



Request for Proposal (RFP) #21-01  
for  
**BROADBAND IMPLEMENTATION**  
**PARTNERS**

Issue Date: May 26, 2020

Proposal Due Date and Hour: June 25, 2020 3:00 p.m.

Montgomery County Purchasing Department  
755 Roanoke Street, Suite 2C  
Christiansburg, VA 24073-3179

# COUNTY OF MONTGOMERY, VIRGINIA

## RFP # 21-01

ISSUE DATE: MAY 26, 2020

### BROADBAND IMPLEMENTATION PARTNERS

(TO BE COMPLETED AND RETURNED)

### GENERAL INFORMATION FORM

**QUESTIONS:** All inquiries for information regarding this solicitation should be directed to: Heather M. Hall, C.P.M., Procurement Manager, Phone: (540) 382-5784; faxed to (540) 382-5783, or e-mail: [hallhm@montgomerycountyva.gov](mailto:hallhm@montgomerycountyva.gov)

**OPTIONAL PRE-PROPOSAL:** An optional pre-proposal conference will be held June 12, 2020 at 2:00 p.m. at 755 Roanoke Street, Suite 2C. The purpose of this conference is to allow potential Offerors an opportunity to present questions and obtain clarification relative to any facet of this solicitation.

While attendance at this conference will not be a prerequisite to submitting a proposal, offerors who intend to submit a proposal are encouraged to attend. If you plan to attend the pre-proposal, please call Jessica Albert by June 10, 2020 at (540) 382-5784 or email [albertjh@montgomerycountyva.gov](mailto:albertjh@montgomerycountyva.gov)

**DUE DATE:** Sealed Proposals will be received until **June 25, 2020**, up to and including **3:00PM**. Failure to submit proposals to the correct location by the designated date and hour will result in disqualification.

**ADDRESS:** Proposals should be mailed or hand delivered to: **Montgomery County Purchasing Department, 755 Roanoke Street, Suite 2C, Christiansburg, Virginia 24073-3179**. Reference the Due Date and Hour, and RFP number in the lower left corner of the return envelope or package.

**COMPANY INFORMATION/SIGNATURE:** In compliance with this Request For Proposal and to all conditions imposed herein and hereby incorporated by reference, the undersigned offers and agrees to furnish the services and goods in accordance with the attached signed proposal or as mutually agreed upon by subsequent negotiation.

Full Legal Name (print)		Federal Taxpayer Number (ID#)	W9 and COI included (check if yes)
Business Name / DBA Name / TA Name and Address		Payment Address	Purchase Order Address
Contact Name/Title		Signature (ink)	Date
Telephone Number	Fax Number	Toll Free Number	E-mail Address

# **BROADBAND**

## **IMPLEMENTATION PARTNERS**

### **1.0 PURPOSE**

The intent of this Request for Proposal (RFP) is to obtain the services of qualified Internet Service Providers (“ISPs”) to assist Montgomery County with the deployment of internet to areas in the county that are deemed un-served or under-served as defined in a Broadband Assessment completed for the County. Areas of need exist beyond those identified in the study; therefore, offers are encouraged to consider proposing projects that can serve a wide range of needs within the County. The purpose of this project is to ensure County residents and businesses have access to internet speeds that are capable and reliable to engage with the current and future needs of internet-based uses for all aspects of education, business, commerce, and entertainment. The County desires ISP partners that will own and operate the service while the County will assist the ISP in securing and administering publicly available funds to off-set the cost of deploying broadband solutions. The County anticipates this will require the following tasks be completed by the Consultant:

- Identification of areas the ISP plans to deploy new/upgraded service; number of households/businesses served; technology to be utilized in the deployment (ie-fiber to the home, fixed wireless, etc); upload/download speed of each proposed project area; monthly cost of service for the user; any required connection fees for the user; amount of private investment being applied to the project; amount of public investment required; identification of any public resources needed (ie-mapping, use of rights of way). The County currently defines broadband coverage as a minimum of 10mbps download and 3mbps upload capacity, although the County strives for citizens and businesses to have access to much greater speeds.
- Clear delineation of the roles and responsibilities for the partnership between the ISP and the County. A partnership agreement the two entities outlining the roles and responsibilities must be included in the response package.
- A management team for broadband planning was assembled for oversight during the planning phase of this effort. The management team consists of key stakeholders within public, private and citizen sectors. The ISP is expected to participate in meetings with the management team and utilize the group as a resource to help ensure the deployment strategies align with and addresses the community needs. Conference calls and/or web-based video interaction may be utilized for coordination.

### **2.0 COMPETITION INTENDED**

It is the intent that this RFP permits competition. It will be the Offeror’s responsibility to advise in writing if any language, requirement, specification, etc., or any combination thereof, inadvertently restricts or limits the requirements stated in this RFP to a single source. Such notification must be received by The County no later than fifteen (15) calendar days prior to the date set for acceptance of proposals.

