>		<b>193</b>	<b>9960</b>	<b>578</b>	<b>10538</b>

**Fixed Broadband Subscriptions by Bandwidths and End-user Type**

Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
3.000	0.768	3071	262	3333
5.000	1.000	1039	65	1104
10.000	1.000	4115	155	4270
10.000	2.000	173	51	224
20.000	4.000	1477	3	1480
30.000	5.000	22	0	22
50.000	10.000	57	10	67
100.000	20.000	6	32	38
<b>Total</b>		<b>9960</b>	<b>578</b>	<b>10538</b>

**Fixed Broadband Subscriptions by Technology, Bandwidths and End-user Type**

Technology	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
Asymmetric xDSL	3.000	0.768	1294	41	1335
	5.000	1.000	455	13	468
	10.000	1.000	1463	25	1508
	10.000	2.000	83	6	89
	20.000	4.000	28	0	28
	100.000	20.000	0	4	4
Optical Carrier/Fiber to the End User	3.000	0.768	1777	221	1998

Technology	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
	5,000	1,000	584	52	636
	10,000	1,000	2632	130	2762
	10,000	2,000	90	45	135
	20,000	4,000	1449	3	1452
	30,000	5,000	22	0	22
	50,000	10,000	57	10	67
	100,000	20,000	6	28	34
<b>Total</b>			<b>9980</b>	<b>578</b>	<b>10538</b>

**Fixed Voice Subscription**

VGE Lines and VoIP Subscriptions by State and End-user Type

State	Total VGE Lines	Consumer VGE Lines	Total VoIP Subscriptions	Consumer VoIP Subscriptions
Tennessee	69	69	0	0
Virginia	4960	4207	0	0
<b>Total</b>	<b>5029</b>	<b>4276</b>	<b>0</b>	<b>0</b>

**Fixed Voice Subscription (VGE Lines)**

VGE Lines Provided to Unaffiliated Providers by State

State	Wholesale	UNE-L
Tennessee	69	0
Virginia	4960	0
<b>Total</b>	<b>5029</b>	<b>0</b>

VGE Lines Provided to End Users by State, Bundle and Product Type

State	Total	by Bundle		by Product Type			
		Sold w/ Internet	Sold w/o Internet	Consumer		Bus-Govt	
				& No PIC	& PIC	& No PIC	& PIC
Tennessee	69	40	29	13	56	0	0
Virginia	4960	3133	1827	587	3620	372	381
<b>Total</b>	<b>5029</b>	<b>3173</b>	<b>1856</b>	<b>600</b>	<b>3676</b>	<b>372</b>	<b>381</b>

VGE Lines Provided to End Users by State, Ownership and Last-mile Medium

State	Total	by Ownership				by Last-mile Medium			
		Owned	UNE-L	Resale	FTTP	Coax	Fixed Wireless	Copper	
Tennessee	69	69	0	0	61	0	0	8	
Virginia	4960	4960	0	0	1669	0	0	3291	



State	Total	by Ownership			by Last-mile Medium			
		Owned	UNE-L	Resale	FTTP	Coax	Fixed Wireless	Copper
Total	5029	5029	0	0	1730	0	0	3299

Date Submitted: August 5, 2019

**LENOWISCO PLANNING DISTRICT COMMISSION  
PUBLIC NOTICE OF AND REQUEST FOR PUBLIC COMMENT**

Virginia Telecommunications Initiative (VATI) 2020 Application:

Effective immediately, notice is hereby given that the LENOWISCO Planning District Commission is requesting public comment on the proposed Virginia Telecommunications Initiative (VATI) Grant Application(s) for 2020. Comments will be accepted from August 5 through August 28, 2019.

Background / Summary:

The Virginia Department of Housing and Community Development (DHCD) has announced a competitive grant and application process to award \$19 million to eligible applicants to provide last-mile services to unserved areas in the Commonwealth. The primary objective of the VATI is to provide financial assistance to supplement construction costs by private sector broadband service providers, in partnership with local units of government to extend service to areas that are presently unserved by any broadband provider. Unserved areas are defined as having broadband speeds of less than 10 Mbps download and 1 Mbps upload or less. In addition, a proposed project area is considered eligible if 10% or less of serviceable units has access to service with no additional special construction costs from any provider as of the date of the application for the proposed project areas. Applications must be submitted by a unit of government (Towns, Cities, Counties, EDA/IDA, Broadband/Wireless Authorities, Planning District Commissions, etc.) with a private sector provider(s) as a co-applicant. Scott County Telephone Cooperative has agreed to collaborate as the private provider partner in the proposed project(s). This notice serves the localities of the LENOWISCO Planning District; Lee, Scott and Wise Counties and the City of Norton. Public comment is encouraged.

Submission of Comments:

Name: LENOWISCO Planning District Commission

Email: [lenowisco@lenowisco.org](mailto:lenowisco@lenowisco.org)

372 Technology Trail Lane

Suite 101

Duffield, VA 24244

Office Hours: 8:00 am to 4:30 pm

Phone: 276-431-2206 (For direct comment or to request assistance)

Virginia Relay Center for Voice/TTY service is available by calling 7-1-1

**Attachment 16**

**Scott County Telephone Cooperative  
Pro Forma 5-Year Financial Forecast – All Areas  
Pro Forma 5-Year Financial Forecast – Each Area  
Summary of Forecast Assumptions**

Pro Forma 5-Year Financial Forecast - All Areas  
Income Statement - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge			Forecast Period	
	2016	2017	2018	2019	2020	2021	2022	
<b>REVENUES</b>								
Broadband, Voice and Video	\$ 8,805,259	\$ 8,995,259	\$ 8,987,034	\$ 8,941,052	\$ 9,296,918	\$ 9,724,361	\$ 9,922,769	
Network Access Service Revenues	2,896,092	3,063,850	3,197,001	2,980,137	2,953,927	2,928,212	2,893,758	
Long distance	1,364,471	2,131,082	2,206,214	2,220,568	2,236,038	2,247,927	2,266,186	
Other Operating Revenues	2,420,794	2,341,423	3,091,423	3,184,166	3,279,691	3,528,081	3,753,081	
Uncollectible Revenues	(106,539)	(113,594)	(101,685)	(101,165)	(105,191)	(110,028)	(112,273)	
<b>Total Revenues</b>	<b>15,380,077</b>	<b>16,418,020</b>	<b>17,379,987</b>	<b>17,224,757</b>	<b>17,661,383</b>	<b>18,318,554</b>	<b>18,723,523</b>	
<b>EXPENSES</b>								
Plant Specific	2,592,175	2,721,990	3,012,465	3,262,465	3,520,546	3,891,754	4,203,365	
Plant Non-specific (excluding depreciation)	4,738,545	5,587,317	5,394,757	5,457,519	5,184,643	4,925,411	4,679,140	
Depreciation	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958	
Customer Operations and Corporate	3,262,060	3,341,927	3,341,058	3,374,469	3,408,213	3,442,295	3,476,718	
Other Operating	-	-	-	-	-	-	-	
<b>Total Expenses</b>	<b>14,376,101</b>	<b>15,122,269</b>	<b>15,289,308</b>	<b>15,741,712</b>	<b>16,116,079</b>	<b>16,695,837</b>	<b>17,110,182</b>	
<b>Net Operating</b>	<b>1,003,976</b>	<b>1,295,751</b>	<b>2,090,679</b>	<b>1,483,046</b>	<b>1,545,304</b>	<b>1,622,717</b>	<b>1,613,341</b>	
Nonoperating Net Income	29,744	55,764	20,435	20,639	20,846	21,054	21,265	
Interest Expense - Existing Debt	383,287	349,553	341,325	345,685	329,000	271,886	195,443	
AFUDC	-	57,709	49,863	50,362	50,865	51,374	51,888	
Income Taxes	664,934	291,871	529,852	545,748	562,120	578,984	596,353	
<b>Net Income (Loss)</b>	<b>38,610</b>	<b>767,800</b>	<b>1,289,800</b>	<b>662,614</b>	<b>725,895</b>	<b>844,275</b>	<b>894,697</b>	

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - All Areas  
Balance Sheet - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge			Forecast Period		
	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>ASSETS</b>									
Current Assets									
Cash	\$ 4,507,034	\$ 5,502,776	\$ 5,051,167	\$ 3,722,933	\$ 2,691,756	\$ 4,211,985	\$ 3,274,927		
Accounts Receivable	669,311	825,985	857,875	885,375	922,816	1,266,928	1,277,153		
Materials & Supplies	561,441	541,016	637,948	1,187,717	1,387,717	1,492,263	1,586,517		
Other current assets	160,778	179,950	166,918	168,587	170,273	171,976	173,696		
<b>Total Current Assets</b>	<b>5,898,564</b>	<b>7,049,727</b>	<b>6,713,908</b>	<b>5,964,612</b>	<b>5,172,562</b>	<b>7,143,151</b>	<b>6,312,293</b>		
Non-Current Assets									
Plant in Service	67,204,502	69,013,544	71,771,543	72,521,957	75,491,958	79,511,958	82,521,958		
Plant Under Construction	2,115,472	1,235,150	858,494	772,645	695,380	625,842	563,258		
Accumulated Depreciation - Other Assets	(41,677,732)	(44,822,110)	(47,418,335)	(51,085,994)	(55,068,271)	(59,504,648)	(64,255,606)		
Other Non-Current Assets	2,114,553	3,867,356	3,840,229	5,790,229	7,640,229	7,716,631	7,866,631		
<b>Total Non-Current Assets</b>	<b>29,756,795</b>	<b>29,293,940</b>	<b>29,051,931</b>	<b>28,019,237</b>	<b>28,759,296</b>	<b>28,349,784</b>	<b>26,696,241</b>		
<b>Total Assets</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,849</b>	<b>\$ 33,931,859</b>	<b>\$ 35,492,935</b>	<b>\$ 33,008,534</b>		
<b>LIABILITIES AND EQUITY</b>									
Current Liabilities									
Accounts Payable	\$ 861,100	\$ 867,577	\$ 1,001,875	\$ 1,437,979	\$ 1,287,979	\$ 1,137,979	\$ 987,979		
Current Portion - Existing Debt	1,403,000	1,857,000	1,874,085	1,776,634	689,948	689,948	973,840		
Other Current Liabilities	479,971	465,152	489,364	424,364	359,364	319,364	304,364		
<b>Total Current Liabilities</b>	<b>2,744,071</b>	<b>3,189,729</b>	<b>3,365,324</b>	<b>3,638,977</b>	<b>2,337,291</b>	<b>2,147,191</b>	<b>2,266,183</b>		
Non-Current Liabilities									
Existing Debt	9,654,364	9,089,048	7,889,338	9,173,435	9,968,487	10,298,638	7,819,798		
Other Non-Current Liabilities	3,594,901	4,703,179	4,966,758	1,150,356	1,075,356	900,356	425,356		
<b>Total Non-Current Liabilities</b>	<b>13,249,265</b>	<b>13,792,227</b>	<b>12,856,096</b>	<b>10,323,791</b>	<b>11,043,843</b>	<b>11,198,994</b>	<b>8,245,154</b>		
<b>Total Liabilities</b>	<b>15,993,336</b>	<b>16,981,956</b>	<b>16,222,020</b>	<b>13,962,768</b>	<b>13,381,134</b>	<b>13,346,185</b>	<b>10,511,337</b>		
Equity									
Capital Stock	103,404	102,874	101,932	106,128	109,878	113,628	117,378		
Accumulated other comprehensive income	(2,464,982)	(3,513,934)	(4,560,451)	(4,750,000)	(4,950,000)	(4,202,000)	(4,750,000)		
Patronage Capital Credits	22,023,601	22,772,771	24,002,338	24,664,952	25,390,847	26,235,122	27,129,819		
<b>Total Equity</b>	<b>19,662,023</b>	<b>19,361,711</b>	<b>19,543,819</b>	<b>20,021,080</b>	<b>20,550,725</b>	<b>22,146,750</b>	<b>22,497,197</b>		
<b>Total Liabilities and Equity</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,848</b>	<b>\$ 33,931,859</b>	<b>\$ 35,492,935</b>	<b>\$ 33,008,534</b>		

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - All Areas  
Cash Flows - VATI

	Historical			Bridge		Forecast Period	
	2016	2017	2018	2019	2020	2021	2022
<b>Beginning Cash \$</b>	<b>5,539,690</b>	<b>4,507,035</b>	<b>5,502,776</b>	<b>5,051,167</b>	<b>3,722,933</b>	<b>2,691,756</b>	<b>4,211,985</b>
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>							
Net Income (Loss)	38,610	767,800	1,289,800	662,614	725,895	844,275	894,697
Adjustments to Reconcile Net Income (Loss) to Net Cash From Operating Activities:							
Add: Depreciation -	-	-	-	-	-	-	-
Add: Depreciation - Other Assets	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958
Changes in Assets and Liabilities:							
Accounts Receivable	143,209	(156,674)	(31,890)	(27,500)	(37,441)	(344,112)	(10,225)
Materials & Supplies	(48,352)	20,425	(96,932)	(549,769)	(200,000)	(104,546)	(94,254)
Other Non-Current Assets	(31,943)	(19,172)	13,032	(1,669)	(1,686)	(1,703)	(1,720)
Accounts Payable	(1,012,691)	6,477	134,298	436,104	(150,000)	(150,000)	(150,000)
Other Current Liabilities	6,753	(14,819)	24,212	(162,451)	(1,151,686)	(40,100)	268,992
<b>Net Cash From Operating Activities</b>	<b>2,878,907</b>	<b>4,075,072</b>	<b>4,873,548</b>	<b>4,004,588</b>	<b>3,187,759</b>	<b>4,640,192</b>	<b>5,658,448</b>
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>							
Change in Memberships	-	-	-	4,196	3,750	3,750	3,750
Proceeds from VATI Grant	-	-	-	-	1,317,441	-	-
Repayments of Existing Debt	(1,480,896)	(1,511,316)	(1,771,540)	1,283,497	795,052	330,151	(2,478,840)
Payments of Patronage Capital Credits	-	(18,631)	(60,233)	-	-	-	-
Payments of Dividends	1,094,911	1,108,278	263,579	-	-	-	-
Other Cash Flows impacts other	(1,135,375)	(1,049,482)	(1,047,459)	(4,005,951)	(275,000)	573,000	(1,023,000)
<b>Net Cash From Financing Activities</b>	<b>(1,521,360)</b>	<b>(71,151)</b>	<b>(2,026,138)</b>	<b>(2,718,258)</b>	<b>1,841,243</b>	<b>906,901</b>	<b>(3,498,090)</b>
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>							
Capital Expenditures VATI Project	-	-	-	-	(1,317,441)	-	-
Capital Expenditures - Other	(2,435,733)	(1,255,376)	(3,326,146)	(664,564)	(2,892,738)	(3,950,462)	(2,947,416)
Grant Match - capital portion	-	-	-	-	-	-	-
Other Cash Flows from Investing	45,531	(1,752,803)	27,127	(1,950,000)	(1,850,000)	(78,402)	(150,000)
<b>Net Cash From Investing Activities</b>	<b>(2,390,202)</b>	<b>(3,008,179)</b>	<b>(3,299,019)</b>	<b>(2,614,564)</b>	<b>(6,060,179)</b>	<b>(4,026,864)</b>	<b>(3,097,416)</b>
<b>Increase (Decrease) in Cash</b>	<b>(1,032,656)</b>	<b>995,742</b>	<b>(451,609)</b>	<b>(1,328,234)</b>	<b>(1,031,177)</b>	<b>1,520,228</b>	<b>(937,058)</b>
<b>Ending Cash \$</b>	<b>4,507,035</b>	<b>5,502,776</b>	<b>5,051,167</b>	<b>3,722,933</b>	<b>2,691,756</b>	<b>4,211,985</b>	<b>3,274,927</b>

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Right Poor Valley  
Income Statement - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical		Bridge		Forecast Period		
	2016	2017	2018	2019	2020	2021	2022
<b>REVENUES</b>							
Broadband, Voice and Video	\$ 8,805,259	\$ 8,995,259	\$ 8,987,034	\$ 8,941,052	\$ 9,283,406	\$ 9,521,690	\$ 9,652,542
Network Access Service Revenues	2,896,092	3,063,850	3,197,001	2,980,137	2,953,927	2,928,212	2,893,758
Long distance	1,364,471	2,131,082	2,206,214	2,220,588	2,236,038	2,247,927	2,266,186
Other Operating Revenues	2,420,794	2,341,423	3,091,423	3,184,166	3,279,691	3,528,081	3,753,081
Uncollectible Revenues	(106,539)	(113,594)	(101,685)	(101,165)	(105,038)	(107,734)	(109,215)
<b>Total Revenues</b>	<b>15,380,077</b>	<b>16,418,020</b>	<b>17,379,987</b>	<b>17,224,757</b>	<b>17,648,024</b>	<b>18,118,177</b>	<b>18,456,353</b>
<b>EXPENSES</b>							
Plant Specific	2,592,175	2,721,990	3,012,465	3,262,465	3,516,328	3,824,270	4,051,526
Plant Non-specific (excluding depreciation)	4,738,545	5,587,317	5,394,757	5,457,519	5,184,643	4,925,411	4,679,140
Depreciation	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958
Customer Operations and Corporate	3,262,060	3,341,927	3,341,058	3,374,469	3,408,213	3,442,295	3,476,718
Other Operating	-	-	-	-	-	-	-
<b>Total Expenses</b>	<b>14,376,101</b>	<b>15,122,269</b>	<b>15,289,308</b>	<b>15,741,712</b>	<b>16,111,861</b>	<b>16,628,353</b>	<b>16,958,343</b>
<b>Net Operating</b>	<b>1,003,976</b>	<b>1,295,751</b>	<b>2,090,679</b>	<b>1,483,046</b>	<b>1,536,163</b>	<b>1,489,823</b>	<b>1,498,010</b>
Nonoperating Net Income	29,744	55,764	20,435	20,639	20,846	21,054	21,265
Interest Expense - Existing Debt	383,287	349,553	341,325	345,685	329,000	271,886	195,443
AFUDC	53,111	57,709	49,863	50,362	50,865	51,374	51,888
Income Taxes	664,934	291,871	529,852	545,748	562,120	578,984	596,353
<b>Net Income (Loss)</b>	<b>38,610</b>	<b>767,800</b>	<b>1,289,800</b>	<b>662,614</b>	<b>716,754</b>	<b>711,382</b>	<b>779,366</b>

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Right Poor Valley  
Balance Sheet - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge	Forecast Period		
	2016	2017	2018		2019	2020	2021
<b>ASSETS</b>							
<b>Current Assets</b>							
Cash	\$ 4,507,034	\$ 5,502,776	\$ 5,051,167	\$ 3,722,933	\$ 2,682,616	\$ 4,069,951	\$ 3,017,562
Accounts Receivable	669,311	825,985	857,875	885,375	922,816	1,266,928	1,277,153
Materials & Supplies	561,441	541,016	637,948	1,187,717	1,387,717	1,492,263	1,586,517
Other current assets	160,778	179,950	166,918	168,587	170,273	171,976	173,696
<b>Total Current Assets</b>	<b>5,898,564</b>	<b>7,049,727</b>	<b>6,713,908</b>	<b>5,964,612</b>	<b>5,163,422</b>	<b>7,001,117</b>	<b>6,054,928</b>
<b>Non-Current Assets</b>							
Plant in Service	67,204,502	69,013,544	71,771,543	72,521,957	75,491,958	79,511,958	82,521,958
Plant Under Construction	2,115,472	1,235,150	658,494	772,645	695,380	625,842	563,258
Accumulated Depreciation - Other Assets	(41,677,732)	(44,822,110)	(47,418,335)	(51,085,594)	(55,068,271)	(59,504,648)	(64,255,606)
Other Non-Current Assets	2,114,553	3,867,356	3,840,229	5,790,229	7,640,229	7,716,631	7,866,631
<b>Total Non-Current Assets</b>	<b>29,756,795</b>	<b>29,293,940</b>	<b>29,051,931</b>	<b>28,019,237</b>	<b>28,759,296</b>	<b>28,349,784</b>	<b>26,696,241</b>
<b>Total Assets</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,849</b>	<b>\$ 33,922,718</b>	<b>\$ 35,350,901</b>	<b>\$ 32,751,169</b>
<b>LIABILITIES AND EQUITY</b>							
<b>Current Liabilities</b>							
Accounts Payable	\$ 861,100	\$ 867,577	\$ 1,001,875	\$ 1,437,979	\$ 1,287,979	\$ 1,137,979	\$ 987,979
Current Portion - Existing Debt	1,403,000	1,857,000	1,874,085	1,776,634	689,948	689,848	973,840
Other Current Liabilities	479,971	465,152	489,364	424,364	359,364	319,364	304,364
<b>Total Current Liabilities</b>	<b>2,744,071</b>	<b>3,189,729</b>	<b>3,365,324</b>	<b>3,638,977</b>	<b>2,337,291</b>	<b>2,147,191</b>	<b>2,266,183</b>
<b>Non-Current Liabilities</b>							
Existing Debt	9,654,364	9,089,048	7,889,898	9,173,435	9,968,487	10,298,638	7,819,798
Other Non-Current Liabilities	3,594,901	4,703,179	4,966,758	1,150,356	1,075,356	900,356	425,356
<b>Total Non-Current Liabilities</b>	<b>13,249,265</b>	<b>13,792,227</b>	<b>12,856,696</b>	<b>10,323,791</b>	<b>11,043,843</b>	<b>11,198,994</b>	<b>8,245,154</b>
<b>Total Liabilities</b>	<b>15,993,336</b>	<b>16,981,956</b>	<b>16,222,020</b>	<b>13,962,768</b>	<b>13,381,134</b>	<b>13,346,185</b>	<b>10,511,337</b>
<b>Equity</b>							
Capital Stock	103,404	102,874	101,932	106,128	109,878	113,628	117,378
Accumulated other comprehensive income	(2,464,982)	(3,513,934)	(4,560,451)	(4,750,000)	(4,950,000)	(4,202,000)	(4,750,000)
Patronage Capital Credits	22,023,601	22,772,771	24,002,338	24,664,952	25,381,706	26,093,088	26,872,454
<b>Total Equity</b>	<b>19,662,023</b>	<b>19,361,711</b>	<b>19,543,819</b>	<b>20,021,080</b>	<b>20,541,584</b>	<b>22,004,716</b>	<b>22,239,832</b>
<b>Total Liabilities and Equity</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,848</b>	<b>\$ 33,922,718</b>	<b>\$ 35,350,901</b>	<b>\$ 32,751,169</b>

See summary of significant forecast assumptions and accounting policies and accountant's report.



Pro Forma 5-Year Financial Forecast - Right Poor Valley  
Cash Flows - VATI

	Historical			Bridge			Forecast Period	
	2016	2017	2018	2019	2020	2021	2022	
<b>Beginning Cash \$</b>	<b>5,539,690</b>	<b>4,507,035</b>	<b>5,502,776</b>	<b>5,051,167</b>	<b>3,722,933</b>	<b>2,682,616</b>	<b>\$ 4,069,951</b>	
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>								
Net Income (Loss)	38,610	767,800	1,289,800	662,614	716,754	711,382	779,366	
Adjustments to Reconcile Net Income (Loss) to Net Cash From Operating Activities:								
Add: Depreciation -	-	-	-	-	-	-	-	
Add: Depreciation - Other Assets	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958	
Changes in Assets and Liabilities:								
Accounts Receivable	143,209	(156,674)	(31,890)	(27,500)	(37,441)	(344,112)	(10,225)	
Materials & Supplies	(48,352)	20,425	(96,932)	(549,769)	(200,000)	(104,546)	(94,254)	
Other Non-Current Assets		(19,172)	13,032	(1,669)	(1,686)	(1,703)	(1,720)	
Accounts Payable	(1,012,691)	6,477	134,298	436,104	(150,000)	(150,000)	(150,000)	
Other Current Liabilities	6,753	(14,819)	24,212	(162,451)	(1,151,686)	(40,100)	268,992	
<b>Net Cash From Operating Activities</b>	<b>2,878,907</b>	<b>4,075,072</b>	<b>4,873,548</b>	<b>4,004,588</b>	<b>3,178,618</b>	<b>4,507,298</b>	<b>5,543,118</b>	
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>								
Change in Memberships	-	-	-	4,196	-	-	-	
Proceeds from VATI Grant	-	1,400,000	589,515	-	590,180	3,750	3,750	
Proceeds from Existing Debt	-	(1,511,316)	(1,771,540)	1,283,497	795,052	330,151	(2,478,840)	
Repayments of Existing Debt	(1,480,896)	(18,631)	(60,233)	-	-	-	-	
Payments of Patronage Capital Credits	1,094,911	1,108,278	263,579	-	-	-	-	
Payments of Dividends	(1,135,375)	(1,049,482)	(1,047,459)	(4,005,951)	(275,000)	573,000	(1,023,000)	
Other Cash Flows impacts other								
<b>Net Cash From Financing Activities</b>	<b>(1,521,360)</b>	<b>(71,151)</b>	<b>(2,026,138)</b>	<b>(2,718,258)</b>	<b>1,113,982</b>	<b>906,901</b>	<b>(3,498,090)</b>	
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>								
Capital Expenditures VATI Project	-	-	-	-	(590,180)	-	-	
Capital Expenditures - Other	(2,435,733)	(1,255,376)	(3,326,146)	(664,564)	(2,892,738)	(3,950,462)	(2,947,416)	
Grant Match - capital portion	45,531	(1,752,803)	27,127	(1,950,000)	(1,850,000)	(76,402)	(150,000)	
Other Cash Flows from Investing								
<b>Net Cash From Investing Activities</b>	<b>(2,390,202)</b>	<b>(3,008,179)</b>	<b>(3,299,019)</b>	<b>(2,614,564)</b>	<b>(5,332,918)</b>	<b>(4,026,864)</b>	<b>(3,097,416)</b>	
<b>Increase (Decrease) in Cash</b>	<b>(1,032,656)</b>	<b>995,742</b>	<b>(451,609)</b>	<b>(1,328,234)</b>	<b>(1,040,318)</b>	<b>1,387,335</b>	<b>(1,052,388)</b>	
<b>Ending Cash \$</b>	<b>4,507,035</b>	<b>5,502,776</b>	<b>5,051,167</b>	<b>3,722,933</b>	<b>2,682,616</b>	<b>\$ 4,069,951</b>	<b>\$ 3,017,562</b>	

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Ocoonita  
Income Statement - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge		Forecast Period	
	2016	2017	2018	2019	2020	2021	2022
<b>REVENUES</b>							
Broadband, Voice and Video	\$ 8,805,259	\$ 8,995,259	\$ 8,987,034	\$ 8,941,052	\$ 9,278,122	\$ 9,442,428	\$ 9,546,859
Network Access Service Revenues	2,896,092	3,063,850	3,197,001	2,980,137	2,953,927	2,928,212	2,893,758
Long distance	1,384,471	2,131,082	2,206,214	2,220,568	2,236,038	2,247,927	2,266,186
Other Operating Revenues	2,420,794	2,341,423	3,091,423	3,184,166	3,279,691	3,528,081	3,753,081
Uncollectible Revenues	(106,539)	(113,594)	(101,685)	(101,165)	(104,979)	(106,838)	(108,019)
<b>Total Revenues</b>	<b>15,380,077</b>	<b>16,418,020</b>	<b>17,379,987</b>	<b>17,224,757</b>	<b>17,642,800</b>	<b>18,039,811</b>	<b>18,351,865</b>
<b>EXPENSES</b>							
Plant Specific	2,592,175	2,721,990	3,012,465	3,262,465	3,514,678	3,797,877	3,992,143
Plant Non-specific (excluding depreciation)	4,738,545	5,587,317	5,394,757	5,457,519	5,184,643	4,925,411	4,679,140
Depreciation	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958
Customer Operations and Corporate	3,262,060	3,341,927	3,341,058	3,374,469	3,408,213	3,442,295	3,476,718
Other Operating	-	-	-	-	-	-	-
<b>Total Expenses</b>	<b>14,376,101</b>	<b>15,122,269</b>	<b>15,289,308</b>	<b>15,741,712</b>	<b>16,110,212</b>	<b>16,601,961</b>	<b>16,898,960</b>
<b>Net Operating</b>	<b>1,003,976</b>	<b>1,295,751</b>	<b>2,090,679</b>	<b>1,483,046</b>	<b>1,532,588</b>	<b>1,437,850</b>	<b>1,452,906</b>
Nonoperating Net Income	29,744	55,764	20,435	20,639	20,846	21,054	21,265
Interest Expense - Existing Debt	383,287	349,553	341,325	345,685	329,000	271,886	195,443
AFUDC	-	57,709	49,863	50,362	50,865	51,374	51,888
Income Taxes	684,934	291,871	529,852	545,748	562,120	578,984	596,353
<b>Net Income (Loss)</b>	<b>\$ 38,610</b>	<b>\$ 767,800</b>	<b>\$ 1,289,800</b>	<b>\$ 662,614</b>	<b>\$ 713,179</b>	<b>\$ 659,409</b>	<b>\$ 734,262</b>