### **3.0 BACKGROUND INFORMATION**

The New River Valley region established a Telecommunications Plan in 2005 with an update in 2006. Since that time, a regional Broadband Authority was established in 2008 to support the deployment of projects. Current members of the Authority consist of Giles County, Pulaski County and the City of Radford. In 2010 the Authority partnered with Citizens Cooperative in Floyd County to secure federal

funds to construct 200 miles of middle-mile open access carrier-grade fiber between Wytheville and Botetourt County. The Authority remains an entity which could be utilized to support deployment solutions. At this time, the local governments in the New River Valley anticipate private Internet Service Providers to be the primary responsible party to deliver broadband services to customers. In 2015-2016 the New River Valley Regional Commission conducted a broadband user survey for Montgomery County. Following survey responses, presentations were delivered to all the local government bodies and meetings were conducted with the existing Internet Service Providers to share the survey findings. The intent of the survey was to identify gaps in service and determine areas where existing ISPs could focus future capacity building projects. As of May 2020, Montgomery County completed a Broadband Assessment and Vertical Asset Inventory of the County conducted by Blue Ridge Advisory Services and Thompson & Litton. This assessment shall serve as direction to the ISPs on areas of greatest need in the County. The full report and attachments is Attachment A to this RFP.

#### **4.0 OFFEROR'S MINIMUM QUALIFICATIONS**

Offerors must demonstrate that they have the resources and capability to provide the services as described herein. All offerors must submit the documentation indicated below with their proposal. Failure to provide any of the required documentation may be cause for offeror's proposal to be deemed non-responsible and rejected.

The following criteria shall be met in order to be eligible for this Contract:

**4.1 Debarment:** By signing and submitting a proposal, Offerors certify that they are not currently debarred by any local or state government or the Federal Government. Offerors shall provide in their bid, documentation related to all debarments that occurred within the last ten (10) years.

**4.2** Any offeror wishing to submit a proposal and be considered for this solicitation must have a minimum of five (5) years of experience providing similar services as requested in this RFP.

#### **5.0 SCOPE OF SERVICES**

All proposals must be made on the basis of, and either meet or exceed, the requirements contained herein.

##### **5.1 General Scope of Services:**

It is the County's intent to seek a public/private relationship(s) with ISP providers in order to expand broadband access to the unserved and underserved parts of the County of Montgomery as identified in the Thompson & Litton Broadband Report. The County seeks to expand broadband service at a minimum service level of 25/3 mbps in the County through one or more individual negotiated broadband projects with one or more selected ISP providers.

The County understands the economic challenges of expanding broadband into less densely populated areas. The County anticipates participating economically on a project by project basis with selected ISP provider(s) in order to entice private sector investment through the public/private process. It is anticipated that selected ISP providers will be looked to provide, to some extent, the following services on a project by project basis:

- A. Provides seamless and reliable broadband access to identified unserved and underserved parts of the County.
- B. Design and engineer a construction plan on a project by project basis to provide broadband services at desirable levels to those identified parts of the County.
- C. Prepare a phased project-based approach to broadband network design to expand broadband access and capacity within the County.

- D. Provide construction cost estimates and funding needed from the County or other sources in addition to the private investment;
- E. Meet with the County to review estimated costs to determine available funding and a project-based approach to extending broadband to the County.
- F. Develop final design and engineering drawings to support the deployment;
- G. Work with the County to pursue state and federal funding opportunities to offset deployment costs.
- H. Operate as an Internet Service Provider, ensuring last-mile solution options to enable these services for those customers reached by new facilities.
- I. Research and prepare all necessary FCC related forms and submittals required to provide services.
- J. Provide a tiered cost plan to provide broadband services to citizens.
- K. Estimate the citizens' response rate to broadband services through surveys.
- L. Other types of services of a nature consistent with the intent of this RFP as so directed by the County.

**5.2** Fee/rate Schedule: Hourly rates established under this Contract will include:

- A. Administrative items such as fax transmissions, long distance phone calls, mailing services, courier services, and materials required in the preparation of presentations, cost of reports, submittals and other expenses deemed typical in the conduct of business. Transportation to and from job sites, vehicles, fuel, vehicle maintenance, cell phones, personal computers, printers, cameras, video equipment, software, general office supplies, home office and administrative support and all overhead and incidental costs.

**5.3** The services to be provided under this Contract include but are not limited to the following:

- A. Evaluations, investigations, analysis, recommendations, cost and time estimates, testing, reports, studies, designs, preparation of documents (including drawings in latest AutoCAD version and specifications) field inspections and investigation.
- B. Professional involvement throughout all phases of the project, including but not limited to development of programs; preparation of reports; periodic progress reports/meetings; processing of invoices for service; timely processing of project correspondence, Consultants' requests for payment, and material and equipment submittals.

**6.0 EVALUATION OF PROPOSALS & SELECTION PROCEDURES**

The Instructions for Submitting Proposals set forth certain criteria which will be used in the evaluation of proposals and selection of the successful offeror. In addition, the criteria set forth below will be considered.

**6.1** Proposal Analysis Group

The proposal analysis group will consist of representatives from Montgomery County, the New River Valley Regional Commission and the Broadband Management Team.

**6.2** Proposal Content – Offerors are to make written proposals that present the offeror's qualifications and understanding of the work to be performed. Offerors shall provide each of the following items below in the order presented. Failure to include any of the requested information may be cause for the proposal to be considered non-responsive and rejected.

- Do not use Federal Government forms such as Standard Form 330; Architect –

Engineer Qualifications in your proposal response.

- A. Signature Page
- B. Documents: Include required documents but not limited to: Proof of Authority to Transact Business Form, W-9, insurance certificate; Acknowledgement of Addendums
- C. Table of Contents
- D. Minimum Qualification response
- E. Management Skills and Technical Expertise

Include as a minimum:

- Provide a narrative description (maximum of one (1) page per project) of three (3) similar projects that have been successfully completed within the past seven (7) years that best illustrate the capabilities of your organization in relation to the RFP Scope of Services. In the project narrative, provide a detailed description of the projects to include the timely delivery of contracted services, completion date, client contact information, contract cost and any unique problems encountered, and solutions devised.

A successfully completed project shall include: 1) that the project was completed within the contract time, including any owner approved time extensions; 2) that the project was completed at or below the contract award amount, including any subsequent owner approved cost change orders; and 3) that the project was completed in accordance with the contract requirements.

- References: All offerors shall include with their proposals a minimum of three (3) current references from project completed in the last three (3) years. This list shall include company name, person to contact, address, telephone number, e-mail address, and the nature of the work performed. Failure to include references may be cause for rejection of the proposal as non-responsive. Offeror hereby releases listed references from all claims and liability for damages that may result from the information provided by the reference.
- Describe your organization's quality control program and provide an example of how your quality control program saved client funds or improved the quality of the end product.
- Awards and letters of commendation received.

- F. Credentials of the Project Team

Include as a minimum:

- Staffing Plan to support the Scope of Services contained in this RFP. The staffing plan should identify the project manager and project team
- Identify the Project Manager and provide resume along with portfolio of related projects
- Provide resumes of key project staff; at a minimum the resumes should include professional licenses; years of experience, technical certifications and experience related to the requirements in the RFP scope of services.
- Identify subconsultants and previous working experience with subconsultants

G. Task Understanding

Provide a narrative describing how you intend to accomplish task requirements contained in this RFP. Address your understanding of overall RFP requirements.

H. Capability for Timely Response

- Identify primary work location (City/Town and State) of all team members identified in the proposal.

I. Non-Binding Fee Schedule

The individual Offeror's fee/rate schedule shall include a rate for all labor categories listed below.

For proposal evaluation purposes, provide an hourly rate (non-binding) for each of the following representative categories. Rates included herein should correspond as closely as possible to the actual rate category identified in the individual offeror's fee/rate schedule even though the category titles may differ.

- Principal (Corporate Officer or Partner)
- Project Manager
- Technical Specialist
- Field Inspector
- Technician
- Administrative

J. Compliance with Contractual Terms

Provide a definitive statement of intent to comply with the Terms and Conditions as delineated in this RFP. If proposed Terms and Conditions are not acceptable as described, Offerors must (a) identify with specificity the County Terms and Conditions to which they take exception or seek to amend or replace; and (b) include any additional or different language with their proposal. Failure to both identify with specificity those Terms and Conditions Offeror takes exception to or seeks to amend or replace, as well as to provide Offeror's additional or alternate terms and conditions, may result in rejection of the proposal if provided after proposed submission.

While the County may accept additional or different language, the Terms and Conditions marked with an asterisk (\*) are mandatory and non-negotiable.

Acknowledge and describe any proposed deviations from Scope of Services.

K. Proposals will be reviewed for: completeness; attention to detail; clarity; organization and appearance. (Specific response to this section not required on proposal)

**6.3** Evaluation Process

The Management Team will review and evaluate each proposal, and selection will be made for each service group on the basis of the criteria listed below.

- A. Management skills, technical expertise, similar projects **(30 points)**
- B. Credentials of project team **(20 points)**
- C. Understanding of task requirements **(15 points)**
- D. Capability for timely response **(5 points)**

- E. Compliance with contractual terms **(5 points)**
- F. Overall quality and completeness of proposal **(5 points)**
- G. Cost of Services **(20 Points)**

Once the Management Team has read and evaluated each proposal, a composite preliminary rating will be developed which indicates the group's collective ranking of the highest rated proposals in a descending order. The preliminary rating will be used to select the offerors for further consideration—the short-list. Thereafter, the Management Team will conduct interviews and have discussions with the top ranked offerors.

## **INSTRUCTIONS TO OFFERORS**

### **7.0 Preparation and Submission of Proposals**

- A. Before submitting a proposal, read the ENTIRE solicitation including the Contract Terms and Conditions. Failure to read any part of this solicitation will not relieve an offeror of the Contractual obligations.
- B. Pricing must be submitted on RFP pricing form only. Include other information, as requested or required.
- C. All proposals must be submitted to The County in a sealed envelope. The face of the sealed container shall indicate the RFP number, time and date of opening and the title of the RFP.
- D. All proposals shall be signed in ink by the individual or authorized principals of the firm.
- E. Each offeror shall submit one (1) original and three (3) copies of their proposal to The County as indicated on the cover sheet of this RFP. Please also include a flash drive with a PDF version of the proposal.