Pro Forma 5-Year Financial Forecast - Ooononita  
Balance Sheet - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge			Forecast Period		
	2016	2017	2018	2019	2020	2021	2022		
<b>ASSETS</b>									
Current Assets									
Cash	\$ 4,507,034	\$ 5,502,776	\$ 5,051,167	\$ 3,722,933	\$ 2,679,041	\$ 4,014,403	\$ 2,916,910		
Accounts Receivable	669,311	825,965	857,875	885,375	922,816	1,266,928	1,277,153		
Materials & Supplies	561,441	541,016	637,943	1,187,717	1,387,717	1,492,263	1,586,517		
Other current assets	160,778	179,950	166,918	168,587	170,273	171,976	173,696		
<b>Total Current Assets</b>	<b>5,898,564</b>	<b>7,049,727</b>	<b>6,713,908</b>	<b>5,984,612</b>	<b>5,159,847</b>	<b>6,945,569</b>	<b>5,954,275</b>		
Non-Current Assets									
Plant in Service	67,204,502	69,013,544	71,771,543	72,521,957	75,491,958	79,511,958	82,521,958		
Plant Under Construction	2,115,472	1,235,150	858,494	772,645	695,380	625,842	563,258		
Accumulated Depreciation - Other Assets	(41,677,732)	(44,822,110)	(47,418,335)	(51,085,594)	(55,068,271)	(59,504,648)	(64,255,606)		
Other Non-Current Assets	2,114,563	3,867,356	3,840,229	5,790,229	7,640,229	7,716,631	7,866,631		
<b>Total Non-Current Assets</b>	<b>29,756,795</b>	<b>29,293,940</b>	<b>29,051,931</b>	<b>28,019,237</b>	<b>28,759,296</b>	<b>28,349,784</b>	<b>26,696,241</b>		
<b>Total Assets</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,849</b>	<b>\$ 33,919,143</b>	<b>\$ 35,295,353</b>	<b>\$ 32,650,517</b>		
<b>LIABILITIES AND EQUITY</b>									
Current Liabilities									
Accounts Payable	\$ 861,100	\$ 867,577	\$ 1,001,875	\$ 1,437,979	\$ 1,287,979	\$ 1,137,979	\$ 987,979		
Current Portion - Existing Debt	1,403,000	1,857,000	1,874,085	1,776,634	689,948	689,848	973,840		
Other Current Liabilities	479,971	465,152	489,364	424,364	359,364	319,364	304,364		
<b>Total Current Liabilities</b>	<b>2,744,071</b>	<b>3,189,729</b>	<b>3,365,324</b>	<b>3,638,977</b>	<b>2,337,291</b>	<b>2,147,191</b>	<b>2,266,183</b>		
Non-Current Liabilities									
Existing Debt	9,654,364	9,089,048	7,889,938	9,173,435	9,968,487	10,298,638	7,819,798		
Other Non-Current Liabilities	3,594,901	4,703,179	4,966,758	1,150,356	1,075,356	900,356	425,356		
<b>Total Non-Current Liabilities</b>	<b>13,249,265</b>	<b>13,792,227</b>	<b>12,856,696</b>	<b>10,323,791</b>	<b>11,043,843</b>	<b>11,198,994</b>	<b>8,245,154</b>		
<b>Total Liabilities</b>	<b>15,993,336</b>	<b>16,981,956</b>	<b>16,222,020</b>	<b>13,962,768</b>	<b>13,381,134</b>	<b>13,346,185</b>	<b>10,511,337</b>		
Equity									
Capital Stock	103,404	102,874	101,932	106,128	109,878	113,628	117,378		
Accumulated other comprehensive income	(2,464,982)	(3,513,934)	(4,560,451)	(4,750,000)	(4,950,000)	(4,202,000)	(4,750,000)		
Patronage Capital Credits	22,023,601	22,772,771	24,002,338	24,664,952	25,378,131	26,037,540	26,771,802		
<b>Total Equity</b>	<b>19,662,023</b>	<b>19,361,711</b>	<b>19,543,819</b>	<b>20,021,080</b>	<b>20,538,009</b>	<b>21,949,168</b>	<b>22,139,180</b>		
<b>Total Liabilities and Equity</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,848</b>	<b>\$ 33,919,143</b>	<b>\$ 35,295,353</b>	<b>\$ 32,650,517</b>		

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Ocoonita  
Cash Flows - VATI

	Historical			Bridge			Forecast Period	
	2016	2017	2018	2019	2020	2021	2022	
<b>Beginning Cash \$</b>	<b>5,539,690</b>	<b>4,507,035</b>	<b>5,502,776</b>	<b>5,051,167</b>	<b>3,722,933</b>	<b>2,679,041</b>	<b>\$ 4,014,403</b>	
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>								
Net Income (Loss)	38,610	767,800	1,289,800	662,614	713,179	659,409	734,262	
Adjustments to Reconcile Net Income (Loss) to Net Cash From Operating Activities:								
Add: Depreciation -	-	-	-	-	-	-	-	
Add: Depreciation - Other Assets	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958	
Changes in Assets and Liabilities:								
Accounts Receivable	143,209	(156,674)	(31,890)	(27,500)	(37,441)	(344,112)	(10,225)	
Materials & Supplies	(48,352)	20,425	(96,932)	(549,769)	(200,000)	(104,546)	(94,254)	
Other Non-Current Assets	(31,943)	(19,172)	(13,032)	(1,669)	(1,686)	(1,703)	(1,720)	
Accounts Payable	(1,012,691)	6,477	134,298	436,104	(150,000)	(150,000)	(150,000)	
Other Current Liabilities	6,753	(14,819)	24,212	(162,451)	(1,151,686)	(40,100)	268,992	
<b>Net Cash From Operating Activities</b>	<b>2,878,907</b>	<b>4,075,072</b>	<b>4,873,548</b>	<b>4,004,588</b>	<b>3,175,043</b>	<b>4,455,325</b>	<b>5,498,013</b>	
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>								
Change in Memberships	-	-	-	4,196	3,750	3,750	3,750	
Proceeds from VATI Grant	-	-	-	-	363,208	-	-	
Repayments of Existing Debt	-	1,400,000	589,515	-	-	-	-	
Payments of Patronage Capital Credits	(1,480,896)	(1,511,316)	(1,771,540)	1,283,497	795,052	330,151	(2,478,840)	
Payments of Dividends	1,094,911	1,108,278	263,579	-	-	-	-	
Other Cash Flows Impacts other	(1,195,375)	(1,049,482)	(1,047,459)	(4,005,951)	(275,000)	573,000	(1,023,000)	
<b>Net Cash From Financing Activities</b>	<b>(1,521,360)</b>	<b>(71,151)</b>	<b>(2,026,138)</b>	<b>(2,718,258)</b>	<b>887,010</b>	<b>906,901</b>	<b>(3,498,090)</b>	
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>								
Capital Expenditures VATI Project	-	-	-	-	(363,208)	-	-	
Capital Expenditures - Other	(2,435,733)	(1,255,376)	(3,326,146)	(664,564)	(2,892,738)	(3,950,462)	(2,947,416)	
Grant Match - capital portion	45,531	(1,752,803)	27,127	(1,950,000)	(1,850,000)	(76,402)	(150,000)	
Other Cash Flows from Investing	-	-	-	-	-	-	-	
<b>Net Cash From Investing Activities</b>	<b>(2,390,202)</b>	<b>(3,008,179)</b>	<b>(3,299,019)</b>	<b>(2,614,564)</b>	<b>(5,105,946)</b>	<b>(4,026,864)</b>	<b>(3,097,416)</b>	
<b>Increase (Decrease) in Cash</b>	<b>(1,032,656)</b>	<b>995,742</b>	<b>(451,609)</b>	<b>(1,328,234)</b>	<b>(1,043,892)</b>	<b>1,335,362</b>	<b>(1,097,493)</b>	
<b>Ending Cash \$</b>	<b>4,507,035</b>	<b>5,507,776</b>	<b>5,051,167</b>	<b>3,722,933</b>	<b>\$ 2,679,041</b>	<b>\$ 4,014,403</b>	<b>\$ 2,916,910</b>	

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Fleenor Town  
Income Statement - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge		Forecast Period	
	2016	2017	2018	2019	2020	2021	2022
<b>REVENUES</b>							
Broadband, Voice and Video	\$ 8,805,259	\$ 8,995,259	\$ 8,987,034	\$ 8,941,082	\$ 9,277,453	\$ 9,432,395	\$ 9,533,481
Network Access Service Revenues	2,896,092	3,063,850	3,197,001	2,980,137	2,953,927	2,928,212	2,893,758
Long distance	1,384,471	2,131,082	2,206,214	2,220,568	2,236,038	2,247,927	2,266,186
Other Operating Revenues	2,420,794	2,341,423	3,091,423	3,184,166	3,279,691	3,528,081	3,753,081
Uncollectible Revenues	(106,539)	(113,594)	(101,685)	(101,165)	(104,971)	(106,724)	(107,868)
<b>Total Revenues</b>	<b>15,380,077</b>	<b>16,418,020</b>	<b>17,379,987</b>	<b>17,224,757</b>	<b>17,642,138</b>	<b>18,029,891</b>	<b>18,338,639</b>
<b>EXPENSES</b>							
Plant Specific	2,592,175	2,721,990	3,012,465	3,262,465	3,514,469	3,794,537	3,984,626
Plant Non-specific (excluding depreciation)	4,738,545	5,587,317	5,394,757	5,457,519	5,184,643	4,925,411	4,679,140
Depreciation	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958
Customer Operations and Corporate	3,262,060	3,341,927	3,341,058	3,374,469	3,408,213	3,442,295	3,476,718
Other Operating	-	-	-	-	-	-	-
<b>Total Expenses</b>	<b>14,376,101</b>	<b>15,122,269</b>	<b>15,289,308</b>	<b>15,741,712</b>	<b>16,110,003</b>	<b>16,598,620</b>	<b>16,891,443</b>
<b>Net Operating</b>	<b>1,003,976</b>	<b>1,295,751</b>	<b>2,090,679</b>	<b>1,483,046</b>	<b>1,532,135</b>	<b>1,431,271</b>	<b>1,447,196</b>
Nonoperating Net Income	29,744	55,764	20,435	20,639	20,846	21,054	21,265
Interest Expense - Existing Debt	383,287	349,553	341,325	345,685	329,000	271,886	195,443
AFUDC	-	-	-	-	-	-	-
Income Taxes	664,934	291,871	529,852	545,748	562,120	578,984	596,353
<b>Net Income (Loss)</b>	<b>38,610</b>	<b>767,800</b>	<b>1,289,800</b>	<b>662,614</b>	<b>712,726</b>	<b>652,830</b>	<b>728,552</b>

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Fleenor Town  
Balance Sheet - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical			Bridge	Forecast Period		
	2016	2017	2018		2019	2020	2021
<b>ASSETS</b>							
<b>Current Assets</b>							
Cash	\$ 4,507,034	\$ 5,502,776	\$ 5,051,167	\$ 3,722,933	\$ 2,678,588	\$ 4,007,371	\$ 2,904,169
Accounts Receivable	669,311	825,985	857,875	885,375	922,816	1,266,928	1,277,153
Materials & Supplies	561,441	541,016	637,948	1,187,717	1,387,717	1,492,263	1,586,517
Other current assets	160,778	179,950	166,918	168,587	170,273	171,976	173,686
<b>Total Current Assets</b>	<b>5,898,564</b>	<b>7,049,727</b>	<b>6,713,908</b>	<b>5,964,612</b>	<b>5,159,394</b>	<b>6,938,538</b>	<b>5,941,535</b>
<b>Non-Current Assets</b>							
Plant in Service	67,204,502	69,013,544	71,771,543	72,521,957	75,491,958	79,511,958	82,521,958
Plant Under Construction	2,115,472	1,235,150	858,494	772,645	695,380	625,842	563,258
Accumulated Depreciation - Other Assets	(41,677,732)	(44,822,110)	(47,418,335)	(51,065,594)	(55,068,271)	(59,504,648)	(64,255,606)
Other Non-Current Assets	2,114,553	3,867,356	3,840,229	5,790,229	7,640,229	7,716,631	7,866,631
<b>Total Non-Current Assets</b>	<b>29,756,795</b>	<b>29,299,940</b>	<b>29,051,931</b>	<b>28,019,237</b>	<b>28,759,296</b>	<b>28,349,784</b>	<b>26,696,241</b>
<b>Total Assets</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,849</b>	<b>\$ 33,918,691</b>	<b>\$ 35,288,322</b>	<b>\$ 32,637,776</b>
<b>LIABILITIES AND EQUITY</b>							
<b>Current Liabilities</b>							
Accounts Payable	\$ 861,100	\$ 867,577	\$ 1,001,875	\$ 1,437,979	\$ 1,287,979	\$ 1,137,979	\$ 987,979
Current Portion - Existing Debt	1,403,000	1,857,000	1,874,085	1,776,634	689,948	689,848	973,840
Other Current Liabilities	479,971	465,152	489,364	424,364	359,364	319,364	304,364
<b>Total Current Liabilities</b>	<b>2,744,071</b>	<b>3,189,729</b>	<b>3,365,324</b>	<b>3,638,977</b>	<b>2,337,291</b>	<b>2,147,191</b>	<b>2,266,183</b>
<b>Non-Current Liabilities</b>							
Existing Debt	9,654,364	9,089,048	7,889,938	9,173,435	9,968,487	10,298,638	7,819,798
Other Non-Current Liabilities	3,594,901	4,703,179	4,966,758	1,150,356	1,075,356	900,356	425,356
<b>Total Non-Current Liabilities</b>	<b>13,249,265</b>	<b>13,792,227</b>	<b>12,856,696</b>	<b>10,323,791</b>	<b>11,043,843</b>	<b>11,198,994</b>	<b>8,245,154</b>
<b>Total Liabilities</b>	<b>15,993,336</b>	<b>16,981,956</b>	<b>16,222,020</b>	<b>13,962,768</b>	<b>13,381,134</b>	<b>13,346,185</b>	<b>10,511,337</b>
<b>Equity</b>							
Capital Stock	103,404	102,874	101,932	106,128	109,878	113,628	117,378
Accumulated other comprehensive income	(2,464,982)	(3,513,934)	(4,560,451)	(4,750,000)	(4,950,000)	(4,202,000)	(4,750,000)
Patronage Capital Credits	22,023,601	22,772,771	24,002,338	24,664,952	25,377,679	26,030,508	26,759,061
<b>Total Equity</b>	<b>19,662,023</b>	<b>19,361,711</b>	<b>19,543,819</b>	<b>20,021,080</b>	<b>20,537,557</b>	<b>21,942,136</b>	<b>22,126,439</b>
<b>Total Liabilities and Equity</b>	<b>\$ 35,655,359</b>	<b>\$ 36,343,667</b>	<b>\$ 35,765,839</b>	<b>\$ 33,983,848</b>	<b>\$ 33,918,691</b>	<b>\$ 35,288,321</b>	<b>\$ 32,637,776</b>

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - Fleenor Town  
Cash Flows - VATI

	Historical		2018	Bridge 2019	2020	2021	Forecast Period	
	2016	2017					2022	2023
<b>Beginning Cash \$</b>	<b>5,539,690</b>	<b>\$ 4,507,035</b>	<b>\$ 5,502,776</b>	<b>\$ 5,051,167</b>	<b>\$ 3,722,933</b>	<b>\$ 2,678,588</b>	<b>\$ 4,007,371</b>	
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>								
Net Income (Loss)	38,610	767,800	1,289,800	662,614	712,726	652,830	728,552	
Adjustments to Reconcile Net Income (Loss) to Net Cash From Operating Activities:								
Add: Depreciation -	-	-	-	-	-	-	-	
Add: Depreciation - Other Assets	3,783,321	3,471,035	3,541,028	3,647,259	4,002,677	4,436,377	4,750,958	
Changes in Assets and Liabilities:								
Accounts Receivable	143,209	(156,674)	(31,890)	(27,500)	(37,441)	(344,112)	(10,225)	
Materials & Supplies	(48,352)	20,425	(96,932)	(549,769)	(200,000)	(104,546)	(94,254)	
Other Non-Current Assets	(31,943)	(19,172)	13,032	(1,669)	(1,686)	(1,703)	(1,720)	
Accounts Payable	(1,012,691)	6,477	134,298	436,104	(150,000)	(150,000)	(150,000)	
Other Current Liabilities	6,753	(14,819)	24,212	(162,451)	(1,151,686)	(40,100)	268,992	
<b>Net Cash From Operating Activities</b>	<b>2,878,907</b>	<b>4,075,072</b>	<b>4,873,548</b>	<b>4,004,588</b>	<b>3,174,591</b>	<b>4,448,746</b>	<b>5,492,304</b>	
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>								
Change in Memberships	-	-	-	4,196	3,750	3,750	3,750	
Proceeds from VATI Grant	-	-	-	-	364,053	-	-	
Repayments of Existing Debt	(1,480,896)	(1,511,316)	(1,771,540)	1,283,497	795,052	330,151	(2,478,840)	
Payments of Patronage Capital Credits	-	(18,631)	(60,233)	-	-	-	-	
Payments of Dividends	1,094,911	1,108,278	263,579	-	-	-	-	
Other Cash Flows impacts other	(1,135,375)	(1,049,482)	(1,047,459)	(4,005,951)	(275,000)	573,000	(1,023,000)	
<b>Net Cash From Financing Activities</b>	<b>(1,521,360)</b>	<b>(71,151)</b>	<b>(2,026,138)</b>	<b>(2,718,258)</b>	<b>887,855</b>	<b>906,901</b>	<b>(3,498,090)</b>	
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>								
Capital Expenditures VATI Project	-	-	-	-	(364,053)	-	-	
Capital Expenditures - Other	(2,435,733)	(1,255,376)	(3,326,146)	(664,564)	(2,892,738)	(3,950,462)	(2,947,416)	
Grant Match - capital portion	-	-	-	-	-	-	-	
Other Cash Flows from Investing	45,531	(1,752,803)	27,127	(1,950,000)	(1,850,000)	(76,402)	(150,000)	
<b>Net Cash From Investing Activities</b>	<b>(2,390,202)</b>	<b>(3,008,179)</b>	<b>(3,299,019)</b>	<b>(2,614,564)</b>	<b>(5,106,791)</b>	<b>(4,026,864)</b>	<b>(3,097,416)</b>	
<b>Increase (Decrease) in Cash</b>	<b>(1,032,656)</b>	<b>995,742</b>	<b>(451,609)</b>	<b>(1,328,234)</b>	<b>(1,044,345)</b>	<b>1,328,783</b>	<b>(1,103,202)</b>	
<b>Ending Cash \$</b>	<b>4,507,035</b>	<b>\$ 5,502,776</b>	<b>\$ 5,051,167</b>	<b>\$ 3,722,933</b>	<b>\$ 2,678,588</b>	<b>\$ 4,007,371</b>	<b>\$ 2,904,169</b>	

See summary of significant forecast assumptions and accounting policies and accountant's report.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 1 - NATURE OF THE FORECASTS

Scott County Telephone Cooperative, Inc. and Subsidiary (the Cooperative) is located in Gate City, Virginia. The financial forecast presents the Cooperative's plans for operations for the next five years.

These financial forecasts present, to the best of management's knowledge and belief, the Cooperative's expected financial position, results of operations, and cash flows for the forecast periods. Unless otherwise noted below, all of the assumptions contained in this report apply to each individual study area contained in this application. Accordingly, the forecasts reflect its judgment as of August 28, 2019, the date of these forecasts, of the expected conditions and its expected course of action. The assumptions disclosed herein are those that management believes are significant to the forecasts. There will usually be differences between the forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

The following is a summary of significant accounting policies of Scott County Telephone Cooperative, Inc. and Subsidiary (the Cooperative):

Consolidation - The consolidated financial statements included the accounts of Scott County Telephone Cooperative, Inc. and its wholly owned subsidiary, SCTC Management Group, Inc. Scott Telecom and Electronics, Inc., Scott County Long Distance, Inc., MountaiNet, Inc., and Appalachian Broadband, LLC are wholly owned subsidiaries of SCTC Management Group, Inc. MountaiNet Telephone Cooperative, Inc. and MountaiNet Long Distance, Inc. are wholly owned subsidiaries of MountaiNet, Inc. SW VA Fiber Network, LLC is a wholly owned subsidiary of Appalachian Broadband, LLC. All material intercompany balances and transactions have been eliminated.

The Cooperative's principal line of business is providing local telephone service, long distance, security, telephone service, and cable and internet access services. The revenues reported on these statements of income reflect the relative importance of each type of service. The principal market for these telecommunications services are local residential and business customers residing in the exchange the Cooperative serves in Gate City, Virginia.

Revenue recognition - Compensation for interstate access services is received through tariffed access charges filed by the National Exchange Carrier Association (NECA) with the Federal Communications Commission (FCC) on behalf of the member companies. These access charges are billed by the Cooperative to the interstate interexchange carriers, and pooled with like revenues from all NECA member companies. The portion of the pooled access charge revenue received by the Cooperative is based upon its actual cost of providing interstate access service, plus a return on the investment dedicated to providing that service.

Compensation for Intrastate/IntraLATA access services (for toll traffic not carried by an interexchange carrier) is received under an IntraLATA Toll Originating Responsibility Plan (ITORP). Access charges, as filed with the Virginia State Corporation Commission, are billed to the originating local exchange carrier for terminating toll traffic, and retained by the Cooperative. Toll revenue is



SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

billed to the end user at the Cooperative's local tariffed rates, and is retained by the Cooperative. The Cooperative pays the other local exchange carrier for terminating the toll traffic.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES: (continued)

Compensation for Intrastate/InterLATA service and Intrastate/IntraLATA service (for toll traffic carried by an interexchange carrier) is received through tariffed access charges as filed with the Virginia State Corporation Commission. These access charges are billed to the interexchange carriers carrying the traffic and retained by the Cooperative.

Compensation for long distance service is received through charges for providing usage of the local exchange network. Toll revenues are recognized when services are rendered.

Compensation for cable television and Internet access is received through monthly charges for providing cable television programming and Internet access to customers that subscribe to these services.

Taxes - The Cooperative collects communications taxes from its members on behalf of the State of Virginia. Revenue is presented net of taxes collected in the statements of income.

Income taxes - The Cooperative accounts for income taxes in accordance with the Income Taxes Topic of the FASB Accounting Standards Codification. This topic requires companies to record deferred tax liabilities or assets for the deferred tax consequences of all temporary differences. Deferred taxes are provided on the liability method whereby deferred tax assets are recognized for deductible temporary differences and operating loss and tax credit carry forwards, and deferred tax liabilities are recognized for taxable temporary differences. Temporary differences are the differences between reported amounts of assets and liabilities and their tax bases. Deferred tax assets are reduced by a valuation allowance, when, in the opinion of management, it is more likely than not that some portion or all of the deferred tax assets will not be realized. Deferred tax assets and liabilities are adjusted for the effects of changes in tax laws and rates on the date of enactment.

Inventories - The Cooperative's inventories are priced at cost. The Cooperative's inventory cost is determined by the average cost method.

Cash equivalents - The Cooperative considers all highly liquid investments with maturity of one year or less when purchased to be cash equivalents.

Accounts receivable - The Cooperative extends credit to its commercial and residential subscribers, the majority of whom reside in southwest Virginia. Accounts receivable are carried at original invoice amount less an estimate made for doubtful receivables based on a review of all outstanding amounts on a monthly basis. Management determines the allowance for doubtful accounts by identifying troubled accounts and by using historical experience applied to an aging of accounts.

Accounts receivable, which do not accrue interest, are written-off when deemed uncollectible. Recoveries of accounts receivable previously written-off are recorded when received.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
 GATE CITY, VIRGINIA  
 VATI Application – All Areas  
 SUMMARY OF SIGNIFICANT FORECAST  
 ASSUMPTIONS AND ACCOUNTING POLICIES

Depreciation - Depreciation is computed principally by the straight-line method. The estimated annual rates used to compute depreciation for financial reporting purposes are as stated below.

Property, plant, and equipment - Property, plant, and equipment in service and under construction are stated at cost. Listed below are the major classes of property, plant, and equipment.

	ESTIMATED ANNUAL DEPRECIATION RATES
Vehicles and other work equipment	10.00% - 12.86%
Buildings	2.86%
Furniture	6.33%
Leasehold improvements	2.86%
Central office and computer equipment	6.33% - 12.22%
Outside plant - pole, aerial, and buried	4.40% - 4.66%

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD:

Operating revenues and expenses - The following are significant assumptions for revenues and expenses:

General statement and historical reconciliation - The 2016, 2017, and 2018 revenues and expenses are based on actual, unaudited year-to-date balances. The 2019 revenues and expenses are based on annualized, unaudited balances from the year to date 2019 financials. Each financial statement line item was reviewed for any known and measurable items that could affect the amount. If any further adjustment was made, the assumption will be noted in the line items below. There are no gaps in between the historical period and the forecast period. The forecast period is December 31, 2019 through December 31, 2024.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

Access line counts and projection assumptions - Existing access lines for the consolidated entity were gathered by service for 2016, 2017, and 2018. These categories were forecasted based on the historical trend for those years. The access lines for the new areas served are based on engineering data in the application, the total population, and the number of homes passed each quarter. SCTC projects to obtain a 60% take rate by the end of 2021 and will provide voice, video and broadband services.