### **7.1 Questions and Inquiries**

Questions and inquiries, both oral and written, will be accepted from any and all offerors. However, when requested, complex oral questions shall be submitted in writing. Inquiries pertaining to the RFP must give the RFP number, time and date of opening and the title of the RFP. Material questions will be answered in writing with an Addendum provided, however, all questions must be received **by 2:00 p.m. June 12, 2020** It is the responsibility of all offerors to ensure that they have received all Addendums and to include signed copies with their proposal. Any Addendums can be downloaded from the County's website.

### **7.2 Addendum and Supplement to Request**

If it becomes necessary to revise any part of this request or if additional data are necessary to enable an exact interpretation of provisions of this request, an Addendum will be issued. It is the responsibility of the offeror to ensure that he has received all Addenda prior to submitting a proposal. Addendums can be downloaded from the County's website.

### **7.3 Proprietary Information**

Trade secrets or proprietary information submitted by an offeror in connection with this solicitation will not be subject to disclosure under the Virginia Freedom of Information Act; however, **pursuant to § 2.2-4342(F) of the Code of Virginia, the offeror must invoke the protections of this section prior to or upon submission of the data or other materials, and must clearly identify the data or other materials to be protected and state the reasons why protection is necessary. Failure to abide by this procedure may result in disclosure of the offeror's information.** Offerors shall not mark sections of their proposal as proprietary if they are to be part of the award of the contract and are of a "Material" nature.

#### 7.4 Authority to Bind Firm in Contract

Proposals MUST give full firm name and address of offeror. Failure to manually sign proposal may disqualify it. Person signing proposal should show **TITLE or AUTHORITY TO BIND THE FIRM IN A CONTRACT**. Firm name and authorized signature must appear on proposal in the space provided on the pricing page. Those authorized to sign are as follows:

- If a sole proprietorship, the owner may sign.
- If a general partnership, any general partner may sign.
- If a limited partnership, a general partner must sign.
- If a limited liability company, a “member” may sign or “manager” must sign if so specified by the Articles of Organization.
- If a regular corporation, the CEO, President or Vice-President must sign.
- Others may be granted authority to sign but the County requires that a corporate document authorizing him/her to sign be submitted with proposal.

#### 7.5 Withdrawal of Proposals

- A. All proposals submitted shall be valid for a minimum period of ninety (90) calendar days following the date established for acceptance.
- B. Proposals may be withdrawn on written request from the offeror at the address shown in the solicitation prior to the time of acceptance.
- C. Negligence on the part of the offeror in preparing the proposal confers no right of withdrawal after the time fixed for the acceptance of the proposals.

#### 7.6 County Furnished Support/Items

The level of support required from County personnel for the completion of each task will be estimated by position and man days. The offeror shall indicate the necessary telephones, office space and materials the offeror requires. The County may furnish these Facilities if the County considers them reasonable, necessary, and available for the offeror to complete its task.

#### 7.7 Subconsultants

Offerors shall include a list of all subconsultants with their proposal. Proposals shall also include a statement of the subconsultants' qualifications. The County reserves the right to reject the successful offeror's selection of subconsultants for good cause. If a subconsultant is rejected, the offeror may replace that subconsultant with another subconsultant subject to the approval of the County. Any such replacement will be at no additional expense to the County, nor will it result in an extension of time without the County approval.

#### 7.8 Late Proposals

LATE proposals will be returned to offeror **UNOPENED**, if RFP number, acceptance date and offeror's return address is shown on the container.

#### 7.9 Rights of County

The County reserves the right to accept or reject all or any part of any proposal, waive informalities, and award the contract to best serve the interest of the County. Informality means a minor defect or variation of a proposal from the exact requirements of the Request for Proposal which does not affect the price, quality, quantity, or delivery schedule for the goods, services or construction being procured.

#### 7.10 Prohibition as Subconsultants

No offeror who is permitted to withdraw a proposal shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the

Contract was awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn proposal was submitted.

**7.11 Deviations from Scope of Services**

If there is any deviation from that prescribed in the Scope of Services, the appropriate line in the Scope of Services will be ruled out and the substitution clearly indicated. The County reserves the right to determine the responsiveness of any deviation.

**7.12 Notice of Award**

A Notice of Award will be issued following action by the Board of Supervisors.

**7.13 Protest**

Offerors may refer to §§ 2.2-4357 through 2.2-4364 of the Code of Virginia to determine their remedies concerning this competitive process.

**7.14 Miscellaneous Requirements**

- A. The County will not be responsible for any expenses incurred by an offeror in preparing and submitting a proposal. All proposals shall provide a straight-forward, concise delineation of the offeror's capabilities to satisfy the requirements of this request. Emphasis should be on completeness and clarity of content.
- B. Offerors who submit a proposal in response to this RFP may be required to make an oral presentation of their proposal. The County will schedule the time and location for this presentation.
- C. The contents of the proposal submitted by the successful offeror as well as this RFP will become part of any Contract awarded as a result of the Scope of Services contained herein. The successful offeror will be expected to sign a Contract with the County.
- D. The County reserve the right to reject any and all proposals received by reason of this request, or to negotiate separately in any manner necessary to serve the best interests of the County. Offerors whose proposals are not accepted will be notified in writing.

**7.15 Debarment**

By submitting a proposal, the offeror is certifying that he is not currently debarred by the County, or in a procurement involving federal funds, by the Federal Government. A copy of the County debarment procedures in accordance with § 2.2-4321 of the Code of Virginia are available upon request.

**7.16 Proof of Authority to Transact Business in Virginia**

An offeror organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 of the Code of Virginia shall include in its bid or proposal the identification number issued to it by the State Corporation Commission. Any offeror that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law shall include in its bid or proposal a statement describing why the offeror is not required to be so authorized. Any offeror described herein that fails to provide the required information shall not receive an award unless a waiver of this requirement and the administrative policies and procedures established to implement this section is granted by the Purchasing Agent or his designee. The SCC may be reached at (804) 371-9733 or at <http://www.scc.virginia.gov/default.aspx>.

### 7.17 W-9 Form Required

Each offeror shall submit a completed W-9 form with their proposal. In the event of Contract award, this information is required in order to issue payments to your firm. A copy of this form can be downloaded from <http://www.irs.gov/pub/irs-pdf/fw9.pdf>.

### 7.18 Insurance Coverage

Offerors shall include with their proposal a copy of their current Certificate of Insurance that illustrates the current level of coverage the offeror carries. The Certificate can be a current file copy and does not need to include any “additional insured” language for the County.

### 7.19 Legal Action

No bidder or potential bidder may institute any legal action until all statutory requirements have been met.

### 7.20 Certification by Contractor as to Felony Convictions

No one with a felony conviction may be employed under this Contract and by the signature of its authorized official on the response to this Solicitation, the Contractor certifies that neither the contracting official nor any of the Contractor's employees, agents or subcontractors who will work under this Agreement have been convicted of a felony.

The Consultant understands that the County, or others may suffer irreparable harm by disclosure of proprietary or confidential information and that the County may seek legal remedies available to it should such disclosure occur. Further, the Consultant understands that violations of this provision may result in termination of the Agreement.

The Consultant understands that information and data obtained during the performance of this agreement shall be considered confidential, during and following the term of this Agreement, and will not be divulged without the Purchasing Agent's written consent and then only in strict accordance with prevailing laws. The Consultant shall hold all information provided by the County as proprietary and confidential, and shall make no unauthorized reproduction or distribution of such material.

#### A. County Confidentiality

The County understands that certain information provided by the Contractor during the performance of this Agreement may also contain confidential or proprietary information. Contractor acknowledges that this Contract and public records (as defined by §2.2-3701 of the Virginia Freedom of Information Act) provided pursuant to this Contract are subject to the Virginia Freedom of Information Act §§2.2-3700 et seq. and the Virginia Public Procurement Act §2.2-4342 of the Code of Virginia.

## 8.0 Terms and Conditions

### General Terms and Conditions

[https://montva.com/docs/default-source/purchasing-solicitations/rfp\\_terms\\_and\\_conditions.pdf?sfvrsn=ecfd231d\\_2](https://montva.com/docs/default-source/purchasing-solicitations/rfp_terms_and_conditions.pdf?sfvrsn=ecfd231d_2)

### SPECIAL TERMS AND CONDITIONS

1. **AUDIT:** The Contractor hereby agrees to retain all books, records, and other documents relative to this contract for five (5) years after final payment, or until audited by the Commonwealth of Virginia, whichever is sooner. Montgomery County, its authorized agents, and/or State auditors shall have full access to and the right to examine any of said materials during said period.
2. **AUTHORIZED USERS:** Additional State agencies, institutions and/or other public bodies may be added or deleted to receive the goods or services resulting from this solicitation. The addition or deletion of authorized users shall be made only by written modification to the contract. Such modification shall name the specific agency added or deleted and the effective date.
3. **AVAILABILITY OF FUNDS:** It is understood and agreed between the parties herein that Montgomery County shall be bound hereunder only to

the extent of the funds available or which may hereafter become available for the purpose of this agreement.