Revenues:

1. Local voice service - Historically, Scott County Telephone Cooperative, Inc. (SCTC) has experienced a 1.5 % decrease in voice lines in its ILEC study area. However, SCTC has seen a 1.7 to 2.5% increase in basic revenue per year based on local rate increases and additions in its non-ILEC areas. The increase from 2017 to 2018 was higher at 2.63%. SCTC forecasts an average 3.81% increase on revenue, which is attributed to the net gains for new areas such as Right Poor Valley. These areas are vastly underserved and SCTC has shown tremendous success in recent years in new areas. Also, SCTC has been proactive in rolling out new services and new bundle pricing. It is forecasted that this rate increase will help offset some of the revenue loss due to access line decrease. Management forecasts a 10% take rate by the end of year one with an average bill of \$70 per month. This trend is expected to continue through 2024. Based on the access line forecast, SCTC forecasted local revenues based on average revenue per unit (ARPU). Local revenue is based on an average ARPU of \$24.92 per month over the entire period 2016 to 2024. This price is inclusive of local service, features, and local bundles. The ARPU is based on an average historical and forecasted price.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

2. Broadband data service - Based on the access line forecast chart above, SCTC forecasted Data revenues based on an average ARPU of \$50.00 per month. The ARPU is based on the average historical price. The increases are from new areas served by the recently closed BIP award, other grants, and increases in the study area. This forecast is based on the engineering, which shows approximately 387 new homes. Right Poor Valley area contains 185 homes, Ocoonita area contains 106 homes, and the Fleenoe Town area contains 96 homes. SCTC forecasts a 60% take rate by the end of 2022 for data service at an average price of \$50.00 per month. The Right Poor Valley line increases are included above. Also, the FCC has increased its DSL wholesale tariff rates, local residential rate floor approximately \$2.00 per month per subscriber.
3. Video service - Based on the customer count forecast chart above, SCTC forecasted Video revenues based on an average ARPU of \$56.72 per month. This includes cable and video customers. The ARPU is based on an average historical and forecasted price. SCTC passes on content increases, including local channels as necessary.
4. Middle mile - SCTC has middle mile revenues from billings to other carriers for special and switched access. As the new plant is placed in service, new revenues will be derived from special access services from businesses including wireless companies purchasing access to towers from switched facilities. Based on current tariff rates and contracts this computes to approximately \$32,500 per year on average. SCTC is in the process of completing negotiations with various cell companies for special access that covers ten cells sites for transports and maintenance.
5. Network access - Since 2016, access has remained relatively flat with only minor variations. SCTC maintains annual plant upgrades to its regulated rate base, which, in turn helps in maintaining revenues from federal sources. Following the most recent FCC order, SCTC is well below Universal Service Fund caps and has not experienced any decrease from regulatory rule changes. Since regulated expenses are stable over the forecast period, SCTC expects a relatively flat access revenue change. Overall, this revenue category increases on average about 3.98% per year for 2016 through 2024. Overall MOU is declining but Connect America Funds (CAF) and NECA settlements are relatively flat. This trend of decreasing MOU will continue. Also, by FCC order, the CAF will decrease at 5% per year. NECA settlements make up the difference as SCTC's rate base is projected to increase after the stimulus project and new facilities are constructed throughout the forecast period and recognized in settlements.
6. Universal Service Fund (USF) - SCTC's study area cost per loop will increase each year as new plant and regulated expenses are incurred. Due to the potential impacts of the FCC regulatory changes, SCTC forecasts USF to decrease by an average of 2.42% from 2016 to 2024.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

7. Toll service/long distance voice (Toll/LD) - Revenue is based on SCTC forecasted Toll/LD customer bill an average of \$17.38 per month. The ARPU is based on an average historical price. SCTC expects an average decline of 0.5% per year. SCTC had approximately 5,000 customers using toll or long distance at December 31, 2016. This is expected to drop to 2,110 by December 31, 2024.
8. Installation revenues - The installation revenue is based on new customers and the rate depends on what type of package is selected. The forecast for new installed customers per year is based on management's forecast. The install revenue is forecasted to grow at a steady amount. Beginning in 2018, SCTC forecasts an average gain of 558 installs per year with an average charge of \$32.86 per install.
9. Uncollectible revenues - This line item has been calculated from the monthly open balance registers. Items over the 60 balance are considered for uncollectibility. As local revenues change, the amount of the uncollectible estimate does as well.
10. Other revenue - Other revenue is made up of security services, billing, collection, service charges, and AFUDC. Due to plant construction level and borrowings, this continues in 2019 and then new projects accelerate in 2020 through 2024 based on an average 12.0% increase each year based on historic trends.

Expenses:

1. Plant Specific - Backhaul/interconnection assumptions - These assumptions are based on the expense per customer per year. As the numbers of customers grow each year, the expense is expected to grow accordingly. Below is a description of each type of expense category relating to backhaul, IP, and video:
  - a. The December 31, 2018 cost for backhaul is \$1,672,557 or \$8.27 per customer per month with 16,848 total customer connections. SCTC will need more capacity as new broadband and video customers are added and previous cost savings have been absorbed. The average cost over the period is projected to be \$8.37 per customer per month. See the project description for the operational needs of the project.
  - b. The current IP/Interconnection cost is \$711,021 at December 31, 2018 or \$5.91 per subscriber per month. There are 10,115 customers who have an Internet connection either for broadband or video. The average price per connection will decrease over time. The average cost over the period is projected to be \$5.70 per subscriber per month.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

- c. Video content cost is \$2,754,422 or \$47.49 per video and cable customer per month with 4,883 customers at December 31, 2018. As the number of customers grows the total cost will increase. The average cost per customer per month is expected to be \$50.30 due to pricing increases over time after 2019.
  
2. Plant Non-Specific - Network maintenance/monitoring - This is based on the payroll expense for the central office, cable, and wire, engineering, and general support departments. It is forecasted to increase by approximately 2.0% through 2024 for two reasons. First, as the fiber plant is deployed and the old copper plant removed, maintenance costs drop. Several temporary employees are expected to drop off the payroll in the forecast period. However, management plans to hire as many employees as possible in some of its non-regulated subsidiaries. Additionally, SCTC plans to hire two to three technicians to keep up with the new network beginning in 2019. Cost of living and raises account for the increase in 2019 through 2024.
  
3. Utilities expense - SCTC forecasts that power expenses will increase based on the need of the new network electronic equipment, which should increase modestly from 2019 to 2024.
  
4. Sales/marketing - SCTC forecasts a modest decline throughout the forecast period as new areas of service can be marketed through existing advertisement. Employee attrition is projected in 2019 and 2024 for retirements and consolidations.
  
5. Customer care - SCTC forecasts a consistent balance to small decline as existing customer service personnel will be able to attend to the new service areas. Employee attrition is projected in 2019 and 2024 for retirements and consolidations.
  
6. Corporate G&A - Management expects this expense will decrease by 9.67% each year based on normalized trends.
  
7. Property taxes - As a new plant is completed, property taxes will accrue on the plant in service. The taxes are expected to increase each year as a new plant is constructed. Taxes are approximately .45% of gross plant.
  
8. Depreciation - Depreciation is calculated based on historically approved depreciation rates times the plant in service balance. The average depreciable life is 20 years since the majority of the plant relates to cable and wire fiber facilities. Plant is forecasted to increase each year as SCTC completes its five year construction plan and maintains upgrades each year.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 4 - BALANCE SHEET AND CASH FLOW STATEMENTS:

The balance sheet items other than the ones discussed above were forecasted using one or a combination of several techniques. Trends were used where feasible and then known and measureable items were taken into account. The following summarizes the significant assumptions impacting the balance sheet line items and cash flow statements:

1. General - The starting point of the forecasted balance sheet is based on the general ledger as of December 31, 2018. Then, any items that are known and measurable were applied to approximate the balance as of the end of each forecasted year. Any adjustments made are described in the assumptions below. SCTC is rate regulated under Part 32 and its Board of Directors.
2. Cash and forecasted cash flow statements - SCTC has historically enjoyed a strong cash balance as management balances leverage with plant investment. The balance at 2018 of \$5.0 million will be used over time for plant upgrades.
3. Current assets - No significant changes are anticipated. This line item includes accounts receivables and inventory.
4. Accounts receivable - SCTC forecasts that connection counts will increase based on historical trends, new services, and new areas. New revenues are from customers for broadband and video. Accounts receivable is approximately 6% of revenues. SCTC has very strong collection policies in place with most of its accounts receivable in the less than 60 days category.
5. Non-current assets - No significant changes are expected. This line item is based on investments in securities and affiliated subsidiaries, in compliance with, the equity method of recording investments.
6. Property, plant, and equipment - SCTC plans on building needed plant upgrades and continuing its five year construction plan process. Historically, SCTC has added, on average, approximately \$500,000 to \$750,000, using part cash flow and part leverage as needed. Most of the plant relates to fiber build outs in SCTC member areas. This is the main use of cash at SCTC. The entire grant portion is accounted for per Part 32 and is netted out against the gross cost of the plant. Therefore, there is no net plant on the balance sheets and no depreciation.
7. Current liabilities - No significant changes are expected for accounts payables, accrued liabilities, or SCTC's current debt structure. This line item is expected to decrease as SCTC pays its accounts payable down each year. SCTC pays invoices as they come in each week after proper review.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 4 - BALANCE SHEET AND CASH FLOW STATEMENTS: (continued)

8. Non-current liabilities - No significant changes are expected for SCTC's long-term debt structure or its post retirement benefit plans. Principal payments continue based on the amortization schedule.
9. Equity - No significant changes are expected. Additions to patronage capital come from net margins and no distributions are expected.
10. Capital stock - No significant change is expected nor forecasted.
11. Accumulated other comprehensive income - This amount represents the effects of ASC Topic 715-30 relating to pensions. This relatively new accounting standard requires companies to recognize in equity the impacts of initial transition costs when it adopted its new retirement plan. No significant change is expected.
12. Patronage capital credits - This amount is affected by income or loss. See the comments made for the statements of equity for other assumptions.

Cash Flow Statement:

1. General - The cash flow statement was prepared using the indirect method and is composed of an operating, investing, and financing section. No estimate of cash paid for interest was made. The preparation of the cash flow is based on the changes in the balance sheet and any non-cash items from the income statement, for example, depreciation. The underlying assumptions for the balance sheet and income statement drive the numbers on the cash flow; therefore, no detailed explanation is warranted here. Please review the assumptions for the other financial statements.
2. Operating - Cash flow from operations is impacted by net income, depreciation, current assets, and current liabilities. As net income increases over the forecast period so does the corresponding cash. This is a significant source of cash.



SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY  
GATE CITY, VIRGINIA  
VATI Application – All Areas  
SUMMARY OF SIGNIFICANT FORECAST  
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 4 - BALANCE SHEET AND CASH FLOW STATEMENTS: (continued)

3. Investing - Cash flow from investing activities is impacted primarily from the acquisition and construction of plant. SCTC forecasts plant construction based on the engineering in this grant application. This is the major use of cash. The capital investments will begin in 2020 and be completed in 2020. As far as other capital additions outside of the grant process, SCTC is in the process of constructing several new areas with a combination of loans, grants, and cash flow from operations. Most of the investment is for cable and wire facilities to fulfill its obligations under RUS current work plan, state of Virginia grants, and FCC directives for broadband.
4. Financing - Cash flow from financing activities is impacted primarily by the borrowing and repayment of long-term debt. The principle payments are based on the projected amortization schedule of debt for this loan, as well as, existing debt. The proceeds or new borrowings are based on the FRS forms submitted to RUS as plant is constructed. This is a major source of cash.
  - a. Sale of equity - None is forecasted.
  - b. Proceeds from existing debt - None is forecasted.
  - c. Repayment of Broadband Initiative Program (BIP) debt - This loan will be paid back over a 15-year timeframe at an interest rate of 3.5%.
  - d. Repayments of non-BIP debt - The outstanding debt is from RUS and is paid back over a 16 year time period at an average rate of 4.78%.
  - e. Payments of patronage capital credits - No payments of capital credits are forecasted.
  - f. Payments of dividends - No payments of dividends are forecasted.
5. Cash and cash equivalents at the end of the year - Management prefers to have a reasonable amount of cash that is secured in various banks and short-term investments. SCTC considers any investment with a maturity date of one year or less to be cash equivalent.

SCTC  
digital entertainment

August 10, 2018

Scott County Telephone Cooperative is currently in the final phase of completing our fiber build in your area. We are conducting a survey of homes to determine interest in services from our company. Enclosed are our services, pricing, and channels we offer. You may choose from any or all services. Please call either of the numbers listed below or email us, if you have any questions. Once you contact us, we will complete a customer sign up and when construction is completed, we will contact you to establish an install date and time.

Please call either number Monday – Friday 8:00am to 5:00pm. Please leave a message if we are unable to take your call.

276-452-7211 or 276-452-7302  
[lmann@sctc.org](mailto:lmann@sctc.org) or [lfields@sctc.org](mailto:lfields@sctc.org)

Best Regards,  
Scott County Telephone Cooperative

# **SORRY**

## **WE MISSED YOU!**

### **Scott County Telephone**

is expanding our Digital Services into your area. Your assistance is needed to make this possible. Please call us at your earliest convenience at the Toll Free Number listed below. Crews are obtaining Right of Ways and permission to run a drop to your home. Once construction is completed we can tailor a package to suit your needs.

**Please Call Us: (888) 926-4581**

# **SCTC**

digital entertainment

P.O. Box 487 • Gate City, VA 24251

Representative: \_\_\_\_\_

# Door to Door Seales.



TV

**NOW AVAILABLE**  
**In The Yuma Community**  
**HIGH SPEED INTERNET**

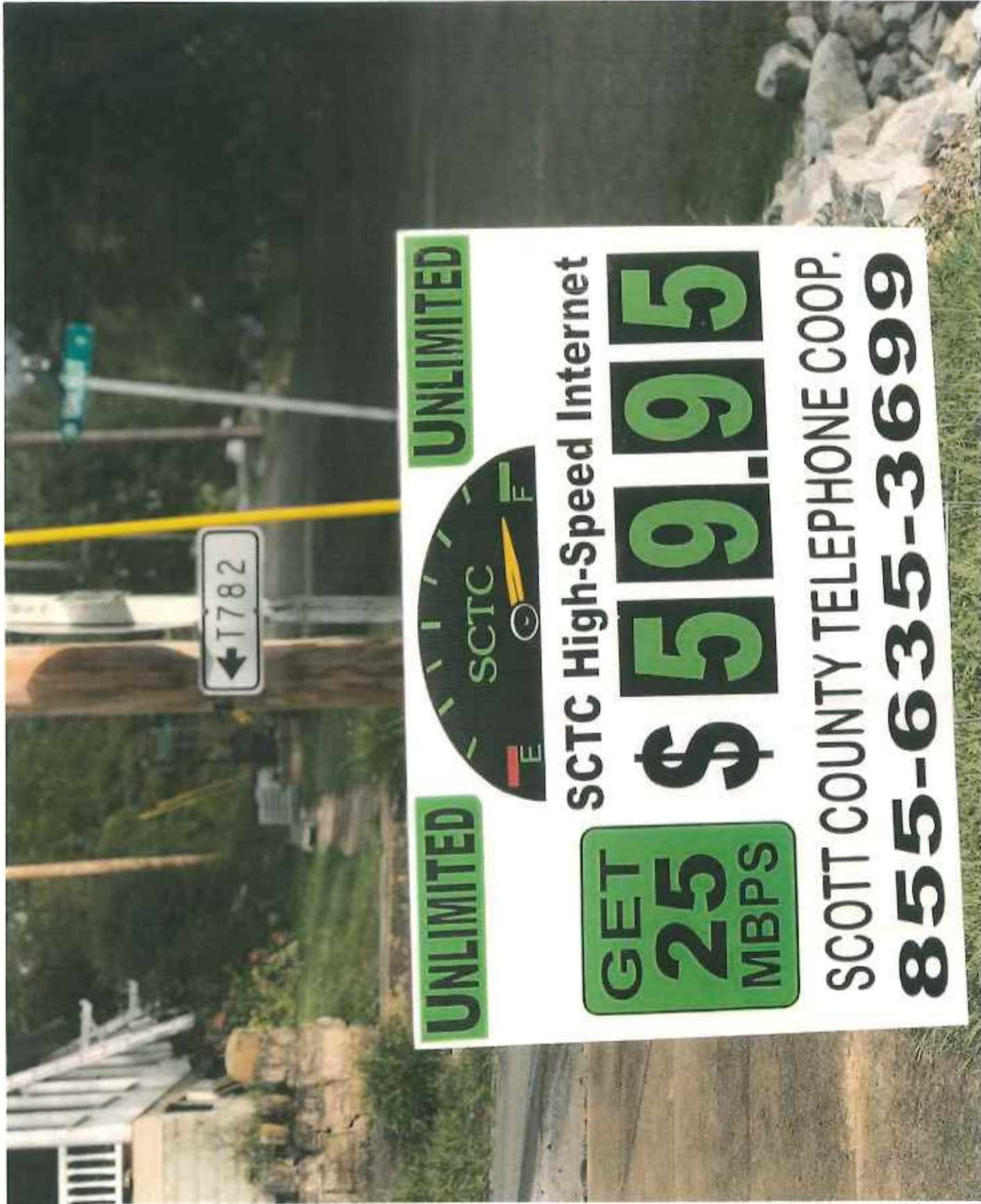


**Call Today**  
**For Pricing!**

**276-452-9119**

**SCTC**  
Community Technical College

Signs



**UNLIMITED**



**SCTC High-Speed Internet**

**GET  
25  
MBPS**

**\$59.95**

**SCOTT COUNTY TELEPHONE COOP.  
855-635-3699**

**UNLIMITED**

Mail / Handouts

# SCTC

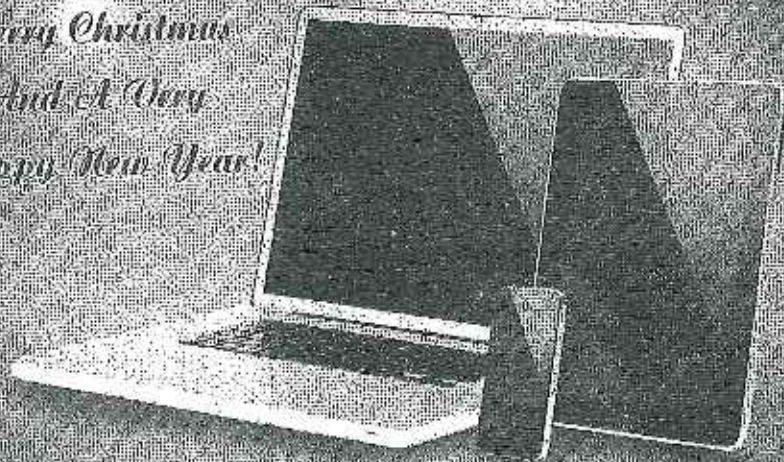
## digital entertainment

Turbo Charge Your Internet Speeds With Our

### Internet Speed Bump

# 50% Off Special!

*We Wish You a  
Merry Christmas  
And A Very  
Happy New Year!*



*Bump your Internet speed for half price  
for 6 months... Increase your speed  
for as little as \$5 per month!*

## Call Or Stop By Today!

149 Woodland St. • P.O. Box 487

© 1999 SCTC WA 91051 • (979) 415-0510

# *Accelerate Your Home*

With High Speed Internet  
Powered by SCTC

Scott County Telephone Coop  
149 Woodland St.  
Gate City, Virginia 24251

FIRST CLASS  
EQUUS  
U.S. POSTAGE  
PAID  
EODM Retail

Local Postal Customer

3Mbps / 768K	\$39.95 per month
5Mbps / 1Mbps	\$49.95 per month
25Mbps / 5Mbps	\$59.95 per month

**SCTC**  
*Connecting you.*  
Scott County Telephone Cooperative

Contact Scott County Telephone Cooperative Monday - Friday 8am to 5pm  
Toll Free at 855-529-8501 or 855-804-2526

Offer valid for Fiber To The Premise customers only. Customers are required to carry Inside Wire Maintenance (currently \$2.00 per month) in addition to their monthly charge for HSI service. Price is subject to change without notice. Variations in upload speed is allowed, but will increase monthly charges. One year contract required of all HSI customers. Wireless routers available for an additional monthly fee of \$5.00. No installation fee for initial install, trip charge may apply for service calls.



Scott County Telephone  
Digital Entertainment Internet Service



More Miles Per Gallon

*The Scott County Telephone Cooperative  
along with  
The Virginia Tobacco Commission  
would like to make a  
Special Broadband Announcement*

*for the  
Flat Top/Sandy Ridge Community*

*Saturday, October 22nd, 2011*

*11:00 a.m.*

*Sandy Ridge/Fairview Community Center*



*Refreshments will follow the Announcement!*

*(For additional details/information, please call 276-452-9119)*

*The Tobacco Indemnification and Community Revitalization Commission is a 31-member body created by the 1999 General Assembly to promote economic growth and development in tobacco-dependent communities, using proceeds of the national tobacco settlement. To date, the Commission has awarded 1,407 grants totaling more than \$793 million across the tobacco region of the Commonwealth, and has made available nearly \$288 million in indemnification payments to tobacco growers and quota holders. For information on the Commission's history, mission, funding programs and recent grant awards, visit our website at [www.tic.virginia.gov](http://www.tic.virginia.gov) or call toll free 877-807-1086.*

**A "Don't Miss" Announcement!**

# **Sandy Ridge**

## **Computer Center Hours**

Monday 10 am – 4 pm

Saturday 9 am – 3 pm

The Computer Center hours are subject to  
change without prior notice.

For More Information Please Call the SCTC  
Main Office at 1-800-511-0808



Scott County Telephone Coop is conducting a survey regarding interest in SCTC providing High Speed Internet Service to your home. If enough interest is expressed in your area, SCTC will apply for a Community Connect Grant through Rural Utility Services to help provide this service.

Do you currently have access to High Speed Internet Service? Yes \_\_\_ No \_\_\_  
Would you be interested in High Speed Internet Service from SCTC? Yes \_\_\_ No \_\_\_

(please print)

Customer Name: \_\_\_\_\_

Customer Telephone Number: \_\_\_\_\_

Physical Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Additional Contact Numbers: (2 Preferably) \_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

This is the website link for the Broadband.

<https://www.sctc.org/resources/broadband/>



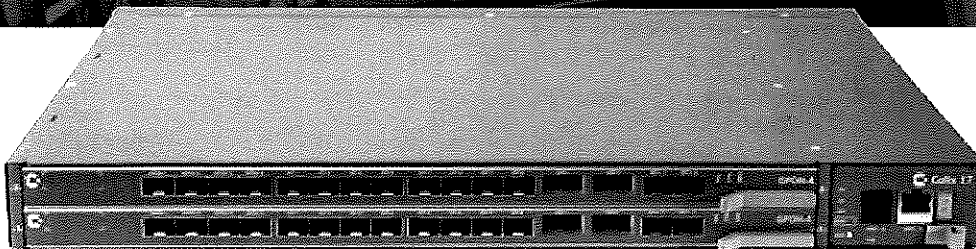
# Calix E7-2 Ethernet Service Access Platform

## DESCRIPTION

What could unparalleled flexibility and network convergence mean to you?

The E7 is a highly extensible, standards-based Ethernet service access platform that offers service providers a modular chassis-based option to address the emerging bandwidth challenges of today's world. As next-generation Ethernet services gain momentum in the marketplace and begin to extend out from the metropolitan area networks, they will drive demand for versatile, cost-effective aggregation out at the network edge.

By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. The AXOS E7-2 leads a rapidly expanding family of AXOES E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.



## **FUNCTIONAL DESCRIPTION**

### **ETHERNET SERVICE ACCESS PLATFORM:**

Residential and business services are converging as more subscribers work from home offices and internet "over the top" video services consume an increasing percentage of both enterprise and service provider network capacity. IP and Ethernet are the dominant network and transport protocols, and all services – voice, data, and video – are rapidly migrating to a packet-based architecture. High performance applications demand high performance solutions; the Calix E7-2 Ethernet Service Access Platform meets the demanding requirements of Ethernet services access networks.

The Calix E7 delivers a wide array of high performance applications, including 10GE Ethernet transport, delivery of high density residential triple play services over copper pairs (VDSL2/ADSL2+), GPON and point-to-point Ethernet, Metro Ethernet Forum (MEF) compliant business services, mobile backhaul, and protected GE aggregation of Calix E7, C7, B6 and E5 platforms.

### **HIGH DENSITY SUBSCRIBER ACCESS**

With two cards per system, the E7-2 provides flexible, high density subscriber access options in a 1RU shelf:

- 96 VDSL2/ADSL2+ & POTS Combo (48 Overlay)
- 16 GPON and 8 GE ports (1024 ONTs)
- 48 point-to-point GE ports (48 ONTs)
- 8 XGS-PON/NG-PON2 ports

With Multi-dwelling unit (MDU) ONTs, the subscribers per 1RU system can exceed several thousand.

### **MODULAR CHASSIS ARCHITECTURE**

The Calix E7-2 modular chassis enables a pay-as-you-grow architecture, combining the most advantageous attributes of a small form factor product with a large chassis-based system.

- 1RU design can expand from a single slot, for very low first install cost, to multiple chassis, to add subscriber growth yielding a near linear cost curve
- Twenty line cards are managed as a single chassis for operational efficiency
- Mix and match line cards in a common chassis – no common control equipment required
- Line cards can be added or replaced without uninstalling/installing power, alarms, or cables – reducing MTR from hours to minutes
- Subscribers are easily aggregated and network resources efficiently shared across protected trunk facilities
- Hardened 1RU system delivers GPON and Ethernet with 10GE transport from CO, cabinet or pole mount
- Resilient, hot-swappable line cards and fan tray

With the E7-2, service providers no longer need to decide between a single service product and a high growth chassis solution. E7-2 provides low first install cost, operational efficiency and near linear incremental cost per subscriber, enabling Calix customers to maximize their business return.

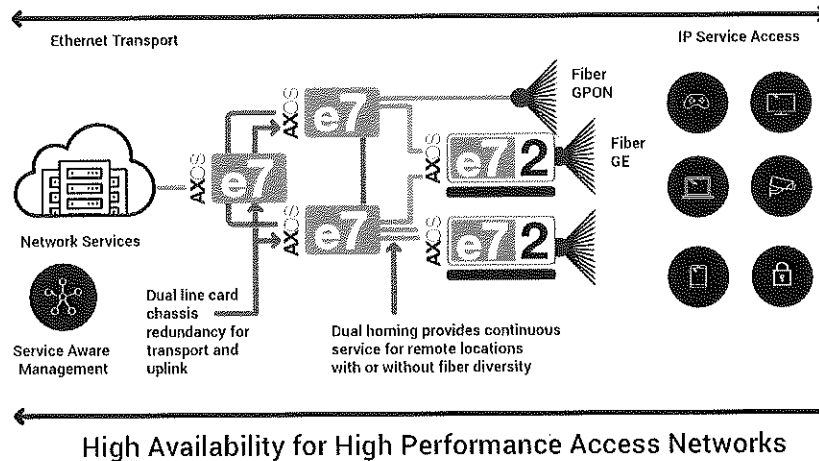
### **FULL SPECTRUM OF SERVICES**

The E7 delivers a full spectrum of access services over GPON and Point-to-Point Ethernet using the family of Calix ONTs, including Single Family Unit (SFU), Small Business Unit (SBU), Multi-Dwelling Unit (MDU), and rack-mount models.

- IPTV – broadcast and Video on Demand (VoD)
- MEF compliant business services
- High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support
- T1 services
- CATV video: RF video overlay with RF return

Calix ONTs support auto sensing GPON and GE network interfaces, allowing service providers to manage service changes without subscriber onsite technical support.

## NETWORK CONVERGENCE



### DELIVERING "QUALITY OF EXPERIENCE"

The E7 provides per-subscriber and per-service hierarchical QoS to deliver uncompromised triple play and business services. A powerful collection of classification, policing, queuing and scheduling algorithms let operators manage per-subscriber and per-service traffic flows to maintain priority/delay/loss service differentiation within the E7 network.

### SCALABLE IPTV SUPPORT

IPTV services are by far the most demanding in terms of quality, and user expectations are very high. The E7 supports industry standard IGMP snooping to identify and replicate multicast video sent between the set-top box and the video distribution network, providing efficient, scalable, high-quality IPTV distribution on both GPON and Ethernet interfaces.

### INTEGRATED HIGH-CAPACITY AGGREGATION

The E7 is built on a core Layer 2 and Layer 3 switch capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. This capacity makes the E7 ideal for aggregation and transport of IP/Ethernet services across the access network. The E7 platform supports industry standard pluggable modules for all service and network interfaces, including ITU G.984 compliant GPON, Small Form-Factor Pluggable (SFP) Gigabit Ethernet, XFP 10GE ports, and SFP+ 10GE ports.

### NETWORK RESILIENCY

The Calix E7 supports a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink applications.