4. **CANCELLATION OF CONTRACT:** Montgomery County reserves the right to cancel and terminate any resulting contract, in part or in whole, without penalty, upon 60 days written notice to the Contractor. In the event the initial contract period is for more than 12 months, the resulting contract may be terminated by either party, without penalty, after the initial 12 months of the contract period upon 60 days written notice to the other party. Any contract cancellation notice shall not relieve the Contractor of the obligation to deliver and/or perform on all outstanding orders issued prior to the effective date of cancellation.
5. **IDENTIFICATION OF PROPOSAL ENVELOPE:** The signed proposal should be returned in a separate envelope or package, sealed and addressed as follows:  
Montgomery County  
Purchasing Department  
755 Roanoke Street, Suite 2C  
Christiansburg, VA 24073-3179  
Reference the opening date and hour, and RFP Number in the lower left corner of the envelope or package.  
If a proposal not contained in the special envelope is mailed, the Offeror takes the risk that the envelope, even if marked as described above, may be inadvertently opened and the information compromised which may cause the proposal to be disqualified. No other correspondence or other proposals should be placed in the envelope. Proposals may be hand delivered to the Montgomery County Purchasing Department.
6. **INDEPENDENT CONTRACTOR:** The contractor shall not be an employee of Montgomery County, but shall be an independent contractor. Nothing in this agreement shall be construed as authority for the contractor to make commitments which shall bind Montgomery County, or to otherwise act on behalf of Montgomery County, except as Montgomery County may expressly authorize in writing.
7. **INSPECTION OF JOB SITE:** My signature on this solicitation constitutes certification that I have inspected the job site and am aware of the conditions under which the work must be accomplished. Claims, as a result of failure to inspect the job site, will not be considered by Montgomery County.
8. **INSURANCE:**  
By signing and submitting a proposal under this solicitation, the Offeror certifies that if awarded the contract, it will have the following insurance coverages at the time the work commences. Additionally, it will maintain these during the entire term of the contract and that all insurance coverages will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.  
During the period of the contract, Montgomery County reserves the right to require the Contractor to furnish certificates of insurance for the coverage required.  
**INSURANCE COVERAGES AND LIMITS REQUIRED:**
  - A. Worker's Compensation - Statutory requirements and benefits.
  - B. Employers Liability - \$100,000.00
  - C. General Liability - \$500,000.00 combined single limit. Montgomery County and the Commonwealth of Virginia shall be named as an additional insured with respect to goods/services being procured. This coverage is to include Premises/Operations Liability, Products and Completed Operations Coverage, Independent Contractor's Liability, Owner's and Contractor's Protective Liability and Personal Injury Liability.
  - D. Automobile Liability - \$500,000.00The contractor agrees to be responsible for, indemnify, defend and hold harmless Montgomery County, its officers, agents and employees from the payment of all sums of money by reason of any claim against them arising out of any and all occurrences resulting in bodily or mental injury or property damage that may happen to occur in connection with and during the performance of the contract, including but not limited to claims under the Worker's Compensation Act. The contractor agrees that it will, at all times, after the completion of the work, be responsible for, indemnify, defend and hold harmless Montgomery County, its officers, agents and employees from all liabilities resulting from bodily or mental injury or property damage directly or indirectly arising out of the performance or nonperformance of the contract.
9. **MINORITY BUSINESS, WOMEN-OWNED BUSINESSES SUBCONTRACTING AND REPORTING:** Where it is practicable for any portion of the awarded contract to be subcontracted to other suppliers, the contractor is encouraged to offer such business to minority and/or women-owned businesses. Names of firms may be available from the buyer and/or from the Division of Purchases and Supply. When such business has been subcontracted to these firms and upon completion of the contract, the contractor agrees to furnish the purchasing office the following information: name of firm, phone number, total dollar amount subcontracted and type of product/service provided.
10. **PRIME CONTRACTOR RESPONSIBILITIES:** The Contractor shall be responsible for completely supervising and directing the work under this contract and all subcontractors that he may utilize, using his best skill and attention. Subcontractors who perform work under this contract shall be responsible to the prime Contractor. The Contractor agrees that he is as fully responsible for the acts and omissions of his subcontractors and of persons employed by them as he is for the acts and omissions of his own employees.
11. **SEVERAL LIABILITY:** Montgomery County will be severally liable to the extent of its purchases made against any contract resulting from this solicitation. Applicable departments, institutions, agencies and Public Bodies of the Commonwealth of Virginia will be severally liable to the extent of their purchases made against any contract resulting from this solicitation.
12. **SUBCONTRACTS:** No portion of the work shall be subcontracted without prior written consent of Montgomery County. In the event that the Contractor desires to subcontract some part of the work specified herein, the Contractor shall furnish Montgomery County the names, qualifications and experience of their proposed subcontractors. The Contractor shall, however, remain fully liable and responsible for the work to be done by his subcontractor(s) and shall assure compliance with all requirements of the contract.
13. **STANDARD OF CARE:** In providing services under this Agreement, the Contractor shall perform in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances as the same time and in the same or similar locality.
14. **WORK SITE DAMAGES:** Any damage to existing utilities, equipment or finished surfaces resulting from the performance of this contract shall be repaired to the Owner's satisfaction at the Contractor's expense.

## PROOF OF AUTHORITY TO TRANSACT BUSINESS IN VIRGINIA

***THIS FORM MUST BE SUBMITTED WITH YOUR BID/PROPOSAL. FAILURE TO INCLUDE THIS FORM SHALL RESULT IN REJECTION OF YOUR BID/PROPOSAL***

Pursuant to Virginia Code §2.2-4311.2, a bidder/offeror organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 of the Code of Virginia shall include in its bid/ proposal the identification number issued to it by the State Corporation Commission (“SCC”). Any bidder/offeror that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law shall include in its bid or proposal a statement describing why the offeror is not required to be so authorized. Any bidder/offeror described herein that fails to provide the required information shall not receive an award unless a waiver of this requirement and the administrative policies and procedures established to implement this section is granted by the Purchasing Agent or his designee.