- ITU G.8032 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation

### SERVICE AWARE MANAGEMENT

The E7, along with the Calix Management System (CMS), allows operators to manage services while understanding their relationship to the network infrastructure. Service-oriented management includes rapid service provisioning, service templates and policies, and service assurance. Comprehensive network management tools let operators create physical and logical topology maps, engineer traffic flows, and manage network commissioning and software upgrades. Network inventory, alarm surveillance and PM collection are enabled by the E7 system. The E7 provides locally hosted Web GUI, CLI, and SNMP interfaces



### BACKPLANE BANDWIDTH

100 Gbps between slots

### SLOTS

2 universal line card slots  
1 Fan Tray slot

### DIMENSIONS (W x H x D)

17.5 x 1.7 x 11.45 inches  
44.5 x 4.3 x 29.1 cm  
Height is 1 RU

### WEIGHT

5.9 lb (2.7 kg) E7 shelf  
7.4 lb (3.4 kg) shelf with Fan Tray

### OPERATING ENVIRONMENT

Temperature: -40 to +65° C  
(-40° F to +149° F)  
Humidity: 10 to 95%  
(non-condensing)  
Operating altitude: 10,000 ft  
(3,049 m)

### STORAGE ENVIRONMENT

Temperature: -40 to +85° C  
(-40° F to +185° F)  
Humidity: 5 to 95%

### MANAGEMENT SUPPORT

Calix CMS network management  
Calix CLI and Web GUI for local  
management interface  
SNMP v2c and v3 performance  
and fault monitoring

### MANAGEMENT INTERFACES

Ethernet 10/100 (RJ-45  
connector on Calix E7-2 Fan  
Tray)  
Ethernet 10/100 (RJ-45  
connector on back of Calix E7-2)  
RS-232 (RJ-11 connector on  
Calix E7-2 Fan Tray)

### SYNCHRONIZATION

Synchronization is enabled by  
the E7-2 line cards as  
required  
External reference timing  
Built-in Stratum-3 clock  
Hardware-ready to support  
Synchronous Ethernet

### ALARM I/O INTERFACES

Wire wrap pin access on E7 back  
User definable alarm inputs:  
7; outputs: 1

### FIBER INTERFACES

All optical ports use pluggable  
optics (SFP, XFP, SFP+)  
LC or SC connectors on modules

### ANALOG/METALLIC INTERFACES

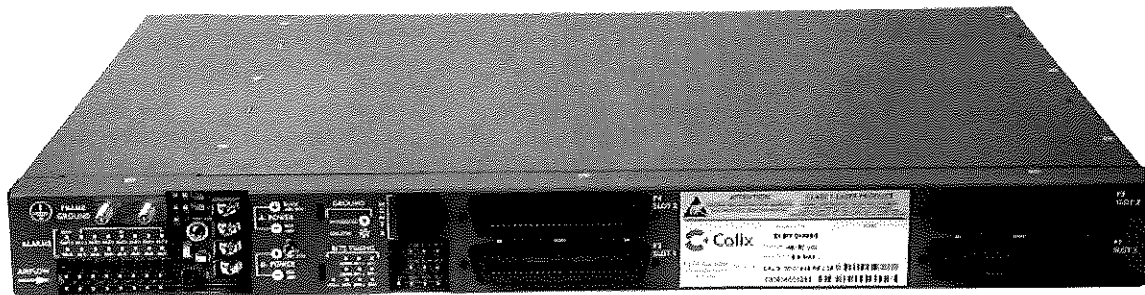
Two standard 25-pair RJ-21  
connectors per slot

### TIMING I/O INTERFACES

Access through wire wrap pins  
on the back of the Calix E7  
BITS clock (sink and source)  
STANDARDS COMPLIANCE  
NEBS Level 3 compliance  
(GR-63-CORE, GR-1089-  
CORE, GR-3028)  
UL 60950  
FCC Part 15 Class A

### POWER FEEDS

Integrated power management  
on Calix E7-2 line cards  
Redundant -48/60 VDC battery  
feeds (A and B)  
Input Range: -42.5VDC to  
-72VDC  
Fuse: 7.5 Amps (A and B)



## FAN TRAY ASSEMBLY (100-01451)

### FANS

4 fans housed in fan tray  
Resilient design maintains  
system cooling with one fan  
failure

### MANAGEMENT INTERFACES

Ethernet 10/100 (RJ-45  
connector)  
RS-232 (RJ-11 connector)

### SYSTEM INFORMATION

7-segment LCD display  
System Controller (MGT) –  
GREEN

### SHELF ALARM INDICATOR

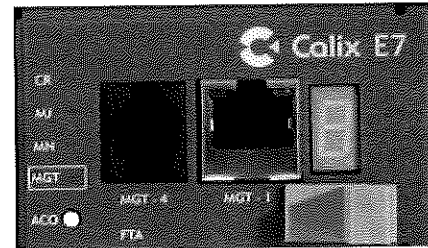
Critical (CR) - RED  
Major (MJ) - RED  
Minor (MN) - AMBER  
Alarm Cut-Off (ACO) button

### POWER SPECIFICATIONS

Min Input Power:  
22 Watts @ -48V  
Max Input Power:  
65 Watts @ -48V

### MAINTENANCE

Field-replaceable air filter (not  
used in RT locations)  
Hot-swappable fan tray  
assembly



## FAN TRAY ASSEMBLY-2 (100-03590)

### FANS

4 fans housed in fan tray  
Resilient design maintains  
system cooling with one fan  
failure

Variable speed operation  
depending on operating  
temperature\*

### MANAGEMENT INTERFACES

Ethernet 10/100 (RJ-45  
connector)  
RS-232 (RJ-11 connector)

### SYSTEM INFORMATION

7-segment LCD display  
System Controller (MGT) –  
GREEN

### SHELF ALARM INDICATOR

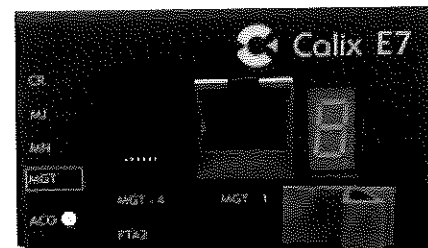
Critical (CR) - RED  
Major (MJ) - RED  
Minor (MN) - AMBER  
Alarm Cut-Off (ACO) button

### POWER SPECIFICATIONS

Min Input Power:  
8.5 Watts @ -48V  
Max Input Power:  
48 Watts @ -48V

### MAINTENANCE

Field-replaceable air filter  
(not used in RT locations)  
Hot-swappable fan tray  
assembly





## NOTES

For GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers, Direct Attach cables, and all transceivers used in CSFP Option 2 sockets, only products purchased directly from Calix are supported. The use of GPON OIM, Active Ethernet CSFPs, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

- SFP modules may also be used in CSFP Option 2 sockets, and in SFP+ sockets at 1GE rate.
- Copper Direct Attach cables can operate in SFP, CSFP Option 2, and SFP+ sockets at 1GE, 2.5GE, and 10GE data rates as supported by the card type.

## CALIX E7-2 ETHERNET SERVICE ACCESS PLATFORM

- 000-00372**..... E7-2 Chassis with Fan Tray Assembly and Installation Kit
- 100-01451** ..... E7-2 Fan Tray Assembly
- 000-00228**..... E7-2 Fan Tray Assembly Filter, Package of 10 units
- 100-03590**..... E7-2 Fan Tray Assembly 2 (FTA2)\*
- 000-00760**..... E7-2 Fan Tray Assembly 2 (FTA2) Filter, Package of 10 units

\* Variable speed operation under software control requires a minimum of E7 Release 2.2 software. In releases prior to 2.2, the FTA2 fan speeds are identical to the original FTA.

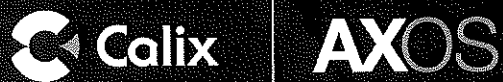
## CALIX PLUGGABLE TRANSCEIVER MODULES

The E7-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Datasheet (#250-00191) for a complete list of modules and specifications.

- CSFP Option 2..... 1GE optical dual-port Compact Small Form-factor Pluggable (CSFP) Option 2 modules
- SFP ..... 1GE and 2.5GE optical and copper Small Form-factor Pluggable (SFP) modules
- SFP+..... 10GE optical Enhanced Small Form-factor Pluggable (SFP+) modules
- Direct Attach..... Multi-rate copper Small Form-factor Pluggable (SFP/SFP+) cables
- XFP ..... 10GE optical Small Form-factor Pluggable (XFP) modules
- GPON OIM..... 2.5Gbps GPON (Class B+ ODN with minimum 28dB link budget, up to 1:64 splits)
- ER-GPON OIM ..... 2.5Gbps Extended Reach GPON (up to 58 km with 1:4 split)

## CALIX MOUNT KIT

- 100-03382 ..... E7-2 ETSI Rack Mount Kit



# Calix E7-2 AXOS GPON-8 r2

## DESCRIPTION

Looking to future-proof your next-generation GPON network in preparation for launching advanced services?

As North America's most widely deployed access system, the Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The AXOS E7-2 leads a rapidly expanding family of AXOS E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.



## FUNCTIONAL DESCRIPTION

### GPON AND POINT-TO-POINT ETHERNET:

The Calix E7-2 AXOS GPON-8 r2 card provides multiservice capability over IP/Ethernet-based networks. Each GPON-8 r2 provides eight GPON OLT ports that subtend up to 128 ONTs each, for a card capacity of 1024 GPON ONTs, or 2048 per E7-2 1RU chassis. An additional four SFP/CSFP sockets per card can provide high-bandwidth, point-to-point Ethernet services to individual subscribers or be used to aggregate other Ethernet devices. The Calix E7-2 GPON-8 r2 card can co-exist with other Calix E7-2 AXOS line cards in a shelf.

## KEY FEATURES AND CAPABILITIES

GPON-8 r2 card features and capabilities include:

- Based on ITU G.984 GPON family of standards—including G.988
- GPON: 2.488 Gbps downstream, 1.244 Gbps upstream
- GEM (Ethernet) based GPON
- Interoperable with Calix ONTs, including the GigaFamily
- Integrated 10GE and GE/2.5GE aggregation and transport
- Class B+ ODN, +28 dB link budget, up to 20 km at 32-way splits
- Class C+ ODN, +32 dB link budget with Forward Error Correction (FEC), up to 35 km at 32-way split, up to 60 km at 2-way split
- Hardened for central office and remote terminals

## INTEGRATED HIGH-CAPACITY AGGREGATION

The E7-2 AXOS GPON-8 r2 card is built on a core Layer 2 and Layer 3 switch capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. Each GPON OLT port has a dedicated 2.5Gbps switch interface. Industry standard pluggable modules are used for all interfaces, including ITU G.984 compliant GPON, GE and 2.5GE optical SFP, 10GE XFP, and 10GE SFP+. The GPON-8r2 supports (4) CSFP (Compact SFP) modules that are mechanically compatible with the industry-ubiquitous SFP module. Each CSFP module supports two independent bidirectional transceivers (1490nm Tx / 1310nm Rx), each capable of operating at a 1 Gbps bi-directional rate. The SFP+ ports also support SFP modules and Direct Attach copper cables.

## IP SERVICES DELIVERY

The Calix E7-2 AXOS GPON-8 r2 card delivers a full spectrum of IP access services over GPON and Point-to-Point Ethernet networks.

- Secure AES encryption on the PON
- IPTV – broadcast and Video on Demand (VoD)
- MEF compliant business services
- High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support
- T1 services
- CATV: 1550nm RF video overlay; 1610nm RF return

## NETWORK RESILIENCY

All Calix E7-2 AXOS GPON-8 r2 cards support a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink.

- ITU G.8032 Ethernet Ring Protection Switching (ERPS)
- ITU G.8032v2 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation
- ITU G.983.5 – Type B Protection and enhanced survivability for GPON OLTs

## MOBILE BACKHAUL

With integrated network synchronization, hierarchical QoS and support for T1 services, the E7-2 AXOS GPON-8 r2 card transport uncompromised mobile broadband traffic while also supporting triple play residential and MEF certified business services from a single platform. A powerful collection of classification, policing, and scheduling algorithms let operators manage per-subscriber and per-service traffic flows to maintain priority/delay/loss service differentiation within the E7 network.

## SCALABLE IPTV SUPPORT

The E7 supports industry standard IGMP snooping to identify and replicate multicast video sent between the set-top box and the video distribution network, providing efficient, scalable, high-quality IPTV distribution on both GPON and Ethernet interfaces.

## MINIMUM SYSTEM REQUIREMENTS

Calix AXOS Software Release  
3.1.3

## DIMENSIONS (W x H x L)

14 x 10.1 x 0.78 inches  
35.6 x 25.7 x 2 cm

## WEIGHT

2.08 lbs. (0.94 kg)

## PORTS

8 GPON OLT ports  
8 CSFP 1GE ports (4 CSFP sockets, also support SFP modules)  
2 SFP+ ports supporting 10GE and GE optical modules  
2 XFP ports supporting 10GE optical modules

## PACKET SWITCHING

### CAPACITY

Wire speed forwarding across all Ethernet and GPON OLT ports  
64,000 MAC addresses per system  
9,000 byte jumbo frames  
2,000 byte frames over GPON  
4,096 VLANs  
4,000 IGMP Multicast channels

## QUALITY OF SERVICE

Service classification based on port, SVLAN-ID, CVLAN-ID, P-Bit  
Port and flow-based policing to 1Mbps increments  
8 CoS queues per port  
Strict priority scheduling with minimum bandwidth guarantee  
Congestion avoidance: Tail Drop

## STANDARDS AND RFC

### SUPPORT

TR101 VLAN Service models  
IEEE802.1ag Connectivity Fault Management (G.8032 support)  
IEEE 802.1D Rapid Spanning Tree  
IEEE 802.1p CoS Prioritization  
IEEE 802.1 MAC Bridges  
IEEE 802.1Q VLAN tagging  
IEEE 802.1ad VLAN stacking (Q-in-Q) support  
IEEE 802.1w RSTP  
IEEE 802.3ad/802.1AX Link Aggregation  
RFC 2236 IGMP v2  
RFC 3376 IGMP v3  
RFC 3046 DHCP Relay Agent Information Option ("Option 82")  
RFC 4541 IGMP snooping  
RFC 4553 Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAtOP)  
ITU-T G.8032 Ethernet Ring Protection Switching (ERPS)/Enhanced EAPS  
ITU-T G.8032v2 Ethernet Ring Protection Switching (ERPS)  
ITU-T G.984 GPON  
ITU G.984.1 Type B Protection Dynamic Bandwidth Assignment (DBA)  
NIST Advanced Encryption Standard (AES)

## SYNCHRONIZATION

Synchronization enabled by E7 line cards  
External reference timing  
Built-in Stratum-3 clock  
Hardware-ready to support Synchronous Ethernet, IEEE 1588v2

## COMPLIANCE

NEBS Level 3 compliance (GR-63-CORE, GR-1089-CORE, GR-3028)  
UL 60950  
FCC Part 15 Class A  
CE Mark

## POWER SPECIFICATIONS

GPON-8 r2 power/heat dissipation: 85 Watts (Maximum) 75 Watts (Typical)

## OPERATING ENVIRONMENT

Temperature: -40° to +65° C (-40° F to +149° F)  
Humidity: 10 to 95% (non-condensing)

## STORAGE ENVIRONMENT

Temperature: -40° to +85° C (-40° F to +185° F)  
Humidity: 5 to 95%



## NOTES

For AXOS GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables, and all transceivers used in CSFP Option 2 sockets only products purchased directly from Calix are supported. The use of GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

- Only AXOS GPON OIMs are supported by the E7-2 AXOS GPON-8 r2 card
- SFP modules may also be used in SFP+ sockets at 1GE rate
- Copper Direct Attach cables can operate in SFP and SFP+ sockets at 1GE, 2.5GE, and 10GE data rates as supported by the card type.

## CALIX ONTs

The E7-2 AXOS GPON-8 r2 card supports the Calix family of ONTs, including 700GX, 700GE, 836GE, and 800G GigaFamily. Calix ONTs support auto sensing GPON and GE network interfaces, allowing service providers to manage service changes without subscriber onsite technical support.

## CALIX E7-2 AXOS LINE CARDS

**100-04665**..... E7-2 AXOS GPON-8 r2 (8x GPON OIM, 4x GE SFP, 2x 10GE SFP+, 2x 10GE XFP)

## CALIX PLUGGABLE TRANSCEIVER MODULES

The E7-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Datasheet (#250-00191) for a complete list of modules and specifications.

**SFP** ..... 1GE and 2.5GE optical and copper Small Form-factor Pluggable (SFP) modules

**SFP+** ..... 10GE optical Enhanced Small Form-factor Pluggable (SFP+) modules

**CSFP Option 2**... 1GE optical dual-port Compact Small Form-factor Pluggable (CSFP) Option 2 modules

**XFP** ..... 10GE optical Small Form-factor Pluggable (XFP) modules

**Direct Attach**..... Multi-rate copper Small Form-factor Pluggable (SFP/SFP+) cables

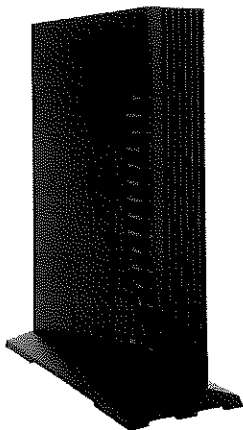
## AXOS GPON

**B+ OIM**..... 2.5Gbps GPON (Class B+, 20km, C-Temp, AXOS) 2.5Gbps GPON (Class B+, 20km, I-Temp, AXOS)

## AXOS GPON

**C+ OIM**..... 2.5Gbps GPON (Class C+, 60Km, I-Temp, AXOS)

## 844G and 854G GigaCenters | ANSI



### DESCRIPTION

The Calix 844G and 854G GigaCenters are next generation residential premises service delivery platforms that extend the access network into the home and act as a strategic location for control of the gigabit experience. Supporting broadband connectivity within the home and managing subscriber voice, data and video services, this intelligent, high-performance service platform integrates a 2.5 GPON optical interface with switching and routing functions that manage premises network traffic at speeds up to 1 Gbps. The GigaCenter service interfaces include: carrier class wireless networking with 802.11ac Wi-Fi and four Gigabit Ethernet (GE) ports for IPTV video and data services, two integrated voice lines supporting carrier grade VoIP and network-based TDM voice circuits, a USB port for home networking services, and an option for RF video.

**GIGABIT SUBSCRIBER EXPERIENCE:** The 844G and 854G GigaCenters are integrated access and gateway solutions that deliver advanced network management and software features to unleash the gigabit experience throughout a subscriber's home. The GigaCenter service delivery platform terminates a GPON fiber optic link at the subscriber's premises and provides carrier class Wi-Fi and Gigabit Ethernet interfaces for customer multi-media devices. The 844G and 854G GigaCenters enable residential subscribers to receive gigabit broadband data, IP video, and VoIP or TDM based voice on a single fiber. Using the latest 802.11ac 5GHz technology incorporating 4x4 multi-user multiple-input and multiple-output (MU-MIMO) and beamforming, the 844G and 854G GigaCenters allow service providers to extend the access network inside the home and establish a strategic location for the delivery and control of broadband services. A USB port is available for home networking with other Ethernet appliances. The GigaCenter family also includes the option of RF signaling for broadcast video services over existing Hybrid Fiber Coax (HFC) networks.

Calix engineered the 844G and 854G GigaCenters for optimal whole-home coverage with simultaneous dual-band 2.4GHz and 5GHz operation and dynamic beamforming at 5GHz. For maximum performance, the GigaCenter supports high-power 2x2 MIMO spatial diversity at 2.4GHz and 4x4 MU-MIMO at 5GHz. The 844G and 854G GigaCenters support the entire 5GHz band including DFS channels and can be provisioned to support 80MHz bandwidth at 5GHz. The GigaCenter solution delivers HD video and data throughout a subscriber's home with control and management of an increasingly video-rich and mobile broadband environment.

**EASY TO INSTALL, ACTIVATE, AND MAINTAIN:** With the 844G and 854G GigaCenters, Calix has redefined how to install and activate residential services at a subscriber's premises. Using the Calix Smart Activate feature and a phone or laptop, a field technician can install and apply the subscriber's service profile without special equipment or assistance from the central office. Calix also provides the innovative Compass software portfolio, including Consumer Connect, which allows the service provider to configure, activate and upgrade the GigaCenter quickly from a remote location using in-band management or TR-069. Extensive troubleshooting capabilities, remote software downloads, and easy-to-use service activation ensure that services are delivered and maintained without needless truck rolls and hardware upgrades. Employing GigaCenters allows service providers to reduce their operational expenses while effectively delivering the gigabit experience to their subscribers.

**TRUE CARRIER GRADE VOICE SOLUTION:** The 844G and 854G GigaCenters deliver a truly agile and responsive service platform with lifeline voice in the event of local AC power loss. A carrier grade 120-240 VAC, 50-60 Hz AC to 12 VDC Uninterruptible Power Supply (UPS) provides battery backup of voice services compliant to Telcordia GR-909. The 844G and 854G GigaCenters can monitor battery status, battery charge and battery life, and report results through the Calix Management System (CMS).



---

## PRODUCT DATASHEET

# 844G and 854G GigaCenters | ANSI

### KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), ITU-T GPON compliant
- Home Gateway:
  - Layer 2 bridge and Layer 3 routing for High Speed Internet (HSI) data and IPTV video services
  - DHCP server options
  - DHCP (IPv6) and PPPoE network connections
  - Network Access Translation (NAT), public to private IP addressing
  - Configurable IP address schemes, subnets, static-IP addresses
  - DNS server
  - Bridge port assignment and data traffic mappings
  - Port forwarding
  - Firewall and security
  - Application and website filtering
  - Selectable forwarding and blocking policies
  - DMZ hosting
  - Parental controls, time of day usage
  - Denial of service
  - MAC filtering
  - Time/Zone support
  - Universal Plug-and-Play (UPnP)
- Wireless:
  - 2.4GHz and 5GHz, simultaneous dual-band
  - 5GHz 802.11ac certified, 802.11a/g/n compatible
  - 2.4GHz 802.11n certified, 802.11b/g compatible
  - WPA/WPA2
  - WPS push-button
  - WEP 64/128 bit encryption
  - Eight SSIDs per band with factory default SSIDs
  - MAC filtering
- Two voice lines:
  - FXS ports, ANSI
  - Carrier grade SIP, H.248, MGCP VoIP
  - TDM GR-303/TR-08 Mode II/GR-57, GR-08 (TR-08 Mode I) voice services
- Four Gigabit Ethernet (GE) interfaces:
  - Symmetrical 1 Gbps bandwidth for residential IPTV and data services
  - Multi-rate 10/100/1000 BaseT Ethernet, auto-negotiating
- USB port:
  - USB 2.0 - Type A configured as a host interface
- RF video bandwidth to 1 GHz for extended digital programming
- Supports multiple data service profiles
- Traffic management and Quality of Service (QoS):
  - 802.1Q VLANs
  - 802.1p service prioritization
  - Q-in-Q tagging
  - Multiple VLANs
  - Rate limiting
  - DiffServ
  - Pre-defined QoS on service type
- IPTV, IGMPv2, IGMPv3:
  - IGMP Snooping and Proxy
  - IGMP Fast Leaves
- Complete OAM&P support via Calix Management System (CMS)
- Gateway Management:
  - TR-069
  - Local Home Gateway GUI, access provisionable
  - Remote WAN side GUI access
  - Default username/password
  - Set-up persistence, factory reboot support
- Indoor mounting:
  - Wall and Structured Wiring Enclosure (SWE) mount with fiber management
  - Desktop mounting stand
- Optional voice lifeline service power source with in-home battery backup and alarm monitoring
- AC to 12 VDC power adapter available for non-lifeline services.

# SPECIFICATIONS

## 844G and 854G GigaCenters | ANSI

### DIMENSIONS

Width: 7.9 in (20.0 cm)  
 Height: 10.6 in (26.9 cm)  
 Depth: 1.8 in (4.6 cm)  
 Weight: 28 oz. (.8 kg)

### PON CHARACTERISTICS

Max. split: 64 GPON  
 Max. reach: 58 km (36 miles) with C+/FEC  
 Maximum Optical Distribution Network (ODN) Attenuation:  
 GPON Class B+, 28 dB  
 GPON Class C+, 32 dB  
 1490 ± 10 nm optical receiver:  
 -27.0 to -8.0 dBm  
 1310 ± 20 nm optical transmitter:  
 0.5 to 5.0 dBm

### INTERFACES

Wireless: 2.4GHz 2x2 and 5Hz 4x4 internal antennas  
 Telephony: Two RJ-11 connectors  
 Data/IPTV: Four 10/100/1000 BaseT Ethernet ports, RJ-45 connectors  
 USB: USB 2.0 Type A  
 RF Video: F-connector, 75 Ohms  
 PON: Single 9/125 μm (single mode) fiber, SC/APC connector, minimum 50 dB return loss  
 Power: 8-pin connector

### TELEPHONY

General: SIP, H.248, MGCP or TDM Gateway (GR-303, GR-57, TR-08 Mode I, TR-08 Mode II)  
 Number of lines: 2  
 RENs per line: 5 maximum  
 RENs per unit: 10 maximum  
 Drop length: Maximum 500 feet (152.4 m)  
 DS0 Output: 23.5 mA

### DATA

Drop length: 328 feet (100 m) maximum using CAT5 cable  
 Auto MDI/MDIX crossover for 1000BASE-TX, 100BASE-TX, and 10BASE-T ports  
 Traffic Management and QOS: 802.11Q VLAN; 802.11p voice, video, data and management priorities; Q-in-Q tagging; Rate limiting

### WIRELESS

2.4GHz 802.11 b/g/n  
 2x2 MIMO, high-power  
 5GHz 802.11 a/g/n/ac  
 4x4 MU-MIMO, implicit/explicit dynamic beamforming  
 2.4GHz and 5GHz simultaneous  
 8 SSIDs per band (2 SSID subscriber default)  
 Auto channel selecting and interference detection  
 WPS, WPS push button  
 Wireless Security: Wi-Fi protected access (WPA/WPA2) WEP, MAC address filtering  
 Wi-Fi multimedia (WMM)

### VIDEO-ANALOG RF OUTPUT

Bandwidth: 54 to 550 MHz  
 Return loss: 10 dB minimum  
 Signal strength (with AGC range):  
 18 ± 2 dBmV  
 Flatness: ± 1.0 dB  
 Tilt: 1.0 dB ± 1.0 dB from 54 to 550 MHz

### VIDEO-DIGITAL RF OUTPUT

Bandwidth: 550 to 1003 MHz  
 Return loss: 8 dB minimum  
 Signal strength (within AGC range):  
 12 ± 2 dBmV  
 Flatness: ± 1.5 dB  
 Tilt: 4.0 dB ± 1.0 dB from 550 to 1003 MHz  
 Modulation Error Ratio (MER: 33 dB)

### VIDEO-DIGITAL RF INPUT

Optical Input (GPON)  
 Wavelength: 1555 ± 5 nm  
 Signal strength at 3.5% OMI (within AGC range):  
 -6.0 to 2.0 dBm

### REMOTE MANAGEMENT

OAM&P via CMS  
 TR-069 remote management  
 TR-064 CPE management  
 TR-098 Internet Gateway Device Data Model

### ENVIRONMENTAL

Operating temperature: Indoor ambient temperature, 0° to 40°C (32° to 104° F)  
 Operating/storage relative humidity: 8 to 95 % non-condensing  
 Altitude: -200 to 10,000 feet (-61 to 3,048 m) above sea level

### CERTIFICATION AND COMPLIANCE

Emissions:  
 FCC Part 15 Class B, IC ICES-003 Class B  
 CISPR-22  
 Safety:  
 UL 60950 and UL 1697 approved  
 IEEE: 802.3, 802.3AB, 802.3U, 802.11p, 802.11Q  
 Wi-Fi Alliance Certified  
 802.11ac and 802.11n



USB-IF Compliance  
 USB 2.0



### POWERING AND ALARMS

8-pin connector with 7-conductor power and alarm cable  
 Input voltage: 12 VDC (nominal), 10 VDC (min.), 15 VDC (max)  
 External Power Adapter: 12 VDC, 2.5 A  
 Residential battery backup source: UPS mounted at subscriber's residence  
 Battery backup time rated capacity:  
 8 hours based on Telcordia GR-909 calculation methods using recommended UPS.

---

ORDERING INFORMATION

## 844G and 854G GigaCenters | ANSI

### Calix 844G and 854G GigaCenters

100-04011..... 844G-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB -UPS Power Interface  
100-04013..... 854G-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB, 1 RF -UPS Power Interface

### Calix 844G and 854G UPS and UPS Cords

100-04068..... Indoor UPS, 12V 7.2AH 36W, Black - AM Type B Grounded  
100-03893..... Indoor UPS Power Cord, 7 pin UPS to 8 pin ONT Male, 1M Black  
100-03894..... Indoor UPS Power Cord, 7 pin UPS to 8 pin ONT Male, 3M Black  
100-03895..... Indoor UPS Power Cord, Un-terminated to 8 pin ONT Male, 6M Black



1035 N. McDowell Blvd., Petaluma CA 94954  
TEL: 877.766.3500 [www.calix.com](http://www.calix.com)

250-00331, Rev.11



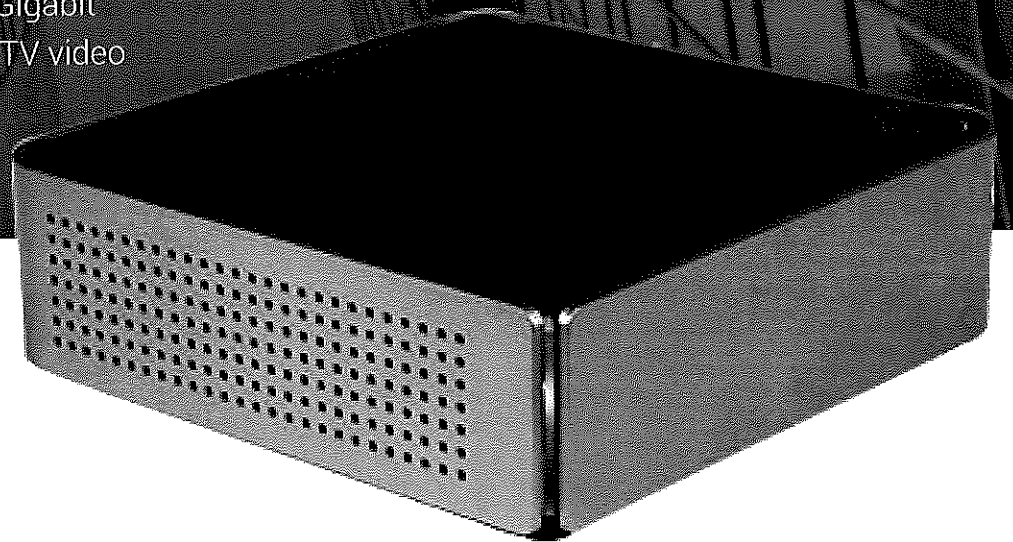
# GigaPoint<sup>®</sup> (GP1000X)

POWERED BY EXOS

## DESCRIPTION

The Calix GP1000X GigaPoint<sup>®</sup> is a small form factor service delivery terminal that delivers broadband connectivity to the subscriber using the XGS-PON standard.

This high-performance terminal integrates a XGS-PON optical WAN interface that enables residential and symmetrical business network traffic at speeds up to 10 Gbps. The GP1000X GigaPoint includes one 10 Gigabit Ethernet (10 GE) port for IPTV video and data services.





## **10 GIGABIT SUBSCRIBER EXPERIENCE**

The GP1000X GigaPoint is an integrated access device that delivers advanced network management and software features to enable the 10 Gigabit experience. The GP1000X GigaPoint terminates an XGS-PON fiber-optic link at the subscriber's premises and provides an industry-standard 100/1000/10G BASE-T interface for the customer premises equipment. The GP1000X GigaPoint enables residential subscribers to receive 10 Gigabit broadband data and IP video on a single fiber.

## **EASY TO INSTALL, ACTIVATE, AND MAINTAIN**

With the GP1000X GigaPoint, Calix has redefined how to install and activate residential and business services at a subscriber's premises. Using the Calix Smart Activate feature and laptop, a field technician can install and apply the subscriber's service profile without special equipment or assistance from the central office. Employing the GP1000X GigaPoint allows service providers to reduce their operational expenses while effectively delivering the 10 Gigabit experience to their subscribers.

## **POWER OPTIONS**

The GP1000X GigaPoint power options include a 120-240 V AC, 50-60 Hz to 12 V DC power adapter.

## KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), XGS (G.9807.1) compliant
- One 10G BASE-T Gigabit Ethernet (GE) interface
  - Symmetrical 10 Gbps bandwidth for residential IPTV and data services
  - Multi-rate 100/1000/10G BASE-T Ethernet, auto-negotiating
- Supports multiple data service profiles
- Traffic management and Quality of Service (QoS):
  - 802.1Q VLANs
  - 802.1p service prioritization
  - Q-in-Q tagging
  - Multiple VLANs
  - Rate limiting
  - DiffServ
  - Pre-defined QoS on service type
- IPTV, IGMPv2, IGMPv3 ASM:
  - IGMP Snooping
  - IGMP Fast Leaves
- Complete Calix Smart Activation
- Indoor mounting options:
  - Wall mount
  - Desktop mount: horizontal or vertical
- AC to 12 V DC power adapter



## SPECIFICATIONS

### DIMENSIONS

Height: 2.38 in (6.0 cm)  
Width (square): 6.88 in (17.5 cm)  
Height: 2.3 in (5.8 cm)  
Weight: 20 oz (0.58 kg)

### PON CHARACTERISTICS

Max. split\*: 128 XGS-PON  
Max. reach\*: 20 km (12.4 miles), N1 Class  
Maximum Optical Distribution Network (ODN) Attenuation: XGS, 29 dB  
Optical receiver 1577nm: -28dBm  
Optical transmitter 1270nm: +4 to +9 dBm

### INTERFACES

Data/IPTV:  
One 10G BASE-T 10G Ethernet port  
PON: Single 9/125  $\mu$ m (single mode) fiber, SC/APC connector, minimum 50 dB return loss  
Power: 8-pin connector

### DATA

Drop length: 180 feet (55m) maximum, using CAT6 cable; 328 feet (100m) maximum, using CAT6A or CAT7 cable  
Auto MDI/MDIX crossover for 100/1000/10G BASE-T ports  
IEEE 802.3an and IEEE802.3-2012  
Traffic Management and QoS: 802.1Q VLAN, 802.1 video data and management priorities; Q-in-Q tagging; rate limiting

### ACTIVATION MANAGEMENT

Calix Smart Activation

### CERTIFICATION AND COMPLIANCE

Emissions:  
FCC Part 15 Class B  
CISPR-22  
Safety:  
UL 60950 and UL 1697 approved  
IEEE: 802.3, 802.3AB, 802.3U, 802.11p, 802.11Q

### ENVIRONMENTAL

Operating temperature:  
Indoor ambient temperature,  
0° to 40°C (32° to 104° F)  
Relative humidity (non-condensing):  
Operating/Storage: 5%-90%  
Shipment/Storage: 5%-95%

### POWERING AND ALARMS

8-pin connector  
Input voltage: 12 V DC (nominal),  
10 V DC (min), 21 V DC (maximum)  
External Power Adapter: External Power Adapter: 12 V DC, 2.5 A  
Maximum power consumption: 13.6 W

\*Not necessarily simultaneously

## ORDERING INFORMATION

### Calix GP1000X GigaPoint

100-04647.....GP1000X 10G GigaPoint, 10 GE and 12 V DC US Power Adapter  
100-04992.....GP1000X GigaPoint, 1 10GE – UPS Power Interface  
100-04141 .....Power Adapter CPA5 12 V 2.5 A – EU Type C w/ 8-pin connector  
000-01057.....GP1000X GigaPoint, 1 10GE -UPS Power Interface and 12 V DC EU Power Adapter

Note: Calix believes the information in this publication to be accurate as of publication date, and is not responsible for error. Product Specifications are subject to change without notice.

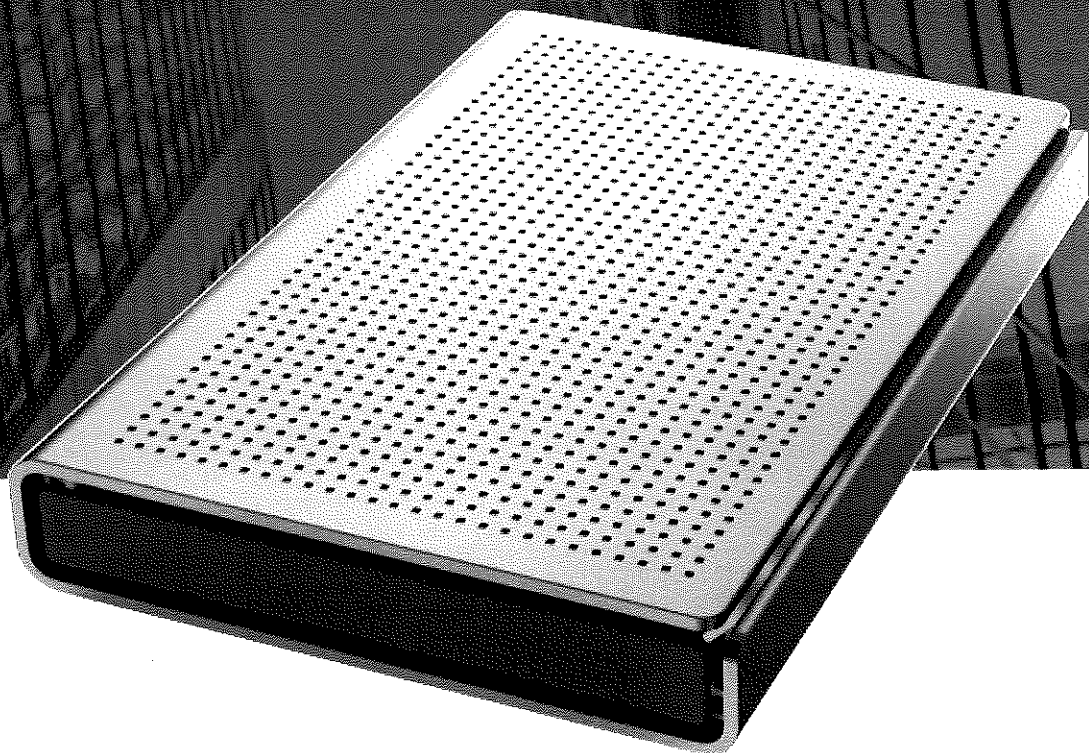


# GigaPro (GPR3000X)

POWERED BY EXOS

## DESCRIPTION

The GPR3000X GigaPro business Ethernet services edge device delivers 10 Gigabit broadband connectivity using the XGS standard to the enterprise environment. This high-performance device delivers IP and Carrier Ethernet services in compliance with MEF CE 2.0. Flexible SFP+ XGS optical WAN interface assures traffic speeds up to 10 Gbps. The GPR3000X service interfaces include: one 10G SFP+ Ethernet port and two 10/100/1000 BASE-T Ethernet ports for business and data services.







## 10 GIGABIT BUSINESS EXPERIENCE

The Calix GPR3000X GigaPro delivers advanced network management and software features with MEF CE 2.0 E-LINE support. The GigaPro business Ethernet platform has an SFP+ optical WAN interface to terminate an XGS fiber-optic wavelength link at the business premises, providing one 10 Gigabit and two Gigabit Ethernet interfaces for customer multi-media devices. Both the 10 Gigabit and two Gigabit Ethernet interfaces have the flexibility to be configured for UNI or I-NNI applications. Multiple services of the same or different types can be multiplexed on the same Ethernet interface to create a multiservice, multi-subscriber demarcation. The GPR3000X enables business and enterprise subscribers to receive 10 gigabit broadband data on a single fiber.

## ETHERNET SWITCHING

The GPR3000X GigaPro supports multiple EVCs per UNI with policing to provide CE 2.0-compliant multi-Class of Service (CoS) capabilities. You can apply bandwidth profiles on the GPR3000X on a per-CoS basis in an EVC. Each GPR3000X GigaPro can support up to 80 EVCs. Scheduling options include Strict Priority Queuing (SP) and Deficit Weighted Round Robin (DWRR). The Ethernet interfaces support 8 CoS egress queues with scheduling, marking of DEI based on classifiers, and minimum/maximum rate controls. The GPR3000X supports an MTU of 9,600 Bytes.

## PERFORMANCE ASSURANCE

The Calix GPR3000X GigaPro is compliant with MEF CE 2.0 manageability requirements through support for IEEE 802.1ag and ITU Y.1731 standards. The GPR3000X also supports Service Activation Testing (SAT) based on ITU Y.1564, and MEF 48, where the GigaPro acts as reflector or load generator/collector for single ended measurements.

## EASY TO INSTALL, ACTIVATE, AND MAINTAIN

The GPR3000X GigaPro supports zero-touch commissioning. A field technician can install without a configuration file, command line interface, special equipment, or central office assistance. Calix also provides the innovative Operations Cloud software portfolio that includes management via Activate and birth, allowing Calix to configure, activate, upgrade and meet MEF CE 2.0 compliance quickly from a remote location. Extensive troubleshooting capabilities and easy-to-use service activation ensure that broadband services are delivered and maintained without needless truck rolls and hardware upgrades.

## CARRIER-GRADE BUSINESS ETHERNET SOLUTION

The GPR3000X GigaPro delivers a truly agile and responsive business Ethernet service platform with high availability. The GPR3000X supports carrier grade 120-240 V AC, 50-60 Hz AC to +12 V DC power adapter.

## KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), XGS (G.9807.1) compliant
- Two Gigabit Ethernet (GE) interfaces:
  - Symmetrical 1 Gbps bandwidth for business services
  - Multi-rate 10/100/1000 BASE-T Ethernet, auto-negotiating
- SFP+ XGS uplink port
- One 10 GigaBit Ethernet SFP+ interface
- Access, traffic management and Quality of Service (QoS):
  - 2r3c policing
  - 802.1Q VLANs
  - 802.1p service prioritization
  - Q-in-Q tagging
  - Multiple EVCs, Multiple VLANs
  - DiffServ
  - Pre-defined QoS on service type
  - Broadcast, Multicast and Destination Lookup Failure (DLF) Storm Control
- Network timing:
  - G.987.3 time of day (TOD) distribution
- Indoor mounting options:
  - Wall mount
  - 19" horizontal rack mounting in 1 RU with mounting bracket
  - Desktop mount: horizontal or vertical
- AC to +12 V DC power adapter

## SPECIFICATIONS

### DIMENSIONS

Height: 9.0 in (22.8 cm)  
Width: 6.5 in (16.5 cm)  
Depth: 1.66 in (4.2 cm)  
Weight: 23 oz (0.7 kg)

### PON CHARACTERISTICS

Max. split\*\*: 128 GPON  
Max. reach\*\*: 20 km (12.4 miles), N1 Class  
Maximum Optical Distribution Network (ODN) Attenuation: XGS, 29 dB  
Optical receiver 1577nm: -28dBm  
Optical transmitter 1270nm: +2.0 to +7 dBm

### INTERFACES

Data/Business Ethernet:  
Two 10/100/1000 BASE-T Ethernet port RJ 45 connectors  
One SFP+ 10G Ethernet port  
SFP+ XGS uplink port  
PON: Single 9/125  $\mu$ m (single mode) fiber, SC/APC connector, minimum 50 dB return loss  
Power: 8-pin connector

### DATA

Drop length: 328 feet (100 m) maximum, using CAT6 or CAT6A cable  
Auto MDI/MDIX crossover for 10/100/1000 BASE-T ports  
Traffic Management and QoS: 802.1Q VLAN, data and management priorities; Q-in-Q tagging; ingress port policing at LAN and WAN

### STANDARDS SUPPORT

IEEE Bridging  
IEEE 802.3 Ethernet  
VLAN Cross-Connect – based on Outer, Outer and Inner VLAN tags  
IEEE 802.1p Prioritization  
IEEE 802.1Q VLAN tagging  
IEEE 802.1ad VLAN stacking (Q-in-Q) support  
IEEE 802.1ag Connectivity Fault Management  
Y.1731 OAM functions and mechanisms for Ethernet based networks  
Y.1564 Ethernet service activation test methodology  
MEF 6.1.1 – L2CP aspects Amendment to 6.1

MEF 10.3 Service Attributes

MEF 11/13/20 UNI type 1 and 2

MEF 23.1 Class of Service Phase 2 Implementation Agreement

MEF 30 Service OAM Fault Management Implementation Agreement

MEF 35 Service OAM Performance Monitoring Implementation Agreement

MEF 45 Multi-CEN L2CP

MEF 48 Service Activation Testing

MEF 49 Service Activation Testing Protocol and PDU Formats

### CERTIFICATION AND COMPLIANCE

Emissions:

FCC Part 15 Class B  
CISPR-22

Safety:

UL 60950 and UL 1697 approved  
IEEE: 802.3, 802.3AB, 802.3U, 802.11p, 802.11Q

## SPECIFICATIONS (... CONTINUED)

### TIMING

ITU G.987.3 10-Gigabit-capable passive optical networks

SyncE SSM per ITU-T G.781  
Synchronization Layer Function

### ENVIRONMENTAL

Operating temperature:

Indoor ambient temperature,  
0° to 40°C (32° to 104° F)

Relative humidity (non-condensing):

Operating/Storage: 5% to 90%

### POWERING AND ALARMS

8-pin connector

Input voltage: 12 V DC (nominal),  
10 V DC (min), 15 V DC (max)

External Power Adapter: External Power  
Adapter: 12 V DC, 2.5 A

### QUALITY OF SERVICE

Classification based on Ethernet and IP  
header

Priority bit (Pbit) and DSCP mapping  
capability at the subscriber edge

Priority bit based CoS queuing: 8 queues  
per egress interface and 4 CoS queues  
per shaped service

MEF-compliant single level policing

Ingress Policing per service, per classified  
traffic

Egress Policing per service, per classified  
traffic

Color blind policers

Burst size

Weighted Random Early Detection  
(WRED) per queue

Advanced Scheduling options: Strict  
Priority, and Deficit Weighted Round  
Robin. A combination of these  
scheduling options can be used on an  
egress interface.

### SERVICE ACTIVATION TESTING (SAT)

Support Generator/Collector for Two-  
Way SAT, frame delivery, SCT (cir,  
eir+cir, policing), SPT (cir)

Keeps up to 5 of the last test results which  
can be referenced via the "  
transaction\_id", i.e tid (persists across  
reboot)

Supports both tagged (FL-PDU) and un-  
tagged (IPV4) subscriber test frames

Support testing multiple EVCs and CoS on  
a single interface simultaneously (up  
to 64 frame-sets) (only one active SAT  
test per interface)

Frame Delivery (unicast, multicast, and  
broadcast)

Bad frame testing supported, CVLAN  
preservation testing

Delay measurement for SCT (cir, cir+eir,  
policing), and SPT

Supports both fixed packet and emix  
profile testing for SCT/SPT (bandwidth  
profile testing and performance testing)

Supports testing DSCP/filtering setting for  
untagged frames

Supports blocking of EVC traffic from  
subscriber ports for both generator and  
reflector

Auto configure parameters from traffic  
management configuration system

Support Per EVC (up to 64 simultaneous)  
latching loopback interface

Supports packet lengths up to full ethernet  
frame sizes of 9,600+ bytes.

Supports auto-configuration required by  
SAT YANG model, as well as specific  
user-defined test settings such as:

- CIR/EIR
- CVID+CPBIT settings (auto-selects  
lowest values when un-specified)
- DSCP value to use (auto-selects  
lowest value when un-specified)

### ETHERNET OAM

802.1ag & Y.1731

Supports CFM, SOAM and Maintenance  
End Points

Peer to Peer Delay Measurements

2-way Delay Measurement

Y.1564 based Service Activation Testing

Service Activation Testing: Multi-Gigabit  
Load generation, Multi-Gigabit Loop  
back

Interoperable with systems supporting  
802.1ag and Y.1731

RFC2544 based Service Activation  
Testing

Continuity Check Message at 100  
milliseconds interval

### MANAGEMENT SUPPORT

Performance monitoring and statistics

Network Configuration Protocol  
(NETCONF)

MEF 31 YANG equivalent Service OAM  
Fault Management Definition of  
Managed Objects

MEF 38 YANG equivalent Service OAM  
Fault Management YANG Modules

### PERFORMANCE MANAGEMENT

Internet Protocol Flow Information Export  
(IPFIX)

\*\*Not necessarily simultaneously



## ORDERING INFORMATION

### Calix GPR3000X GigaPro

000-01101 .....	GPR3000X (100-04811) and XGS-PON SFP+ optical module 1270/1577nm, single fiber transceiver, I-Temp (100-04531)
100-04811 .....	GPR3000X 10G GigaPro, 2 GE, 1 SFP+10GE, AM Power Adapter
100-04994 .....	GPR3000X 10G GigaPro, 2 GE, 1 SFP+10GE, UPS Power Interface
100-05088 .....	GPR3000X 19 inch rack mount bracket and accessories

Note: Calix believes the information in this publication to be accurate as of publication date, and is not responsible for error. Product Specifications are subject to change without notice.

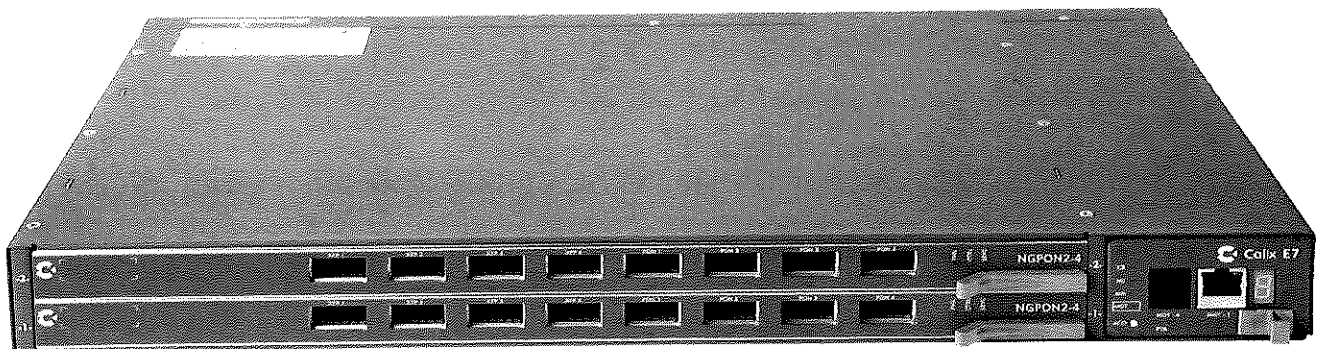


# Calix E7-2 A AXOS NGPON2-4

## DESCRIPTION

Looking to future-proof your next-generation GPON network in preparation for launching advanced services?

As North America's most widely deployed access system, the Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The AXOS E7-2 leads a rapidly expanding family of AXOES E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.



## **FUNCTIONAL DESCRIPTION**

### **10 GIGABIT PON:**

The Calix AXOS E7-2 NGPON2-4 line card provides all the benefits of Calix AXOS while bringing both NG-PON2 and XGS-PON technology to the access network. Each card provides 4 XGS-PON or NG-PON2 OLT channel termination ports that subtend up to 128 ONTs each, for a capacity of 512 ONTs per card and 1024 ONTs per E7-2 1RU chassis. Each port can be independently provisioned to support NG-PON2 or XGS-PON.

## **KEY FEATURES AND CAPABILITIES**

The NGPON2-4 card features and capabilities include:

- Based on ITU G.989 NG-PON2 and XGS-PON family of standards
- 9.953 Gbps downstream, 9.953 Gbps upstream
- Supports up to 4 TWDM wavelengths (one per physical port, upgradeable to 8 wavelengths in future) and the XGS-PON wavelength
- Supports NG-PON2 wavelength mobility
- Leveraging OMCI and GEM (Ethernet) based provisioning model as GPON
- Interoperable with Calix Next Generation 10G PON Residential SFUs and MDUs as well as Business ONTs
- Class N1 +29 dB link budget, up to 1:128 splits
- Integrated 10GE aggregation and transport
- Hardened for central office and remote terminals

## **IP SERVICES DELIVERY**

The Calix AXOS E7-2 NGPON2-4 line card delivers a full spectrum of IP access services over PON fiber networks.

- 4K IPTV – broadcast and Video on Demand (VoD)
- MEF CE 2.0 compliant business services
- Ultra-fast High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support

## **INTEGRATED HIGH-CAPACITY TRANSPORT**

Built on a core Layer 2 and Layer 3 switch, the AXOS E7-2 NGPON2-4 line card is capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. Each PON port has a dedicated 10 Gbps switch interface. Four 10 GE XFP uplinks provide support for backhaul of all traffic.

## **NETWORK RESILIENCY**

The Calix AXOS E7-2 NGPON2-4 line card supports a flexible set of standards-based network topology protocols for use in point to point or ring based transport.

- ITU G.8032v2 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation

## **MOBILE BACKHAUL & FRONTHAUL**

With integrated network synchronization, Ethernet OAM and advanced timing capabilities, the AXOS E7-2 NGPON2-4 line card can be used to transport mobile front haul as well as backhaul traffic while also supporting triple play residential and MEF certified business services from a single platform.

## **UNIFIED ACCESS INFRASTRUCTURE**

With advanced QoS and intelligent NG-PON2 card architecture, operators have a cost-effective way to start with XGS-PON for high density MDU residential services such as Gfast. Then, operators can seamlessly migrate to TWDM

optics and further monetize their investment by offering SLA-driven business and mobile hauling capabilities. The AXOS E7-2 NGPON2-4 line card will thus offer ultra-high bandwidth residential IPTV services, mobile and business services over a single unified access infrastructure.

**MINIMUM SOFTWARE  
RELEASE**

Calix E7 AXOS Release 3.0

**DIMENSIONS (W x H x L)**

14 x 10.1 x 0.78 inches  
35.6 x 25.7 x 2 cm

**WEIGHT**

2 lbs. (1 Kg)

**PORTS**

4 XFP interfaces for 10G/10G,  
10G/2.5G PON Access  
Links (4 TWDM channels  
per card)  
4 XFP interfaces for  
10GE network uplink

**WAVELENGTH SUPPORT**

XGS-PON: 1577nm Down,  
1270  
nm Up  
NG-PON2: Up to 4  
TWDM wavelengths:  
1596-  
1599 Down, 1532-1535 Up [one  
wavelength pair per OLT  
port]

**SPLIT RATIO\***

XGS-PON: 1:128  
NG-PON2: 1:128  
(\*Refer to Calix PPG  
for engineering  
design guidelines)

**QUALITY OF SERVICE**

Service classification based  
on port, SVLAN-ID,  
CVLAN-ID,  
p-bit  
Strict priority and Weighted  
Round Robin (WRR)  
based scheduling with  
minimum bandwidth  
guarantees  
Congestion avoidance: Tail  
Drop

**STANDARDS AND RFC  
SUPPORT**

ITU-T G.989.2 a1 NG-PON2  
ITU-T XGS-PON  
ITU-T G.8032v2 Ethernet Ring  
Protection Switching  
(ERPS)  
TR-101 VLAN Service models  
IEEE 802.1p CoS  
Prioritization IEEE 802.1 MAC  
Bridges  
IEEE 802.1Q VLAN tagging  
IEEE 802.1ad VLAN  
stacking  
(Q-in-Q)  
support RFC 2236  
IGMP v2 RFC  
3376 IGMP v3  
RFC 3810 MLDv2  
RFC 3046 DHCP Relay Agent  
Information Option ("Option  
82")  
RFC 4541 IGMP Proxy  
RFC 4553 Structure-Agnostic  
Time Division Multiplexing  
(TDM) over Packet  
(SAToP)  
Dynamic Bandwidth Allocation  
(DBA)  
Advanced Encryption  
Standard (AES)  
Forward Error Correction (FEC)

**PACKET SWITCHING  
CAPACITY**

9216 byte frames over NGPON2/  
XGS-PON  
4,096 VLANs per system  
4,096 IGMP Multicast channels

**SYNCHRONIZATION**

Integrated Stratum-3 reference  
Timing Options: BITS, Synch,  
1588v2 (TC, OC, BC)

**COMPLIANCE**

NEBS Level 3 compliance  
(GR-63-CORE, GR-  
1089-CORE, GR-  
3028)  
UL 60950  
FCC Part 15 Class  
A CE Mark

**POWER AND  
HEAT**

**DISSIPATION**

NGPON2-4 power consumption:  
125 Watts (typical with  
optics)

**OPERATING ENVIRONMENT**

Temperature: -40° to +65° C  
(-40° F to +149° F)  
Humidity: 10 to 95%  
(non-condensing)

**STORAGE ENVIRONMENT**

Temperature: -40° to +85° C  
(-40° F to +185° F)  
Humidity: 5 to 95%



#### **NOTES**

For XGS-PON XFP, NG-PON2 XFP, and 10GE XFP, only products purchased directly from Calix are supported. The use of XGS-PON XFP, NG-PON2 XFP, and 10GE XFP pluggable transceivers not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

#### **CALIX ONTs**

The AXOS E7-2 NGPON2-4 line cards support operation with the Next Generation GigaFamily of ONTs using fixed (XGS- PON) and tunable TWDM wavelengths.