If this bid/proposal for goods or services is accepted by the County of Montgomery, Virginia, the undersigned agrees that the requirements of the Code of Virginia Section 2.2-4311.2 have been met.

Please complete the following by checking the appropriate line that applies and providing the requested information. ***PLEASE NOTE: The SCC number is NOT your federal ID number or business license number.***

- A. \_\_\_\_ Bidder/offeror is a Virginia business entity organized and authorized to transact business in Virginia by the SCC and such bidder’s/offeror’s Identification Number issued to it by the SCC is\_\_\_\_\_.
  
- B. \_\_\_\_ Bidder/offeror is an out-of-state (foreign) business entity that is authorized to transact business in Virginia by the SCC and such bidder’s/offeror’s Identification Number issued to it by the SCC is\_.
  
- C. \_\_\_\_ Bidder/offeror does not have an Identification Number issued to it by the SCC and such bidder/offeror is not required to be authorized to transact business in Virginia by the SCC for the following reason(s):

**Please attach additional sheets of paper if you need to explain why such bidder/offeror is not required to be authorized to transact business in Virginia.**

\_\_\_\_\_  
Legal Name of Company (as listed on W-9)

\_\_\_\_\_  
Legal Name of Bidder/Offeror

\_\_\_\_\_  
Date

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Print or Type Name and Title

# **Broadband Assessment Montgomery County, Virginia**

**Includes City of Radford and Towns of Christiansburg and  
Blacksburg**

**Final Report**

May 11, 2020

Prepared by



*and*



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## 2 Executive Summary

This report documents a comprehensive needs assessment of high-speed Internet services in Montgomery County, Virginia including the City of Radford and the Towns of Christiansburg and Blacksburg. The study was conducted in the fall of 2019.

This report identifies forty-one communities in the County, City, and Towns that need assistance in either attaining high-speed internet service or improving the existing service. It would be natural to assume these 41 communities encompass all households to be remediated; it does not. There are certainly households in the study area that are not included in this report. We are confident that we have identified the preponderance of communities in need, but there are certainly outlying households not included in this report. Our recommendations address this and provide a path forward to identify all households in need of service improvement.

Montgomery County is an exception in Southwest Virginia. It is a hub of innovation, economic development, growth, and prosperity. Yet, despite its demographics and the presence of world-class research and education institutions, there is a surprisingly large population of un-served and under-served communities in the Study Area. Nationally, the un-served population is approximately 6% of households. In Montgomery County and Radford, the un-served population is about 7.6% of households. In total, just over 9,000 households are un-served or under-served.

Un-Served Communities	Number of Households
Alleghany Springs	183
Christiansburg -- Eastern edge. Woodland Dr.	20
Christiansburg -- Park Dist (S. Franklin south of 8	584
Christiansburg -- Park Street	157
Christiansburg --Trailers off Fairview St at 81	126
McCoy	250
McDonalds Mill	59
Norris Run	111
Shawsville (CDP)	550
Sugar Grove and George's Run	49
Tom's Creek	656
Walton	360
Total	<b>3,105</b>

Our estimate of the Capital Cost to solve this situation is between \$7.3 Million and \$31 Million. The variance is because of network deployment – wireless, or an all-fiber-optic deployment. Wireless is significantly less capital intensive to deploy but has much lower network reliability, network performance, and higher network operations cost.

Under-Served Communities	Number of Households
Belmont	650
Blacksburg Country Club Area	174
Bradshaw	179
Brake Road	174
Brush Mountain	217
Catawba Valley	129
Childress Road (Radford)	202
Dry Valley	56
Ellett Valley	119
Elliston (CDP)	345
Gulberg Estates	55
Indian Valley	65
Lafayette (CDP)	194
Longshop	78
Mt. Tabor	274
Peppers Ferry Road	540
Pilot	168
Plum Creek (CDP)	627
Preston Forest	310
Prices Fork	498
Riner (CDP)	317
Rogers (South of Christiansburg, along Rt. 615)	65
Selu	50
Smith Creek	82
Union Valley	132
Vicker	82
Wake Forest	48
Whitethorn	42
Woodland Hills	61
Total	<b>5,933</b>

In reality, the low-density of some communities will dictate a wireless deployment, and we expect the most likely Capital Expenditure (CAPEX) requirement to fully address the un-served and under-served communities will be in the \$18 Million range.

The County leadership articulated four objectives for the project team:

1. Every citizen of Montgomery County have access to high-speed Internet.
2. Families with school-aged children must be a priority.
3. Knowledge workers must have ubiquitous access to high-speed Internet.
4. County leadership desires a market-based solution.