#### **CALIX E7 LINE CARDS**

**100-04636**..... E7-2 NGPON2-4 (4x XGS-PON/NG-PON2 XFP, 4x 10GE XFP)

#### **CALIX PLUGGABLE TRANSCEIVER MODULES**

The E7-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Datasheet (#250-00191) for a complete list of modules and specifications.

**XFP**.....10GE optical Small Form-factor Pluggable (XFP) modules

**XGS-GPON XFP** .....10Gbps XGS-PON optical Small Form-factor Pluggable (XFP) modules

**NG-PON2 XFP** .....10Gbps NG-PON2 optical Small Form-factor Pluggable (XFP) modules (CO use only)



# Telecommunications Needs Assessment and Development of Remedial Strategies for Southwest Virginia

Prepared for:

The Virginia Department of Housing and Community Development

The Town of Nickelsville

LENOWISCO, Cumberland Plateau, and Mount Rogers PDCs

May 8, 2019

*Prepared by*



*and*



# 1 Table of Contents

<b>2</b>	<b>EXECUTIVE SUMMARY</b> .....	<b>3</b>
<b>3</b>	<b>INTRODUCTION</b> .....	<b>6</b>
3.1	Project Area.....	6
3.2	Project Team .....	7
	Thompson and Litton Engineers.....	7
	Blue Ridge Advisory Services Group.....	8
3.3	Deliverables.....	9
3.4	Methodology.....	9
3.5	Accomplishments in Southwest Virginia.....	10
<b>4</b>	<b>Regional Needs</b> .....	<b>11</b>
<b>5</b>	<b>PRIORITIZATION OF COMMUNITIES</b> .....	<b>13</b>
5.1	Broadband – Target Areas for Improvement.....	13
	PDC 1 -- Broadband.....	13
	PDC 2 -- Broadband.....	14
	PDC 3 -- Broadband.....	15
5.2	Broadband Prioritized Target Areas for Improvement; All PDCs .....	16
5.3	Cellular – Target Areas for Improvement.....	17
	PDC 1 -- Wireless.....	17
	PDC 2 -- Wireless.....	18
	PDC 3 -- Wireless.....	18
	Wireless Service in the Future.....	18
	5 <sup>th</sup> Generation Wireless (5G).....	19
<b>6</b>	<b>Recommendations and Next Steps</b> .....	<b>20</b>
6.1	Recommendations.....	20
<b>7</b>	<b>ATTACHMENTS AND APPENDICES</b> .....	<b>22</b>
7.1	COMMUNITY NEEDS APPENDIX .....	22
	LENOWISCO .....	22
	Cumberland Plateau.....	25
	Mount Rogers.....	28
7.2	Sources of Funding Appendix .....	34
	National Funding .....	34
	State Level Awards Granted.....	34
	Regional Awards Granted .....	34
	Pending Applications at the Tobacco Commission.....	35
	Funding Strategy .....	36
7.3	Addressable Market Appendix.....	41
	Market Overview .....	41
7.4	Service Provider Appendix .....	44

## 2 EXECUTIVE SUMMARY

This report documents a comprehensive needs assessment of the telecommunications services in thirteen counties and three cities in Planning Districts 1, 2 and 3 in Southwest Virginia.

The rural parts of Southwest Virginia are largely under-served, with some areas completely *unserved*, by broadband providers. The low population density in the region and the highly challenging geography -- the Appalachian Mountain range -- make it unlikely that the region's leaders will be able to rely on the private sector to solve this problem -- if there were a market-based business case, the investor-owned service providers would already be serving.

With few exceptions, the Incumbent Local Exchange Carriers' traditional copper and cable networks are insufficient to meet the current and future bandwidth needs of the region. Due to the financial impracticality of deploying current-technology networks, most incumbent local exchange carriers have neglected to extend, upgrade, or expand their networks in the region. Through public and private investment funds, others have built middle-mile fiber along the main corridors but generally without a last-mile solution.

This lack of ubiquitous, affordable, reliable broadband has had an ongoing impact on the region. In many areas covered in this study, populations are declining. Communities are having difficulties retaining youth. Economies are stagnant and lacking the means to grow. Residents are frustrated and, in some cases, indignant about the lack of broadband and wireless. Students are falling behind. Small businesses cannot compete. Larger businesses are moving out of the region. Not all of these maladies are caused by lack of sufficient broadband services, but it is certainly a contributing factor.

The need and demand for broadband communications services is great. The demand is sufficient to justify a long-term public investment. The total projected cost for broadband is estimated at \$52 Million. This represents a high-level estimate of the total cost to solve the last-mile issue at 62 high-priority communities within the three Planning Districts. This cost estimate is based upon leveraging the existing investments made by the Virginia Tobacco Region Revitalization Commission, the Virginia Coalfield Economic Development Authority, the EDA, and other providers of capital in the regional communications infrastructure. The plan calls for approximately -372 miles of new backbone fiber and 931 miles of drops, resulting in an estimated cost of \$ 7,584 per home. The investment will pass over 9,800 homes and it is estimated 6,884 will subscribe to service. It must be noted that these unserved and underserved 62 communities are the most difficult to reach with the sparsest population density. Also, once the backbone is built to serve these communities, additional incremental (those not subscribing to service in the initial buildout) can be added for approximately \$2,200 per residence, depending upon drop length.

The following table displays the breakdown of the residences to be served, the miles of backbone and drops, and total estimated cost to remediate the targeted areas by Planning District.

Cost Estimate	Regional Total	PDC 1	PDC 2	PDC 3
Homes Passed	9,831	1,368	4,574	3,889
No. of Customers (at take rate)	6,884	957	3,202	2,725
Miles of Backbone	372	70	126	177
Miles of Drop	931	130	433	368
Total Cost (EST)	\$ 52,207,296	\$ 8,662,984	\$ 20,566,494	\$ 22,977,817
Cost per Home	\$ 7,584	\$ 9,052	\$ 6,423	\$ 8,432

This \$52 million investment will not solve all of the regional connectivity problems. It will however, address access to high-speed Internet service for the communities in the greatest need.

Additionally, this plan does not address wireless services (cellular) in the region. Simply put, there is no path forward to improving commercial wireless services in the region without a partnership/collaboration with one of the major wireless operators. The region has immense potential to build upon the wireless infrastructure deployed for the 4g project, but it is fruitless to build additional towers, distributed antennae systems, or microcells in hopes that a wireless service provider will use the assets. Wireless operators are inscrutable in their network planning and never use assets simply because they have been made available.

The prioritized list of communities to be addressed are presented in Section 5 of this report. For implementation of this plan we recommend that the regional leaders find a way to formalize a relationship with Scott County Telephone Cooperative, Citizens Telephone Cooperative, and CPC Broadband. All three of these organizations have displayed a long history of *purpose-over-profit* and shared values with the regional planning leaders to improve the quality of life in the region and drive economic development. For any collaboration to work, shared values is the most important characteristic for success.

To fund this plan Section 7.2 of the Appendices lists the resources available to improve the lack of broadband services in the identified communities. It is recommended that a separate legal entity be organized to address the connectivity issues (broadband and

wireless) in the 13 -county region. Additionally, that Executive Director must be tasked with specific accountabilities (and rewards) to seek funding for these high priority communities. In short, all of rural America will be competing for these funds. The regional leaders must become tireless advocates for the region's communications needs.

Intuitively, everyone understands there is a correlation between investments in broadband and economic development. The relationships are well studied and there are a number of scholarly articles that quantify the impacts of investment in rural broadband and economic growth, specifically:

- Gross Domestic Product Per capita Increase,
- Median Household Income Increase, and
- Productivity Increase

One of the more recent studies commissioned by the World Bank, studied the economic impact in developing economies:

*Digital Dividends. Exploring the Relationship Between Broadband and Economic Growth,*  
by Michael Mingos, 2016.

The study concludes that a 10 percentage point increase in fixed broadband penetration would increase GDP growth by 1.21% in developed economies and 1.38% in developing ones. The GDP of the 13 county region is approximately \$12 Billion annually. The resulting economic impact in the region from the proposed investment can be expected to yield between \$145 Million and \$166 Million of economic growth, recurring annually.

There are hundreds of scholarly articles supporting this expectation.

## 3 INTRODUCTION

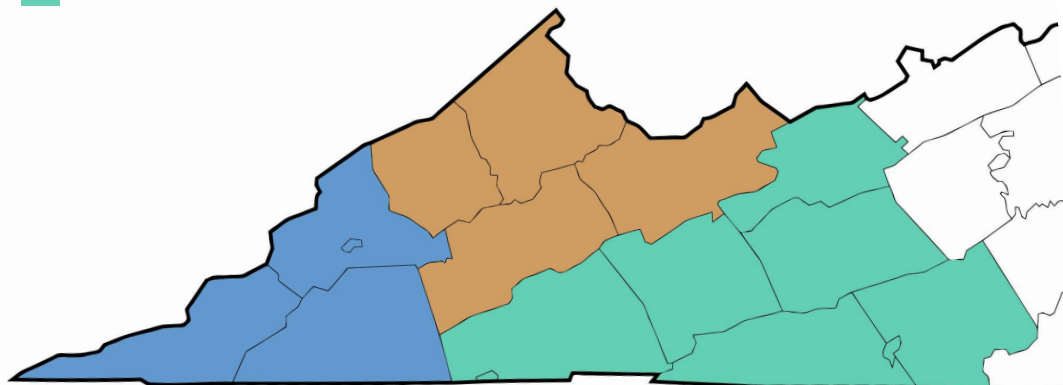
This report documents a comprehensive needs assessment of the telecommunications services in thirteen counties and three cities in Planning Districts 1, 2 and 3 in Southwest Virginia.

### 3.1 Project Area

#### Broadband Project Assessment Area – SW VA

##### Legend

- LENOWISCO PDC 1
- Cumberland Plateau PDC 2
- Mount Rogers PDC 3



Despite the fact that Southwest Virginia has seen over \$160 mm in capital investment over the last 20 years to improve the communications infrastructure, the region still has significant gaps in coverage. In 2016, a study by the Virginia Chamber of Commerce indicated that only 53 percent of rural Virginians had access to broadband Internet compared to urban areas with 96 percent.

During the course of this study, many communities have come forward to highlight the fact that there are areas completely unserved and underserved, and that many services are unaffordable. This outcry prompted leaders within the planning districts to strive to help improve high-speed Internet service, emergency communications service, and wireless service.

The areas studied are outlined in the following table. Across the region, population densities are low, and counties and cities are losing population due to the lack of vibrant economies. To support a growing economy, the region must have sufficient infrastructure and technologies.

Region	2010 Census	2018 Estimate	Percent Change	Square Miles	Density per Sq. Mile
Bland	6,824	6,432	-6%	358	18
Bristol city	17,835	16,877	-5%	13	1,297
Buchanan	24,098	21,576	-10%	503	43
Carroll	30,042	29,141	-3%	475	61
Dickenson	15,903	14,516	-9%	331	44
Galax City	7,042	6,587	-6%	8	799
Grayson	15,533	15,330	-1%	442	35
Lee	25,587	23,994	-6%	436	55
Norton City	3,958	3,908	-1%	7	522
Russell	28,897	27,057	-6%	474	57
Scott	23,177	22,121	-5%	536	41
Smyth	32,208	30,475	-5%	451	68
Tazewell	45,078	41,973	-7%	519	81
Washington	54,876	53,992	-2%	561	96
Wise	41,452	38,386	-7%	403	95
Wythe	29,235	28,650	-2%	462	62
<b>Total/Average</b>	<b>401,745</b>	<b>381,015</b>	<b>-5%</b>	<b>5,977</b>	<b>211</b>

### 3.2 Project Team

#### Thompson and Litton Engineers

Thompson & Litton Engineers (T&L), a local professional services firm, was selected to develop the study. T&L teamed with Blue Ridge Advisory Services Group, Inc. (Blue Ridge) to complete a comprehensive needs assessment and identify potential remedial solutions for the LENOWISCO (PDC 1), Cumberland Plateau (PDC 2), and Mount Rogers (PDC 3) planning districts.

T&L has over 100 employees in eight offices, offering an array of engineering, architectural, surveying, planning and construction services throughout Southwest Virginia, Tennessee, and West Virginia. T&L has designed 15 broadband projects and numerous wireless deployment projects since 2006.

With offices in Wise, Tazewell, and Chilhowie, T&L has a presence in each PDC associated with this study and is committed to providing superior service to the people within the region, as it has since 1956.

T&L's related project experiences include:

- Roanoke Valley Broadband Authority
- Citizens Telephone Cooperative
- Bristol VA Utilities/Cumberland Plateau
- Virginia Coalfield Coalition
- Verizon Wireless
- AT&T Mobility
- Nextel Communications
- SBA Communications
- Roanoke County, Virginia
- Virginia State Police

### **Blue Ridge Advisory Services Group**

Blue Ridge Advisory Services Group (Blue Ridge) is a professional services firm that has been serving the telecommunications sector for 20 years. The firm provides strategies, business plans, feasibility studies, financial modeling, and other value-added related services to bring about actionable plans to improve communities.

Blue Ridge's related project experience includes:

- Dominion Energy Telecommunications,
- DukeNet,
- CaroNet,
- TVA Telecom,
- Bonneville Power Telecom,
- Mid-Atlantic Broadband (and LIT Networks),
- Virginia Coalfield Coalition 4g Wireless.
- LENOWISCO LLC
- Roanoke Valley Broadband Authority
- Consolidated Cooperative FTTH Initiative

The study is being funded by a grant from the Appalachian Regional Commission (ARC) and Virginia Department of Housing and Community Development (DHCD). It is sponsored by the Town of Nickelsville, the Cumberland Plateau, LENOWISCO and Mount Rogers PDCs, and the Virginia Coalfield Coalition (VCC). The results of this study will serve to increase awareness and knowledge of where the broadband gaps are and hopefully lead to improved broadband choices for all residents, businesses, and visitors in Southwest Virginia.



### **3.3 Deliverables**

The final deliverables of this study include this written report, as well as two presentations to the management team. The first presentation was made in February 2019 and was followed by a second presentation in April 2019. All work products are the property of the ARC, DHCD, the VCC, the three PDCs, and the Town of Nickelsville.

### **3.4 Methodology**

T&L and Blue Ridge worked with a cross-functional management team of regional representatives to define:

- Accomplishments in the Region,
- Community Needs,
- Regional Needs,
- Remedial Strategies and Associated Costs,
- Prioritized List of Communities in Greatest Need,
- Potential Funding Sources and Strategies, and
- Potential Service Providers.

To identify the specific needs of each community (as well as the regional needs identified in Section 7.1 of the Appendices to this report) Blue Ridge conducted 40 interviews with key stakeholders in the region, covering 13 counties and 3 cities in Southwest Virginia, including:

- 8 with LENOWISCO
- 6 with Cumberland Plateau
- 8 with Mount Rogers
- 7 with industry leaders/stakeholders in the region
- 11 with telecom service providers that are active in the region

### 3.5 Accomplishments in Southwest Virginia

Over the past 20 years, approximately \$168 Million dollars of public investments have been made in Planning Districts 1, 2 and 3 to enhance broadband communication. The following table shows a breakdown of those investments by planning district.

Planning District	Amount Invested
LENOWISCO	\$ 71,579,167
Cumberland Plateau	\$ 45,758,931
Mount Rogers	\$ 50,383,291
<b>Total Public Investment in Planning Districts 1, 2, &amp; 3</b>	<b>\$167,721,389</b>

Beginning in 2000, the PDCs, realizing that the Internet was more than a passing fad, began to aggressively integrate broadband planning into their regional planning. Attitudes towards broadband gradually shifted from being considered an *amenity* to being recognized as a *necessity*. Broadband has become a quality of life issue and a necessity for ensuring economic development in every region. Essentially, it is the modern day equivalent of the Rural Electrification Act from the 1930s that brought electricity to rural America. In fact, today many are calling broadband “*the fifth utility*.”

On a national level, investments are being made in tele-health, school system technology, distance learning, and emergency preparedness. Telecommunications grants and loans are being made to improve services in each of these critical areas within the study area.

While some of these grant awards were single purpose and would not allow broadband operators to maximize their use by connecting all classes of commercial and residential customers in some cases, technology investment has driven and enhanced economic development in certain areas. A prime example of this is the Southwest Virginia Technology Center of Excellence, which is a software development and systems integration facility in the town of Lebanon in Russell County. CGI Group Inc., the fifth largest independent information technology and business process services firm in the world, invested in the area because of the grant-funded fiber optic backbone. Northrop Grumman Corporation, an American global aerospace and defense technology company, is also located in Lebanon.

Other examples include DP Facilities, Inc. data center in Wise County and Sykes Enterprises’ call centers in Buchanan and Wise Counties. Norton (PDC 1) has a Medicare transportation call center and one of its partners – the medical records data center - is in Duffield (Scott County). It is billed as “the first Tier 4 commercial data center in the US.”

## 4 Regional Needs

The region's needs to support technology-enabled, quality-of-life-improving applications were identified by interviewing key stakeholders throughout the three planning districts. Regional leaders view broadband as a necessity - a "4th utility." Some county leaders have taken the lack of broadband into their own hands and have begun their own initiatives to secure better services (Grayson County's RFP, for example).

### Major Trends

These viewpoints and initiatives demonstrate the following major trends/needs that were identified during the interview process:

- Plenty of middle-mile fiber exists in the region but there is **very little last mile connection**, especially in the more rural areas/off the main corridors. This presents a real need for a last-mile solution, as several providers have deployed fiber in the region along the major corridors but haven't extended the lines. The existing last mile providers, the incumbent local exchange carriers (ILECs), have not invested in upgrading their networks to adequately serve customers or ensure reliability in service.
- Broadband is available in areas with higher densities (cities such as Bristol and/or Norton), but issues include **unaffordable prices, lack of competition, and low quality of service**
- Some areas lack the basics - *cable TV* and/or reliable *landline* service
- **Cellular service is spotty** throughout parts of the region; there is no comprehensive cellular solution. *Some areas still run on 3G.*
- Residents in the more rural areas seem to tolerate the lack of coverage. Visitors and prospective investors -- who are accustomed to better services -- do NOT. They take their business elsewhere.

### Impact on Economic Development

While there is adequate connectivity to most of the industrial parks in the region, the lack of broadband in many areas has a profound impact on economic development.

- **Attracting Investment** - Prospective companies expect broadband to be available & won't wait for it to be built to suit. If a business expects to locate, high speed broadband with 4G is anticipated. Potential investors who cannot place a phone call from their cell phones are immediately turned off.
- **Tourism** - Tourists don't come back without cell service.
- **Infrastructure** - Broadband infrastructure is key to economic survival. Can't "get in the game" or even "sit on the bench" without it.
- **Workforce** - It's a serious "workforce issue" for retaining employees or getting new hires to relocate. Non-traditional, virtual jobs, and work from home will become more and more the future.

- **Innovation** - Broadband is necessary to foster innovation and to retain young people -- largest export is educated youth.
- **Real Estate** - Impacts home sales, as there is a noted lower demand for homes without access to broadband
- **Farming** - Impacts farming as operations become more technology-driven

#### **Impact on Citizens**

- **Options** - Without fiber and broadband, communities are unable to develop and provide advanced services
- **Price** - Consumers experience substantial pricing differentials across the region, depending on the level of competition
- **Speeds** – There is a gap between what’s advertised and what residents are experiencing, plus asymmetry between upload and download speeds

#### **Impact on Emergency Medical Services**

- Seamless emergency services communication is necessary
- A large concern by EMS is reaching tourists who cannot place cellular calls from remote areas
- Some people have to use landlines to call 911. As an illustration, in Haysi, if a call doesn’t go through, it doesn’t get forwarded, and callers have no access to emergency service.

#### **Impact on Educational System**

- Schools are well connected, but there is a major disconnect between school and home accessibility, also known as the “homework gap”

## 5 PRIORITIZATION OF COMMUNITIES

To prioritize the communities, the following methodology was agreed upon and used:

Rank	Criteria	Weight
1	<b>Level of Need</b>	<b>50 points</b>
	a) Un-served	
	b) Underserved	
2	<b>Number of Potential Connections</b>	<b>30 points</b>
3	<b>Cost</b>	<b>20 points</b>
	a) Backbone Connection Cost	
	b) Cost Per Connection (wireless, fiber)	

### 5.1 Broadband – Target Areas for Improvement

The following areas have been identified as targets for remediation in descending order of priority.

#### PDC 1 -- Broadband

PDC 1 - LENOWISCO								
Priority	County	Target Area for Improvement - Broadband	Homes Passed	Cost per Customer	Customers (at take rate)	Backbone Miles	Drop Miles	Total Estimated Cost
1	Lee	District 5 (north of 58 Alt)	62	\$ 8,100	43	3	6	\$ 348,313
2	Scott	Gate City to Duffield	366	\$ 10,688	256	24	35	\$ 2,736,206
3	Wise	Appalachia - Stonega	268	\$ 6,388	188	7	25	\$ 1,201,032
4	Wise	Appalachia - Exeter	260	\$ 6,578	182	8	25	\$ 1,197,236
5	Wise	Coeburn	150	\$ 7,005	105	5	14	\$ 735,528
6	Wise	Guest River	103	\$ 10,309	72	6	10	\$ 742,264
7	Wise	Birchfield	91	\$ 12,389	64	7	9	\$ 792,921
8	Lee	Blackwater	39	\$ 19,884	27	6	4	\$ 536,867
9	Wise	Hurricane	29	\$ 18,631	20	4	3	\$ 372,618
<b>TOTAL - PDC 1</b>			<b>1,368</b>	<b>\$ 9,052</b>	<b>957</b>	<b>70</b>	<b>129</b>	<b>\$ 8,662,984</b>

## PDC 2 -- Broadband

PDC 2 - CUMBERLAND PLATEAU								
Priority	County	Target Area for Improvement - Broadband	Homes Passed	Cost per Customer	Customers (at take rate)	Backbone Miles	Drop Miles	Total Estimated Cost
1	Tazewell	Baptist Valley	712	\$ 3,671	498	2	67	\$ 1,828,233
2	Dickenson	Haysi	37	\$ 5,454	26	1	4	\$ 141,813
3	Russell	Cleveland to Carbo	690	\$ 4,246	483	6	65	\$ 2,050,899
4	Buchanan	Council to Davenport	473	\$ 3,415	331	0	45	\$ 1,130,458
5	Tazewell	Abbs Valley	370	\$ 3,899	259	2	35	\$ 1,009,884
6	Tazewell	Gratton Valley	341	\$ 5,317	239	6	32	\$ 1,270,687
7	Dickenson	Honey Camp	85	\$ 9,467	60	5	8	\$ 568,009
8	Buchanan	Conaway	77	\$ 10,159	54	5	7	\$ 548,573
9	Buchanan	Big Rock	76	\$ 7,936	53	3	7	\$ 420,621
10	Tazewell	Richlands to Jewell Ridge	248	\$ 7,172	174	9	23	\$ 1,247,892
11	Buchanan	Dismal River Rd to Whitewood	234	\$ 11,460	164	17	22	\$ 1,879,384
12	Dickenson	Clinchco	112	\$ 4,267	78	1	11	\$ 332,822
13	Tazewell/Buchanan	Jewell Ridge to Bearwallow	63	\$ 13,490	44	6	6	\$ 593,565
14	Tazewell	Thompson Valley	167	\$ 11,241	117	12	16	\$ 1,315,201
15	Russell	Green Valley Rd	139	\$ 7,311	97	5	13	\$ 709,206
16	Russell	Belfast Mills	129	\$ 7,011	90	4	12	\$ 630,976
17	Tazewell	Tannersville	122	\$ 13,576	85	11	12	\$ 1,153,952
18	Buchanan	Home Creek	105	\$ 7,835	74	4	10	\$ 579,798
19	Buchanan	Hurricane Creek	89	\$ 9,166	62	5	8	\$ 568,297
20	Dickenson	Breaks	78	\$ 8,462	55	4	7	\$ 465,385
21	Buchanan	Hurley	57	\$ 9,021	40	3	5	\$ 360,833
22	Dickenson	Hill Ridge	56	\$ 6,974	39	2	5	\$ 271,981
23	Dickenson	Lick Creek	79	\$ 16,872	55	10	7	\$ 927,987
24	Buchanan	Bearwallow to Peapatch	35	\$ 22,402	25	6	3	\$ 560,039
<b>TOTAL - PDC 2</b>			<b>4,484</b>	<b>\$ 209,957</b>	<b>3,139</b>	<b>126</b>	<b>425</b>	<b>\$ 20,566,494</b>

**PDC 3 -- Broadband**

PDC 3 - MOUNT ROGERS								
Priority	County	Target Area for Improvement - Broadband	Homes Passed	Cost per Customer	Customers (at take rate)	Backbone Miles	Drop Miles	Total Estimated Cost
1	Washington	South of Glade Spring	182	\$ 7,733	127	7	17	\$ 982,091
2	Bland	Ceres	39	\$ 6,271	27	1	4	\$ 169,327
3	Grayson	Providence to Fries	374	\$ 4,548	262	4	35	\$ 1,191,642
4	Smyth	Sugar Grove	301	\$ 4,910	211	4	29	\$ 1,035,967
5	Bland	Clear Fork	113	\$ 13,752	79	11	11	\$ 1,086,374
6	Smyth	Rich Valley	443	\$ 6,863	310	14	42	\$ 2,127,419
7	Bland	Bland to Holly Brook	283	\$ 10,703	198	19	27	\$ 2,119,121
8	Carroll	Hillsville to Fancy Gap	254	\$ 7,132	178	9	24	\$ 1,269,484
9	Washington	Damascus	182	\$ 3,768	127	1	17	\$ 478,483
10	Wythe	Austinville	175	\$ 5,955	123	4	17	\$ 732,497
11	Bland	Grapefield	96	\$ 16,083	67	11	9	\$ 1,077,560
12	Grayson	Independence to Elk Creek	185	\$ 9,485	130	10	18	\$ 1,233,007
13	Bland	Dry Fork	151	\$ 8,958	106	8	14	\$ 949,500
14	Grayson	Baywood	76	\$ 6,313	53	2	7	\$ 334,601
15	Washington	Mendota	63	\$ 4,959	44	1	6	\$ 218,205
16	Grayson	Galax to Old Town	60	\$ 5,962	42	1	6	\$ 250,419
17	Washington	Hayter's Gap	45	\$ 9,927	32	3	4	\$ 317,649
18	Smyth	Chilhowie Industrial Park	1	\$ 88,852	1	1	0	\$ 88,852
19	Bland	Little Creek	119	\$ 15,516	83	13	11	\$ 1,287,826
20	Carroll	Dugspur to Laurel Fork	105	\$ 15,285	74	11	10	\$ 1,131,108
21	Grayson	Independence to Bridle Creek	101	\$ 9,296	71	5	10	\$ 660,010
22	Wythe	Castleton Road	98	\$ 9,239	69	5	9	\$ 637,484
23	Carroll	South of Woodlawn	73	\$ 8,112	51	3	7	\$ 413,735
24	Wythe	Barren Springs	53	\$ 8,221	37	2	5	\$ 304,195
25	Grayson	East of Troutdale	25	\$ 7,217	18	1	2	\$ 129,910
26	Grayson	Mouth of Wilson to Rugby	87	\$ 14,762	61	9	8	\$ 900,503
27	Grayson	Rte 58 to Providence	77	\$ 12,331	54	6	7	\$ 665,873
28	Grayson	Elk Creek to Comers Rock	74	\$ 9,816	52	4	7	\$ 510,407
29	Grayson	Bridle Creek to Mouth of Wilson	54	\$ 17,752	38	7	5	\$ 674,567
<b>TOTAL - PDC 3</b>			<b>3,889</b>	<b>\$ 349,720</b>	<b>2,725</b>	<b>177</b>	<b>368</b>	<b>\$ 22,977,817</b>

## 5.2 Broadband Prioritized Target Areas for Improvement; All PDCs

Ranking	PDC	County	Target Area for Improvement - Broadband	Ranking	PDC	County	Target Area for Improvement - Broadband
1	PDC2	Tazewell	Baptist Valley	32	PDC1	Wise	Coeburn
2	PDC3	Washington	South of Glade Spring	33	PDC2	Russell	Green Valley Rd
3	PDC3	Bland	Ceres	34	PDC2	Russell	Belfast Mills
4	PDC2	Dickenson	Haysi	35	PDC3	Grayson	Baywood
5	PDC2	Russell	Cleveland to Carbo	36	PDC3	Washington	Mendota
6	PDC2	Buchanan	Council to Davenport	37	PDC3	Grayson	Galax to Old Town
7	PDC3	Grayson	Providence to Fries	38	PDC3	Washington	Hayter's Gap
8	PDC2	Tazewell	Abbs Valley	39	PDC3	Smyth	Chilhowie Industrial Park
9	PDC2	Tazewell	Gratton Valley	40	PDC2	Tazewell	Tannersville
10	PDC3	Smyth	Sugar Grove	41	PDC3	Bland	Little Creek
11	PDC3	Bland	Clear Fork	42	PDC3	Carroll	Dugspur to Laurel Fork
12	PDC2	Dickenson	Honey Camp	43	PDC2	Buchanan	Home Creek
13	PDC2	Buchanan	Conaway	44	PDC1	Wise	Guest River
14	PDC2	Buchanan	Big Rock	45	PDC3	Grayson	Independence to Bridle Creek
15	PDC1	Lee	District 5 (north of 58 Alt)	46	PDC3	Wythe	Castleton Road
16	PDC3	Smyth	Rich Valley	47	PDC2	Buchanan	Hurricane Creek
17	PDC1	Scott	Gate City to Duffield	48	PDC2	Dickenson	Breaks
18	PDC3	Bland	Bland to Holly Brook	49	PDC3	Carroll	South of Woodlawn
19	PDC1	Wise	Appalachia - Stonega	50	PDC2	Buchanan	Hurley
20	PDC1	Wise	Appalachia - Exeter	51	PDC2	Dickenson	Hill Ridge
21	PDC3	Carroll	Hillsville to Fancy Gap	52	PDC3	Wythe	Barren Springs
22	PDC2	Tazewell	Richlands to Jewell Ridge	53	PDC3	Grayson	East of Troutdale
23	PDC2	Buchanan	Dismal River Rd to Whitewood	54	PDC1	Wise	Birchfield
24	PDC3	Washington	Damascus	55	PDC3	Grayson	Mouth of Wilson to Rugby
25	PDC3	Wythe	Austinville	56	PDC2	Dickenson	Lick Creek
26	PDC2	Dickenson	Clinchco	57	PDC3	Grayson	Rte 58 to Providence
27	PDC3	Bland	Grapefield	58	PDC3	Grayson	Elk Creek to Comers Rock
28	PDC2	Tazewell/Buchanan	Jewell Ridge to Bearwallow	59	PDC3	Grayson	Bridle Creek to Mouth of Wilson
29	PDC3	Grayson	Independence to Elk Creek	60	PDC1	Lee	Blackwater
30	PDC2	Tazewell	Thompson Valley	61	PDC2	Buchanan	Bearwallow to Peapatch
31	PDC3	Bland	Dry Fork	62	PDC1	Wise	Hurricane



### 5.3 Cellular – Target Areas for Improvement

#### PDC 1 – Wireless

PDC 1	
County	Target Area for Improvement - Cellular
Lee	Blackwater
Lee	Ewing
Lee	Flatwoods
Lee	Keokee
Lee	LMU Vet School
Lee	Rose Hill
Lee	St Charles
Norton	Flag Rock Recreation Area
Norton	Hawthorne Drive
Scott	Clinchport to Dungannon
Scott	Dungannon
Scott	Fort Blackmore
Scott	Gate City to Duffield
Scott	Gate City to Nickelsville
Scott	Nickelsville
Scott/Russell	Nickelsville to Lebanon (Russell County, 30 mi)
Scott	Rye Cove
Scott	Twin Springs
Wise	Airport
Wise	Appalachia
Wise	Coeburn
Wise	Guest River area (NW of Norton, N of Blackwood)
Wise	Pound
Wise	Wise (past the airport towards Dickenson County)

**PDC 2 – Wireless**

<b>PDC 2</b>	
<b>County</b>	<b>Target Area for Improvement - Cellular</b>
Buchanan	US 460 Vasant to Richlands
Buchanan/Dickenson/Russell	Route 80/Scenic Bike Trail
Dickenson	Clintwood to St. Paul
Dickenson	Edwards Ridge
Dickenson	Haysi
Dickenson	Lick Creek
Russell	Cleveland
Russell	Dante
Russell	Honaker
Russell	Lebanon to Hansonville
Russell/Washington	Hansonville to Abingdon

**PDC 3 – Wireless**

<b>PDC 3</b>	
<b>County</b>	<b>Target Area for Improvement - Cellular</b>
Bland	Ceres
Bland	Clear Fork
Bland	Dry Fork
Bland	Grapefield
Bland	Holly Brook
Bland	Little Creek
Carroll	Dugspur
Carroll	Laurel Fork
Carroll	S of Woodlawn/NE of Lambsburg
Washington	Abingdon

**Wireless Service in the Future**

Unlike Broadband Service, little can be done by the regional leaders to improve wireless communications without the full cooperation and assistance of a major wireless carrier.

It is impossible to forecast the total capital cost to improve the wireless coverage in these unserved communities. The recent 4g wireless project undertaken by the Virginia Coalfield Coalition resulted in significant regional coverage expansion (estimated at 90% of the population in PDCs 1 and 2) for \$15 Million, with a matching capital expenditure by a carrier. It is reasonable to estimate that a similar budget would be required to achieve 100% coverage.

One thing is clear from the initial 4g wireless initiative. There can be no economic development, eco-tourism, smart communities, smart electric grid, autonomous vehicles, or anything of the like without solid wireless communications network.

#### **5<sup>th</sup> Generation Wireless (5G).**

The next evolution of wireless communications (mobile point-to-multipoint communications, sometimes called “cellular”) is called 5<sup>th</sup> Generation Wireless or 5G. 5G is a standards-based protocol that enables much higher data transmission speed to wireless devices than any previous standard.

**Why is 5G important?** 5<sup>th</sup> generation wireless will enable speeds of up to 4 gigabits per second. That is 80 times faster than the speeds experienced on a 4g LTE network. Our world is becoming increasingly more dependent upon mobile data. Things like Smart Cities, Smart Grid, Hi-definition Tele Health, and Autonomous Vehicles will all require 5G.

**What is the network like?** 5G operates at a much higher wave frequency than any of the previous generation’s networks. This means the signals will travel shorter distances and not be able to travel through impediments. However, the frequencies will carry much greater data payloads.

The FCC concluded its first 5G spectrum auction this year in the 28 GHz band, and its auction of 24 GHz spectrum is taking place right now. Later this year, the FCC will auction the upper 37 GHz, 39 GHz, and 47 GHz bands.

5G will require a completely different network architecture and infrastructure than is currently in place. Instead of 200 foot-tall towers with large macro cells that can cover miles of territory, 5G will require small-cell or micro-cell architecture that broadcasts only a few hundred feet. It is generally believed that 5G cells will be required every thousand feet or so. Cells will be placed on light poles, utility poles, rooftops, and sides of buildings. The cells are small and require less power than macro cells. A key component of the network is fiber optic cable, as all cells must be connected with fiber to meet the bandwidth and latency requirements.

**When will 5G be deployed?** Carriers are working on beta tests and early network testing in a handful of metropolitan markets. The complete spectrum auction being managed by the FCC will not be completed until the end of 2019. Mobile handset makers like Apple will not release a 5G phone until late 2020 or 2021. 5G will not be widely available for several years. The initial deployments that have been announced are all major metropolitan areas. It is unknown how long, if ever, 5G will be deployed in rural markets like our three Planning Districts. ***There is nothing expected from 5G that would disrupt the plan outlined in this document for the foreseeable planning horizon.***

## 6 Recommendations and Next Steps

It is neither the purpose nor the intention of this study to point out the obvious to the leadership of PDCs 1, 2, and 3. The situation is plainly known to every planner, politician, stakeholder, and citizen in the region – **the communications infrastructure in Southwest Virginia is woefully inadequate to move the region forward.**

There are areas of breakthrough performance that can be pointed to as major successes:

1. LIT Networks bringing direct fiber connectivity and terabit speeds to the region from Ashburn thus enabling the development of critical data centers. Lowering the cost of wholesale Internet for all regional service providers. And providing diversity to the major Internet NAPs in Atlanta Georgia with ring protection.
2. Scott County Telephone's, Citizens Telephone's, and Sunset Digital's Fiber to the Home (FTTH) initiatives delivering gigabit speeds to residential customers.
3. The VCC 4g wireless project which enabled 4<sup>th</sup> generation wireless services to reach a reported 90% of the population of PDC's 1 and 2 (excluding Scott and Tazewell Counties).
4. CPC Broadband (formerly CPC OptiNet) is a subsidiary company of the Cumberland Plateau PDC. It was organized to serve Russell, Dickenson, Tazewell, and Buchanan Counties. Partnering with Point Broadband the Company has obtained over \$37 million in grant funding for the construction of 700 miles of fiber optic broadband backbone that is now serving almost 900 industrial, commercial, governmental and educational institutions in the region, including Northrup Grumman, Sykes, Pyott-Boone, and Dickenson County Public Schools.

Yet, despite these successes, the plain truth is that without service **ubiquitously** in the region, there can be no sustainable economic development, job creation and retention, and work force development.

The purpose of this report is to identify a prioritized inventory of areas to address; presented in Section 5. Our recommendations for implementing improvement are as follows:

### 6.1 Recommendations

1. Address the broadband problem on a regional basis as three PDC's, not individually, competing against one another for scarce resources. Consider forming a separate legal entity (or repurposing an existing one like the VCC) specifically to attack solving the broadband problems in the region. Hire a

dedicated Executive Director and task him/her with time-specific and measurable goals. Link compensation to goal attainment.

2. This report presents a priority list by PDC, and a single integrated list. There are economies of scale to network deployment. It may be far more cost effective to attack the highest priority from PDC 3 and a middle priority from PDC 2 at the same time. This should be considered before undertaking a strict buildout of the presented priorities.
3. Formalize agreements with SCTC, Citizens, and CPC Broadband that outline the mechanics of how network will be funded, deployed, operated, and maintained, including any revenue sharing.
4. Continue to encourage WISPs such as iGo, HillCom, and Gigabeam to deploy their wireless networks in unserved markets. While wireless is neither as robust nor as high-a-quality service as fiber, this is a situation where anything is better than nothing for the unserved customer. The encouragement can come in the form of discounted costs for tower attachment, access to dark fiber, and assistance with grant/loan programs.
5. Ignore the notion that some communities may eventually be served by virtue of the Connect America Fund. The FCC Connect America Fund recipients are not obligated to serve customers for up to six years. The unserved residents of Southwest Virginia need service NOW.
6. Attain legislative assistance, particularly for wireless (cellular) deployments. Several times in this report it has been noted that there is no path forward for wireless expansion without a carrier's participation. When the VCC implemented the 4g wireless program in 2011, it was only possible because of the leadership of Delegate Kilgore and the Tobacco Commission striking a deal with a commercial wireless provider.
7. Strive to get Southwest Virginia broadband worked into the annual state budget. Governor Northam has noted several times that rural broadband is a priority for his administration. In December 2018, the Governor announced plans to ask the General Assembly to commit \$46 million in the state's upcoming budget to assist rural areas of Virginia to get broadband Internet access. The Southwest Legislative Delegation should strive for a specific earmark for the region.

## 7 ATTACHMENTS AND APPENDICES

### 7.1 COMMUNITY NEEDS APPENDIX

#### LENOWISCO

The following table shows the population change and density per square mile for PDC 1 – LENOWISCO (Lee, Norton, Wise, and Scott).

PDC 1	2010 Census	2018 Estimate	Percent Change	Square Miles	Density/Sq. Mile
Lee	25,587	23,994	-6%	436	55
Norton City	3,958	3,908	-1%	7	522
Wise	41,452	38,386	-7%	403	95
Scott	23,177	22,121	-5%	536	41
<b>Total/Average</b>	<b>94,174</b>	<b>88,409</b>	<b>-5%</b>	<b>1,382</b>	<b>68</b>

#### Lee County

Lee County is served by Comcast and Verizon with additional services provided by Sunset Digital Communications.

Pennington Gap and Jonesville are the main population centers within the county and are relatively well served. However, St. Charles and the surrounding communities are not as well served. A few areas reported no telephone service in inclement weather and a complete void of multi-channel video service. Of course, high speed Internet service is non-existent. Business services are limited.



From Rose Hill westward toward Cumberland Gap, complaints about broadband service have been ongoing for years.

Verizon, the Incumbent Local Exchange Carriers (ILEC) in the region, is offering broadband services using DSL in some portions of the region. DSL has a physical

distance limitation that precludes it from being widely available. Even then, DSL is insufficient to meet the current FCC definition of broadband. Because of the technology limitations, it is understood there are no upgrades forthcoming for DSL that will keep pace with current bandwidth services in most of the nation.

Poor cellular service is a common complaint. New towers are being planned in Lee County for emergency services. The county planners are building these towers to accommodate commercial carriers in the hope that macro cells will be collocated on these towers and improve that wireless situation. To date, no commercial carriers have shown an interest in these new towers. Local officials understand that cellular wireless service is inadequate throughout the county and that it is an impediment to sustainability.

Communities identified as high-priority for broadband expansion are:

- District 5 (north of 58 Alt)
- Keokee
- Blackwater
- Flatwoods
- Rose Hill
- Ewing

***“The two things which we must overcome as a community and as a region is the challenge of overcoming the older generation/leaders’ way of thinking and planning for the expected exponential change in [broadband] capacity needs in the future.” –  
Leton Harding, Powell Valley National Bank***

### Wise County

Wise County receives most of its digital services from Comcast, Verizon, Sunset Digital, and Scott County Telephone Cooperative (SCTC).



Wise County has several backbone networks traversing the county with acceptable service levels to many. As a result, the county has seen economic development opportunities improve. One major data center, two call centers, and one digital-operations-center have located in Wise County.

However, not all residents of Wise County are receiving satisfactory services. Customers farthest from the main networks experience service quality and reliability failures, and competitive services options are not available. Greater speeds for uploads and downloads are needed for work-at-home opportunities for entrepreneurs and the general workforce.





## City of Norton

The City of Norton has enjoyed robust communications services for years as a result of Verizon hosting a major Central Office in the downtown area. Economic development has taken advantage of that situation by successfully recruiting several digital businesses over the years including the Dual Party Relay Center providing services for the entire Commonwealth of Virginia through a contract with AT&T. That center recently closed as a result of contract changes and consolidation of services elsewhere. Verizon has also placed a directory assistance center within the city as has the statewide service that arranges Medicaid transportation services for their clients.

## Cumberland Plateau

The following table shows the population change and density per square mile for PDC 2 – Cumberland Plateau (Buchanan, Dickenson, Russell, and Tazewell Counties).

PDC 2	2010 Census	2018 Estimate	Percent Change	Square Miles	Density/Sq. Mile
Buchanan	24,098	21,576	-10%	503	43
Dickenson	15,903	14,516	-9%	331	44
Russell	28,897	27,057	-6%	474	57
Tazewell	45,078	41,973	-7%	519	81
<b>Total/Average</b>	<b>113,976</b>	<b>105,122</b>	<b>-8%</b>	<b>1,826</b>	<b>56</b>

## Buchanan County

Buchanan County is deep within the Coalfields of Virginia, adjacent to both Kentucky and West Virginia. The greatest communications network challenges in Buchanan County are the steep mountain terrain. However, a certain “can do” attitude exists which has fostered creative solutions to many problems.

This theme carried throughout the interviews conducted in the county. When solutions weren’t forthcoming from the service providers, local leaders took the initiative to raise funds and, in some cases, worked directly with the incumbent providers to extend services into communities where a business case could be made.

Educational institutions have created strong demand for broadband and wireless services, making communications a critical success factor for the region. A private law school and college of pharmacy have been operational in Buchanan County since 1994 and 2003,





*“Poor cellular coverage results in unsatisfying tourism experiences for our visitors” - Rita Surratt, Director, Dickenson County Chamber of Commerce*

## Russell County

Service providers in Russell County include Shentel, Verizon, and the Cumberland Plateau Company through a partnership with Sunset Digital. Russell County has capitalized on the “gig economy” by successfully recruiting call centers and software development centers to the region.

High-speed fiber lines were first placed in Lebanon nearly two decades ago which allowed the creation of data center and software development jobs.

However, connectivity beyond the Lebanon and the transportation corridors is still a problem for most of the county.



Affordability of broadband services was mentioned as a particular issue in Russell County.

When interviewees were asked about particular Russell County needs, **“all areas beyond Lebanon”** was the response.

Particular communities outlined regarding cellular wireless service needs included:

- Lebanon to Gate City - 71 - No service 75% of the time (1 hr. drive)
- Lebanon to Hansonville - Dropped calls/spotty coverage
- Lebanon to Abingdon - Dropped calls/spotty coverage
- Dante (near St. Paul) - Dropped calls/spotty coverage
- Cleveland - Dropped calls/spotty coverage
- Swords Creek -- Dropped calls/spotty coverage

The most pressing concern however was the inability to foster innovation and retain young people without dependable, affordable, quality broadband communications.

*From an economic development perspective, “you can’t ‘get in the game’ or even ‘sit on the bench’ without broadband infrastructure.” – Rachel Patton, WIA One Assistant Director*

## Tazewell County

Service providers in Tazewell County include Verizon, Spectrum, Burkes Garden, Comcast and Sunset. Tazewell County communities identified as high-priority for broadband expansion:

- Gratton Valley
- Tannersville and Clear Fork
- Thompson Valley
- Baptist Valley
- Abbs Valley
- Jewell Ridge
- Bluestone Commerce Park



The poor condition of Verizon legacy infrastructure is of great concern. Even landline service, the most basic of all telecom services, is unreliable.

In terms of cellular service, the main transportation corridor running through the county was the only reliable area for wireless communication.

*“The most important piece of technology in the classroom is the teacher.” – Drennon Laney, Server and Systems Administrator, Tazewell County Public Schools.*

## Mount Rogers

The following table shows the population change and density per square mile for PDC 3 – Mount Rogers (Bland, Bristol, Carroll, Galax, Grayson, Smyth, Washington, and Wythe).

PDC 3	2010 Census	2018 Estimate	Percent Change	Square Miles	Density per Sq. Mile
Bland	6,824	6,432	-6%	358	18
Bristol City	17,835	16,877	-5%	13	1,297
Carroll	30,042	29,141	-3%	475	61
Galax City	7,042	6,587	-6%	8	799
Grayson	15,533	15,330	-1%	442	35
Smyth	32,208	30,475	-5%	451	68
Washington	54,876	53,992	-2%	561	96
Wythe	29,235	28,650	-2%	462	62
<b>Total/Average</b>	<b>193,595</b>	<b>187,484</b>	<b>-3%</b>	<b>2,770</b>	<b>305</b>

## Bland County

Bland County, the least populated county studied, was recently awarded a \$459,764 grant from the Appalachian Regional Commission for a 33-mile fiber build to businesses and institutions in the county. The fiber run will start in Rocky Gap, then south through Bastian, then to Bland. The fiber will run along the Route 52 corridor. Once the fiber construction is finished, an ISP partner will use wireless technology to reach additional locations off Route 52. The project will make Internet access available to 37 businesses, as well as Bland County Schools, the Board of Education offices and the Bland County Medical Clinic, a federally qualified health center.



The existing providers in Bland County primarily use fixed wireless and existing DSL network plant to provide service and include:

- Sunset - Middle-mile fiber along Rt. 42 to Bland Correctional Facility
- CenturyLink – Some 10 MBPS service over copper but mostly 3 MBPS
- Verizon
- Gigabeam – Serving approximately 200 residents using towers throughout the county. They provide 50 MBPS service for \$79/mo. and 25 MBPS for \$30/mo.

Bland currently has a public-private partnership with Gigabeam Networks for up to 2 gig wireless.

Currently, the residential needs are not being met. The following areas were identified as having the greatest needs:

- Ceres (agriculture, tourism, 42/52 split)
- Grapefield
- Dry fork, Clear Fork, and Little Creek
- Hollybrook

## Carroll County

Carroll County has a population of approximately 29,724. Parts of the county are adequately served (the north side of Hillsville, for example), but other areas (specifically the south side of Hillsville) can only get about 1.5 MBPS, or “barely enough to e-mail.” In terms of cellular coverage, U.S Cellular has “good coverage” along main transportation corridors.



Resident complaints stem from CenturyLink and the lack of responsiveness to customers. The county has good broadband in the industrial parks, but workforce is the big issue for economic development.

CenturyLink is using its incumbent network (DSL) to serve customers

and used CAF funding to make it look as if customers had access to broadband when, in fact, they didn't.

Areas of greatest need include:

- Pipers Gap
- Laurel Fork
- Dugspur Region
- South of Woodlawn/Northeast of Lambsburg (FastLink has about 300 customers north of Lambsburg)

### Grayson County

Grayson County has been very proactive in pursuing solutions to its communities' broadband needs. In fall 2018, Grayson County issued an RFP for Broadband Services.

While a high level of detail on Grayson County's specific needs can be found in the RFP, a high level assessment is that most of the county is underserved or unserved.

- 77%, or 5,222 households have documented need for improved broadband
- Broadband is the number one need in the community. After Broadband, "Roads" are the number two need.
- Real estate sales and values are impacted by the degree to which broadband is available in a community.
- There is a potential growth opportunity for farmers to implement enabling technologies to better manage farm operations, but these technologies often require a broadband infrastructure
- Population retention & recruitment is a top priority for the Grayson County government. Broadband is considered #1 opportunity to solve this problem.



- As a former health care administrator, the County Administrator sees the value of connectivity to the entire population to improve health outcomes, especially in an area such as Grayson with a “graying population.”
- A lack of high speed communications is also contributing to the loss of young people after graduation.
- Areas of greatest need in the county (from current RFP):
  - Wilson & Elk Creek Districts; Mouth of Wilson, Rugby, East of Troutdale, Comers Rock
  - Providence, Elk Creek and Old Town; Elk Creek, Independence, Baywood
  - Wilson & Elk Creek Districts; East Mouth of Wilson, Buck Mountain, Big Ridge, Bridle Creek
  - Wilson District; West Mouth of Wilson, Whitetop
  - Providence, Old Town Districts; Fries, Baywood (east)
- Existing providers include:
  - CenturyLink
  - HughesNet and Exceed (WildBlue)
  - Comcast
  - Lingo (via Wired Road)
  - Citizens Telephone
- There are 13 total towers in the County but providers lack the incentive to upgrade.

*“High speed communication is a driver and enabler for the community. After Broadband, ‘Roads’ are the number two need.” – Bill Shepley, Grayson County Administrator*

### Smyth County

Smyth County has some fiber assets in the area through Sunset but, like many other counties in the planning districts covered in this report, needs a last mile solution. The business community’s needs are not being met and are at risk of leaving.

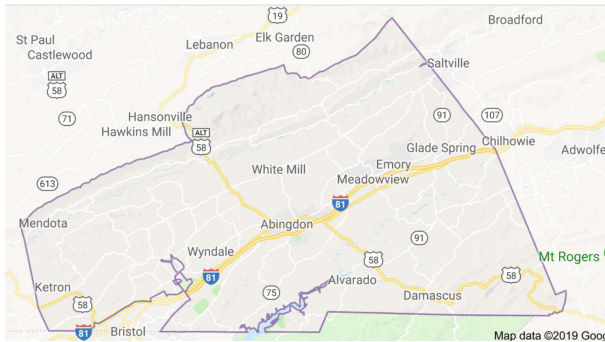
Providers serving Smyth County include CenturyLink, Comcast, and Sunset. There are no competitive local exchange carriers in the area. Cell phone service is “totally unreliable” in certain areas (northern and southern bands of the county), but providers won’t locate off the towers in the area. The majority of the complaints are about CenturyLink’s service.



The communities within Smyth County with the greatest need are:

- Sugar Grove
- Rich Valley.

### Washington County



In Washington County, business needs are being met only along I-81 corridor and within the Town of Abingdon and the City of Bristol. Beyond a three-mile radius from that corridor, businesses are either underserved or unserved. Residential needs are even greater. Mendota, Glade Spring and Damascus are all in need of service. Complaints from residents are frequent.

Service providers include Sunset, Charter, CenturyLink, and Comcast. Cellular wireless providers include VZW, T-Mobile and AT&T.

The specific communities within the county with the greatest needs include:

- Mendota
- Glade Spring
- Damascus

### Wythe County



In general, the industrial parks have good service. Businesses located along the transportation corridors are considered adequately served due to the amount of fiber available. However, residential coverage is spotty. The county has been suffering from economic stagnation in recent years. Historically, Wythe had been slowly growing while counties to the west were losing population. Only recently has the trend changed in Wythe as well. The current population is just over 29k.

The level of coverage in Wythe County varies depending on the part of the county. The denser areas (the eastern end of the county including Max Meadows and Austinville) have more coverage than less dense areas.

The current providers include CenturyLink and Shentel (which bought Rural Retreat Cable). Shentel offers “higher” speeds in Rural Retreat (up to 10 Mbps). The Chairman



of the BoS lives on Chapman road (the road running parallel to I-81/77 corridor (south side of Interstate) and is very dissatisfied with options and speeds available.

The Fort Chiswell/Lead Mines area is the one of greatest need. Also, the eastern end of the county is the largest growth area.

### **City of Galax**

Galax is more dense than other areas with the planning district. Also, it is part of Wired Road and is a Regional Broadband Authority, so the businesses and residents' needs are being met for the most part.

- Big businesses include Albany Industries, Moag Industrial, Vaughn Bassett furniture company, etc. CrossRoads Facility is a business incubator, and XM Radio call center has about 150 employees.
- There are about 7,000 people over 8 square miles, so a bit denser than other areas in the planning district.
- Wired Road forced providers to upgrade and expand their networks
- Perceived positive impact on real estate (byers won't consider moving to homes without broadband)
- Important for small businesses' online sales
- Schools are seeing higher enrollments and were using Lingo, which is one of the Wired Road providers. They are now using CenturyLink.
- Galax is upgrading some cell towers to ensure reliability
- Fiber runs east up to Airport Road

The main regional service providers in Galax include:

- Comcast – up to 130 meg residential in some areas; has a retail store in downtown Galax.
- CenturyLink – up to 25 meg
- Wired Road RBA

## 7.2 Sources of Funding Appendix

### National Funding

In December 2018, US Department of Agriculture (through RUS) announced a \$600 million grant and loan Broadband Program, ReConnect, to assist with building rural broadband infrastructure. Telecommunications companies, rural electric cooperatives and utilities, Internet service providers, and municipalities may apply for funding. To be eligible, communities must have populations smaller than 20,000 people with no broadband service or where service is slower than 10/1. Loan applications are due April and May 2019, depending on the program applied for.

### State Level Awards Granted

The state of Virginia, through Governor Northam, is heavily invested in the vision of equitable broadband coverage throughout the state. The Governor's vision is statewide broadband coverage within 10 years. The two agencies that have deployed the most capital to support broadband connectivity are the Virginia Tobacco Region Revitalization Commission (Tobacco Commission) and the Virginia Department of Housing and Community Development (DHCD). Part of receiving funding is a requirement that communities/localities have a "granular plan" for ensuring coverage.

#### Virginia Coalfield Economic Development Authority (VCEDA)

VCEDA has been involved with regional broadband expansion efforts for many years. They have been a provider of capital for the LENOWISCO Fiber-to-the-Home initiative, the Cumberland Plateau Company network expansion, and the Virginia Coalfield Coalition 4g Wireless project.

VCEDA indicated that "the more broadband deployed in the region, the more economic development is enhanced."

VCEDA identified the following communities as high potential candidates for broadband deployment:

- Haysi
- Nickelsville
- US 460 (between Richlands and Vansant)
- Hurley
- Whitewood
- Clinchco.

### Regional Awards Granted

#### Appalachian Regional Commission (ARC)

The Appalachian Regional Commission, or ARC, believes that “access to advanced telecommunications infrastructure for all Appalachian communities is essential for the Region to reach economic parity with the nation.”

ARC partners with public entities, non-profits, and the private-sector to spread access to telecommunications infrastructure and applications throughout the Region.

Specifically, ARC’s POWER program is a congressionally funded initiative that targets federal resources to help communities and regions that have been affected by job losses in coal mining, coal power plant operations, and coal-related supply chain industries due to the changing economics of America’s energy production. Virginia will receive 5 grants totaling more than \$2.8 million as part of this program.

One of the grants will go to Bland County (in the amount of \$459,764) for a 33-mile fiber build to businesses in the county. The fiber run will start in Rocky Gap, then south through Bastian, then to Bland. The fiber will run along the Route 52 corridor. Once the fiber construction is finished, an ISP partner will use wireless technology to reach additional locations off Route 52. The project will make Internet access available to 37 businesses, as well as Bland County Schools, the Board of Education offices and the Bland County Medical Clinic, a federally qualified health center.

**Pending Applications at the Tobacco Commission**

- Fiscal year 2019 pending last mile broadband applications to the Tobacco Commission for Southwest Virginia are outlined in the following table:

FY 2019 Last Mile Broadband - Pending Applications for SWVA

<b>Req #</b>	<b>Organization</b>	<b>Project Title</b>	<b>Request Amount</b>
3535	Carroll County Industrial Development Authority	The Wired Road/Carroll County Last Mile Neighborhood Pole Project	\$200,000
3531	Cumberland Plateau Company	Cleveland Broadband Expansion Project	\$544,137
3530	Grayson County	Connect Grayson	\$325,000
3522	Industrial Development Authority of Dickenson County	Honey Camp Last Mile Broadband	\$65,000
3519	Scott County Telephone Cooperative	Weber City Broadband Fiber-to-the-Home Initiative	\$1,500,000
3525	Tazewell County Industrial Development Authority	Tazewell County Wireless Service Authority Broadband Expansion Phase III	\$150,000
3527	Industrial Development Authority of Russell County VA	North Central Russell / South Buchanan Counties Broadband Expansion Project	\$1,900,000
<b>Total Potential Funding for SWVA</b>			<b>\$4,684,137</b>

## Funding Strategy

Identify the highest potential providers of capital, including government and private sources, to fund the highest priority communities. Start at the regional level, then state, then national.

- Virginia Rural Broadband Planning Initiative (VRBPI)
- Connect America Fund
- Rural Utility Services
- Community Development Block Grants (CDBG)

## Potential Funding Sources

The following table outlines a more comprehensive list of potential funding sources that have been identified by the Tobacco Commission.

Source	Opportunity	Brief Description	Application Timeline
<b>State Funding Opportunities</b>			
<b>Department of Housing and Community Development (DHCD)</b>	Community Development Block Grant Planning Grant <a href="http://www.dhcd.virginia.gov/index.php/community-partnerships-dhcd/79-community-development-block-grant-cdbg-planning-grant.html">http://www.dhcd.virginia.gov/index.php/community-partnerships-dhcd/79-community-development-block-grant-cdbg-planning-grant.html</a>	Funds available for 3 areas: planning grants, local innovation grants, implementation and economic development, and large scale local level projects.	January – September
<b>Department of Housing and Community Development (DHCD)</b>	Virginia Telecommunication Initiative <a href="http://www.dhcd.virginia.gov/">http://www.dhcd.virginia.gov/</a>	Provides financial assistance to supplement construction costs by private sector providers to extend services to areas that are presently unserved by any broadband provider. Definition of unserved; speeds <= 10 Mbps/1 Mbps. Eligible applicants: towns, cities, counties, EDA/IDA, broadband/wireless authorities, PDC, etc.	Fall

<b>Virginia Tobacco Region Revitalization Commission</b>	TRRC Last-mile Grant and Loan Fund  <a href="https://www.revitalizeva.org/grant-loan-program/grant-programs/research-development-grant-program/">https://www.revitalizeva.org/grant-loan-program/grant-programs/research-development-grant-program/</a>	Provides grants and loans to public/private partnerships between localities and ISPs to construct projects within its service area.	Announced annually
<b>Virginia Resources Authority (VRA)</b>	Virginia Pooled Financing Program <a href="http://www.virginiaresources.org/page/virginia-pooled-financing-program/">http://www.virginiaresources.org/page/virginia-pooled-financing-program/</a>	Provides financing to local governments for essential projects. All VRA's authorized project areas are eligible for financing in the Virginia Pooled Financing Program (VPFP). Since inception in 2003, over 100 local governments in Virginia have utilized this program to finance or refinance over \$2 billion in infrastructure projects.	Multiple windows annually

### Federal Funding Opportunities

<b>United States Department of Agriculture Rural Development (USDA)</b>	Community Connect Grant program  <a href="https://www.rd.usda.gov/programs-services/community-connect-grants">https://www.rd.usda.gov/programs-services/community-connect-grants</a>	This program helps fund broadband deployment into rural communities where it is not yet economically viable for private sector providers to deliver service.	Announced periodically
<b>United States Department of Agriculture Rural Development (USDA)</b>	Rural Broadband Access Loan and Loan Guarantee <a href="https://www.rd.usda.gov/programs-services/rural-broadband-access-loan-and-loan-guarantee">https://www.rd.usda.gov/programs-services/rural-broadband-access-loan-and-loan-guarantee</a>	This program offers financial assistance to eligible applicants that will construct, improve, or acquire facilities and equipment needed to provide service at the broadband lending speed as defined in the most recent funding announcement in eligible rural areas.	Announced periodically
<b>United States Department of Agriculture Rural Development (USDA)</b>	Telecommunications Infrastructure Loans & Loan Guarantees  <a href="https://www.rd.usda.gov/programs-services/telecommunications-">https://www.rd.usda.gov/programs-services/telecommunications-</a>	This program provides financing for the construction, maintenance, improvement and expansion of telephone service and broadband in rural areas.	Applications are accepted on a continuing basis

	<a href="#">infrastructure-loans-loan-guarantees</a>		
<b>United States Department of Agriculture Rural Development (USDA)</b>	Distance Learning and Telemedicine Program  <a href="https://www.rd.usda.gov/programs-services/distance-learning-telemedicine-grants">https://www.rd.usda.gov/programs-services/distance-learning-telemedicine-grants</a>	This program helps rural communities use telecommunications to connect to each other and to the world for the purposes of distance learning and telemedicine.	Announced periodically
<b>United States Department of Agriculture Rural Development (USDA)</b>	Community Facilities Direct Loan & Grant Program  <a href="https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program">https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program</a>	This program provides affordable funding to develop essential community facilities in rural areas.	Applications are accepted on a continuing basis
<b>Federal Communications Commission (FCC)</b>	Connect America Fund <a href="https://www.fcc.gov/general/connect-america-fund-caf">https://www.fcc.gov/general/connect-america-fund-caf</a> CAF I, \$1.5B over 10 years to 103 companies. CAF II \$1.98 B over 10 years. Bidding ended 8/2018. Awards pending.	Provider funding for FCC eligible areas only. Eligible areas map: <a href="https://www.fcc.gov/reports-research/maps/connect-america-phase-ii-initial-eligible-areas-map/">https://www.fcc.gov/reports-research/maps/connect-america-phase-ii-initial-eligible-areas-map/</a>	No longer active for new bidders.
<b>Federal Communications Commission (FCC)</b>	FCC Mobility Fund Phase II <a href="https://www.fcc.gov/mobility-fund-phase-2">https://www.fcc.gov/mobility-fund-phase-2</a>	The FCC plans to make up to \$4.53 billion in funding available to mobile operators that are building out 4G LTE networks to underserved rural markets. The funding will be made available over a 10-year period. Operators that receive the support from the auction will build out 4G LTE mobile service that will deliver at least 10 Mbps to customers in markets that lack access to unsubsidized 4G LTE.	Not yet active
<b>Federal Communications Commission (FCC)</b>	E-Rate Funding <a href="http://www.fcc.gov/encyclopedia/e-rate-schools-libraries-usf-program">http://www.fcc.gov/encyclopedia/e-rate-schools-libraries-usf-program</a>	The schools and libraries universal service support program, commonly known as the E-Rate program, helps schools and libraries to obtain affordable broadband.	Winter-Spring
<b>Universal Service Administration Co. (USAC)</b>	Lifeline Support <a href="https://www.usac.org/li/">https://www.usac.org/li/</a>	Lifeline is a federal program that lowers the monthly cost of phone and Internet for eligible customers. Participating companies in Virginia: <a href="http://www.lifelinesupp">http://www.lifelinesupp</a>	Applications are accepted on a continuing basis

		<a href="http://www.usac.org/rhc/healthcare-connect/default.aspx">ort.org/ls/companies/CompanyListing.aspx?state=VA&amp;stateName=Virginia</a>	
<b>Universal Service Administration Co. (USAC)</b>	Rural Health Care – Healthcare Connect Fund  <a href="https://www.usac.org/rhc/healthcare-connect/default.aspx">https://www.usac.org/rhc/healthcare-connect/default.aspx</a>	This program provides a 65 percent discount on eligible expenses related to broadband connectivity to both individual rural health care providers (HCPs) and consortia, which can include non-rural HCPs, if the consortium has a majority of rural sites.	Winter - Summer
<b>Universal Service Administration Co. (USAC)</b>	Rural Health Care – Telecommunications Program <a href="https://www.usac.org/rhc/telecommunications/default.aspx">https://www.usac.org/rhc/telecommunications/default.aspx</a>	This program provides reduced rates to rural health care providers (HCPs) for telecommunications services related to the use of telemedicine and telehealth.	Winter - Summer
<b>US Economic Development Administration (EDA)</b>	Planning Program and Local Technical Assistance Program  <a href="https://www.grants.gov/web/grants/view-opportunity.html?oppld=301936">https://www.grants.gov/web/grants/view-opportunity.html?oppld=301936</a>	This program assists eligible recipients in developing economic development plans and studies designed to build capacity and guide the economic prosperity and resiliency of an area or region.	Applications are accepted on a continuing basis
<b>US Economic Development Administration (EDA)</b>	Public Works and Economic Adjustment Assistance Programs <a href="https://www.grants.gov/web/grants/view-opportunity.html?oppld=294771">https://www.grants.gov/web/grants/view-opportunity.html?oppld=294771</a>	Grants made under this program will leverage regional assets to support the implementation of regional economic development strategies designed to create jobs, leverage private capital, encourage economic development, and strengthen America's ability to compete in the global marketplace.	Applications are accepted on a continuing basis
<b>Department of Education (DOE)</b>	Promise Neighborhoods Competition <a href="http://www2.ed.gov/programs/promiseneighborhoods/index.html">http://www2.ed.gov/programs/promiseneighborhoods/index.html</a>	This program provides funding to support eligible entities to significantly improve the educational and developmental outcomes of children and youth in our most distressed communities.	Spring
<b>Appalachian Regional Commission (ARC)</b>	ARC Project Grants <a href="https://www.arc.gov/funding/arprojectgrants.asp">https://www.arc.gov/funding/arprojectgrants.asp</a>	ARC funds a number of telecommunications activities, including strategic community planning, equipment	Announced annually

		acquisition, and hardware and software for network building. ARC funds can be used for strategic telecommunications planning activities, telecommunication service inventory and assessment activities, aggregation of demand projects, among other activities.	
<b>Federal Reserve</b>	Community Reinvestment Act (CRA) <a href="https://www.dallasfed.org/cd/pubs/digitaldivide.aspx">https://www.dallasfed.org/cd/pubs/digitaldivide.aspx</a>	The Federal Reserve has issued guidance on how to leverage a bank's CRA resources in digital equity initiatives.	Ongoing
<b>Tribal Funding Opportunities</b>			
<b>U.S. Department of Housing and Urban Development (HUD)</b>	Indian Community Development Block Grant <a href="http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/icdbg">http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/icdbg</a>	Provides funds to eligible grantees for housing rehabilitation, land acquisition, community facilities, infrastructure construction, and economic development activities. Eligible applicants for assistance include any Indian tribe, band, group, or nation.	Winter
<b>U.S. Department of Housing and Urban Development (HUD)</b>	Indian Housing Block Grant (IHBG) program <a href="http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/ihbg">http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/ihbg</a>	The provision of broadband is eligible under this program. Eligible IHBG recipients are Federally recognized Indian tribes or their tribally designated housing entity (TDHE), and a limited number of state recognized tribes who were funded under the Indian Housing Program authorized by the United States Housing Act of 1937 (USHA).	Winter
<b>Institute of Museum and Library Services</b>	Native American Library Services <a href="https://www.ims.gov/nofo/native-american-library-services-basic-grants-fy16-notice-funding-opportunity">https://www.ims.gov/nofo/native-american-library-services-basic-grants-fy16-notice-funding-opportunity</a>	Basic Grants are available to support existing library operations and to maintain core library services. Indian tribes, Alaska native villages, regional corporations, and village corporations are eligible to apply for funding under the Native American Library Services grant program.	Spring



### 7.3 Addressable Market Appendix

#### Market Overview

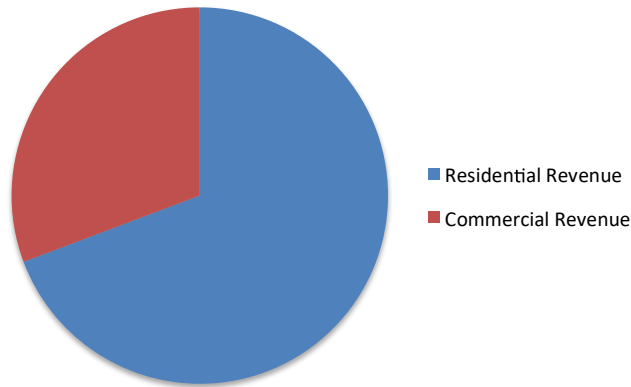
The telecommunications market in Southwest Virginia is estimated at \$289 Million annually for voice, video, data, and wireless services. This estimate is based on the following key factors:

Key Economic Index Factors	SWVA Region
Residential	
Population (2018)	401,745
Households (BRASG 2018 Estimate)	84,270
Median Household Income (BRASG 2018 Estimate)	\$38,945
Economic Index (Income Relative to US)	68%
Economic Index (Income Relative to VA)	56%
Commercial	
Businesses (BRASG Estimate)	7,430
Employment (BRASG Estimate)	49,423

On average, approximately 4% of household income is spent on all communication services.

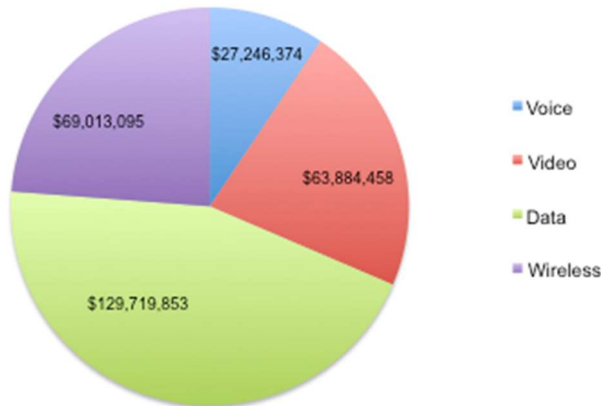
The overall market is roughly split between 31% commercial and 69% residential services.

### Total Revenue – Residential vs. Commercial



By service, the revenue distribution is outlined in the following table, with broadband services driving most of the growth:

### Total Annual Telecom Revenue at Year 1



The important market dynamics that will influence this addressable market are threefold:

1. **Cable TV Cord Cutting.** As wireless service becomes more reliable and ubiquitous, and as broadband becomes more available, there will be a continued defection not only from landline voice to wireless but also from cable tv to digital, a-la-carte streaming services. Cisco predicts that nearly four-fifths (79 percent) of the world’s mobile data traffic will be video by 2022.
2. **Mobile Data Demand.** The explosion in mobile data demand only continues. It grew 23% in 2017 in North America. The increasing number of wireless devices and connections will continue to drive the surge in demand for wireless data.

3. **5G Technology.** The evolution of 5<sup>th</sup> Generation, or 5G, networks, holds the promise to deliver faster speeds. However, it is likely that rural areas such as Southwest Virginia may be last in line to see the carriers upgrade, as they will target the larger markets initially. A strong fiber backbone will still be needed to service the 5G network. 4G will carry most of the traffic for the next 10 years or so.

These trends will drive demand for expanded fiber and wireless-dependent services in the region, presenting an opportunity for service providers. However, the issue remains. The associated costs of upgrading networks to meet that demand is still extremely high due to the low population densities and challenging geography of the region. Regional leaders must find ways to partner with providers to bridge the gap so that their communities are not left behind.

## **7.4 Service Provider Appendix**

Following is a brief description of the regional service providers and their capabilities:

### **Burkes Garden Telephone Company**

Burkes Garden Telephone Company (BGTCO) is a small, investor-owned telephone company offering “triple-play” services via a fiber-optic system of approximately 72 fiber miles. The service area is tucked in the eastern edge of Tazewell County, adjacent to Bland County, Virginia. BGTCO migrated from copper to fiber over approximately two years.

The service area covers approximately 75 Sq. Miles from the top of Rich Mountain through Little Creek through Burkes Garden. The service area sits within a crater-like bowl with a mountain ridge totally surrounding the region. The customer count includes 160 full-time with as many as 185 during the summer season. Approximately 100 customers receive broadband, which equates to a take rate of 62%.

GPON and active Ethernet are utilized to serve these customers providing 15/10 Mbps service priced at \$32.95/mo. There are no business customers on the system and approximately 13 or 14 customers are considered to be Amish and as such only utilize the telephone service.

### **Charter Communications**

Charter / Spectrum is the second largest cable provider in the United States (third largest multi-channel video service provider when AT&T / DirecTV are considered) but has limited network operations in Southwest Virginia. Spectrum’s local network is primarily in Buchanan and Tazewell counties, with some network in Russell County. Charter has an operational office in Richlands, with a head-end site in Cedar Bluff. Spectrum’s network covers the Town of Tazewell, a good portion of Tazewell County, Grundy, and Richlands. Charter utilizes a hybrid-fiber-coaxial cable network architecture. 100 MBPS asynchronous service is Charter’s standard/basic service at \$44.99 per month. This price is dependent upon various bundling schemes.

### **Citizens Telephone Cooperative**

Citizens is a regional ILEC with full-service communications offerings, including land-line telephone, VoIP, IPTV Video, web and e-mail hosting, DSL, and FTTP (Fiber to the Premise, and Business Ethernet. Citizen’s serves portions of 7 counties in Southwest Virginia. Based in Floyd, Virginia, Citizens network is still 90% copper based, but they are rolling out gigabit FTTP.

There is some overlap of their services and a few counties within PDC’s 1, 2, &3, including Carroll County, Grayson County, and Wythe County. Citizens’ network stops at the Smyth County line. Their fiber runs from 58 to 16 (BVU/Sunset) and 221 to Sparta. They just completed a build on 221 (North) to Roanoke Co., passing over 1,000 homes with FTTH.

## **Century Link**

CenturyLink is the incumbent local exchange carrier in many parts of the study region. CenturyLink still has their legacy network in place and have not invested in upgrading their network. As a result, customer satisfaction rates due to speed and reliability, were low across the board. The biggest complaint related to customer service and the perception of a total “lack of response.”

## **Comcast**

Comcast is the largest cable provider in the United States (second largest multi-channel video service provider when AT&T / DirecTV are considered). Comcast operates a hybrid-fiber-coaxial system throughout the study area. Comcast is doing little in terms of upgrades, with some limited upgrades in PDC 1. In PDC 2, one respondent placed Comcast quality of service at the middle of the pack of the 5 service providers available in that area. Another respondent in the northwestern portion of PDC 2 listed Comcast as “adequate” with 4 stars. Still another official in the southwestern portion of region 3 gave Comcast high marks for quality of service.

## **CPC Broadband**

CPC Broadband (formerly CPC OptiNet) is a subsidiary company of the Cumberland Plateau PDC. It was organized to serve Russell, Dickenson, Tazewell, and Buchanan Counties. Partnering with Bristol Virginia Utility's OptiNet division (now Point Broadband) the Company has obtained over \$37 million in grant funding for the construction of 700 miles of fiber optic broadband backbone that is now serving almost 900 industrial, commercial, governmental and educational institutions in the region.

## **iGo Technologies**

iGo, founded in 1994, is a Virginia-based Internet service company, providing wireless and fiber high speed Internet service to its customers who include residential and commercial clients, individuals and small to mid-size and large business. In 2017, iGo also began offering telephone service to its Internet customers.

iGo coverage areas include parts of Buchanan, Russell, Tazewell, Washington and Wise counties, with additional operations in Tennessee and West Virginia. iGo utilizes one VCC tower to reach unserved residents of the region.

iGo is mainly a fixed wireless provider with 6-8 towers, 520 customers, and 12 employees. Although existing customers are mostly wireless, iGo has successfully competed for USDA Community Connect grants for FTTH build outs. They are underway with a \$1.78M project awarded in 2016 which will include 21 miles of fiber in the Buchanan County area north of Oakwood.

In 2017, they were awarded an additional \$3.0M project for a buildup Garden Creek Rd toward Honaker. iGo was just awarded \$455,581 to extend the build into Russell County and add interconnection with SCTC along Virginia Route 624.

The current build includes 468 customers passed. iGo is an essential element of solving the problem of unserved residents in the region.

### **Gigabeam Networks**

Gigabeam Networks, a wireless Internet service provider, or WISP, provides service in Southwest Virginia, West Virginia and southeastern Kentucky. Their network is completely wireless, including the backhaul. Gigabeam is a small entrepreneurial venture owned by Michael Clemens. They have approximately 200 subscribers in Bland and utilize towers throughout the county. Their service packages include \$79/mo. for 50 meg and \$30 for 25 meg.

### **HillCom**

HillCom, Inc is a family-owned wireless Internet service provider located in Dickenson County. The company started in 2016 out of necessity when a local resident was unable to access adequate Internet service but was able to create his own wireless broadband network solution. By 2017, HillCom had responded to neighbors requesting the service and grew to 20 customers. They then purchased DCWin (Dickenson County Wireless) and now have approximately 600 customers (95% in Dickenson County), with a mission to provide service to the entire county.

Most of the service requests HillCom receives are from the following areas within the county:

- Lick Creek
- Honey Camp
- Breaks

### **Point Broadband**

Formerly BVU OptiNet, Point Broadband was organized in 2018 as the combination of Duffield-based Sunset Digital and Bristol-based BVU OptiNet. The organization is part of a family of telecommunications enterprises headquartered in West Point, Georgia called ITC Holding Company, LLC. ITC began as The West Point Telephone and Electric Company, founded in 1896. Point Broadband is in the process of an organization period, and their exact strategy is unknown. As with many other providers in the region, Point Broadband is attempting to determine how to affordably build out and maintain their network. Point Broadband is the recipient of a multi-million-dollar CAF II award for the study region including Lee County, and the Cumberland Plateau counties of Dickenson, Russell, and Tazewell.

### **Scott County Telephone Cooperative**

Scott County Telephone Cooperative (SCTC), a local provider headquartered in Gate City, is a key player in the region. It serves 420 square miles of Scott County with some service in Tennessee. Their current service territory includes parts of Russell, Wise, Dickenson, and Lee Counties, and the City of Norton. They provide voice, video, and data Voice,

video, data, and security, primarily over a traditional copper/ILEC network but have been upgrading to eventually deploy and utilize an all fiber network to provide enhanced broadband services.

Using primarily grant funding, SCTC has upgraded about 100 miles of its network to fiber, with builds to 5 exchanges in the following areas:

- Ft. Blackmore
- Duffield
- Nickelsville
- Dungannon
- Clinchport

SCTC has approximately 7,000 access lines (about 5,000 in ILEC area and 2,000 in CLEC area). Additionally, they have about 7,000 high speed Internet customers.

### **Shentel**

Shentel, or Shenandoah Telecommunications Company, is a publicly traded telecommunications company headquartered in Edinburg, Virginia. Shentel has digital wireless and wireline network in rural Virginia, West Virginia, Maryland and Pennsylvania. Shentel is also an affiliate of Sprint with wireless coverage in Pennsylvania, Maryland, Virginia, West Virginia, Kentucky and Ohio. It owns its own cell site towers built on leased land and leases space on these towers to both affiliates and non-affiliated service providers. Shentel has invested over \$200 million in the past two years upgrading and expanding its wireless networks, primarily in rural markets. Shentel also provides fiber services to commercial and wholesale customers along its 5,641-mile fiber network across four states.

Shentel's cable segment provides video, Internet and voice services in franchise areas in Virginia, West Virginia, and portions of western Maryland and leases fiber optic facilities throughout its service area. It does not include video, Internet and voice services provided to customers in Shenandoah County, Virginia.

Shentel's wireline segment provides regulated and unregulated voice services, DSL Internet access and long-distance access services throughout Shenandoah County and portions of Rockingham, Frederick, Warren and Augusta Counties, Virginia. The segment also provides video services in portions of Shenandoah County and leases fiber optic facilities throughout the northern Shenandoah Valley of Virginia, northern Virginia and adjacent areas along the Interstate 81 corridor, including portions of West Virginia and Maryland.

Shentel has over 5,400 fiber route miles with fiber to over 325 cell sites, but with network in only Carroll and Russell counties. It has cable plant in Lebanon, Honaker, Swords Creek, Rye, Dante, Wytheville, and Rural Retreat.

Shentel does not actively pursue grant funding, as they have not been very successful in the past doing so.

## **Wired Road**

The Wired Road Authority is a collaborative effort between private sector service providers, the local governments of Grayson County, Carroll County, and the City of Galax, and the Carroll-Grayson-Galax Regional Industrial Facilities Authority (dba Blue Ridge Crossroads Economic Development Authority). Its purpose is to provide the critical enabling infrastructure to transform the regional economy into a dynamic, small business, and entrepreneurial economy. This transformation, enabled by The Wired Road and a complementary economic development focus on attracting and supporting entrepreneurs and small businesses, will allow the region's economy to spawn new businesses, generate jobs, create wealth, and protect the rural character of our region.

The Wired Road network has been in operation for over ten years and is a true public/private partnership with two service providers offering last mile services on the network. The Wired Road is an open access, fully integrated fiber and wireless regional broadband network offering "big broadband" 100 megabit and Gigabit fiber connections and multi-megabit wireless connections in Carroll County, Grayson County, and Galax.

Currently, the Wired Road is finishing a network extension which will connect fiber in Galax with fiber in Hillsville. It is also expanding its wireless coverage and constructing "community poles" to get service to areas that couldn't be reached before. Fiber Wireless Providers

The bill will allow Dominion Energy and Appalachian Power to provide or make available broadband capacity to service providers in unserved areas. It also authorizes the utility to own or lease broadband capacity equipment.

With existing infrastructure that already serves almost every resident and business in rural areas, utilities are uniquely positioned to bridge the gap between middle mile networks and last mile consumers.



## References

Source data for population: Published on January 28, 2019 by the Weldon Cooper Center for Public Service Demographics Research Group <https://demographics.coopercenter.org>

Source data for county land area: U.S. Census Bureau, Census of Population and Housing. Land area is based on current information in the TIGER® data base, calculated for use with Census 2010.

Source: WideOpen Networks, The Wired Road, "Broadband Recommendations," April 2017, Revised, October 2017, pp. 32-34.

<http://lis.virginia.gov/cgi-bin/legp604.exe?191+sum+HB2691>

<https://wcyb.com/news/local/new-pilot-program-could-improve-broadband-Internet-in-rural-southwest-virginia>

<https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-738429.html>

<https://www.usda.gov/media/press-releases/2018/12/13/usda-launches-new-program-create-high-speed-Internet-e-connectivity>

[https://www.arc.gov/program\\_areas/index.asp?PROGRAM\\_AREA\\_ID=18](https://www.arc.gov/program_areas/index.asp?PROGRAM_AREA_ID=18)

<https://www.usda.gov/reconnect>

*Digital Dividends. Exploring the Relationship Between Broadband and Economic Growth*, by Michael Mingos, 2016. <http://pubdocs.worldbank.org/en/391452529895999/WDR16-BP-Exploring-the-Relationship-between-Broadband-and-Economic-Growth-Mingos.pdf>