Montgomery County is rich in fiber optic deployments. At least five companies have fiber optic backbones that traverse the County. The County has expressed a strong preference for finding a market-based solution to address this problem. There are a number of service providers who have expressed a strong interest in partnering with the County to achieve grant funding to address the un-served and under-served communities. We believe there are at least six companies who are high-potential partners to collaborate with the County to address the needs. There is probably not a single solution for the County. The matter will have to be addressed on a community-by-community basis, cobbling together a number of different solution sets to fully resolve the matter.

It is recommended the County take the following actions to ameliorate the lack of high-speed Internet. These recommendations are explained more fully in section 7 of this report:

- **Immediate Action:** Allocate a resource – a *broadband czar* – to address the situation and find solutions for each community. Task this individual with identify the outlying households that need service but have not been identified. Consider forming/joining a broadband authority.
- **Intermediate Action:** Require new major subdivisions to build Fiber to the Home (FTTH) conduit systems. Install telecom conduit whenever a trench is opened. Revise local franchise requirements to foment more competition.
- **Long-Term Action:** Plan for and encourage FTTH deployment. Improve competition in the County.

## What is Broadband and High-Speed Internet?

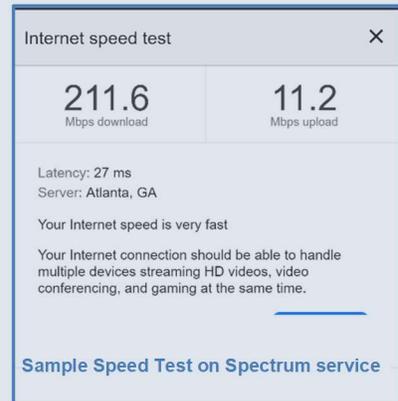
The definition of Broadband has been a constantly changing value as services and applications have become more sophisticated and feature-rich, requiring more and more bandwidth to deliver a satisfactory user experience.

In 1994, when the internet was generally considered to be “born,” a 56 kilobit dial-up line and phone modem were sufficient for email messages, chat rooms, message boards, and fee-based services like Prodigy and America online. At the time, 1.5 megabits per second (Mbps) was considered the threshold for broadband services. This was a business-class service and was synchronous, meaning 1.5 Mbps up and down.

The Federal Communications Commission (FCC), today considers residential broadband service to be a minimum of 25 Mbps down X 3 Mbps up.

It is quite common today to find Cable TV service offering 100 to 400 Mbps down, and 10 to 15 Mbps up. This service costs between \$50 and \$65 per month depending upon the local market.

Services like Netflix state they need at least a 25 Mbps down connection for users to have a quality experience with HD TV. From first-hand experience, this is an understatement; much more bandwidth is required for a satisfactory experience.



## Business Class Service and Residential Service.

Business Class Service is a dedicated service, meaning no other users are sharing that pipe or bandwidth. If a business subscribes to 100 MBPS, they are getting precisely that much bandwidth up and down. Dedicated service is significantly more expensive than residential service. A dedicated 100 Mbps service will cost between \$600 and \$1,200 per month depending upon market conditions. Residential service is “over-subscribed,” meaning many people are sharing the same pipe. Depending upon network architecture, several hundred to 1,000 end users can be on the same 100 Mbps service.

## Minimum Recommended Speeds for Residential Use:

10 Mbps	20 Mbps	50 Mbps	100 Mbps
<ul style="list-style-type: none"><li>• Email</li><li>• IP Telephone</li><li>• Few devices connected</li><li>• One or two users</li></ul>	<ul style="list-style-type: none"><li>• All 10 Mbps services, plus:</li><li>• Occasional Streaming video service on one device</li><li>• ~ 10 internet connected devices</li></ul>	<ul style="list-style-type: none"><li>• All 20 Mbps services, plus:</li><li>• Daily audio streaming</li><li>• ~ 20 internet connected devices</li><li>• 4k HD video stream</li></ul>	<ul style="list-style-type: none"><li>• All 50 Mbps services, plus:</li><li>• Multi-user on-line gaming</li><li>• 30 or more internet connected devices</li><li>• Four people in household watching multiple HD streams</li></ul>

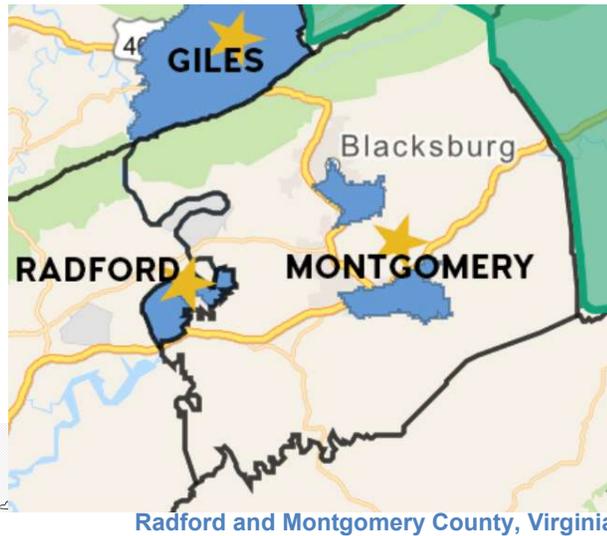
## 3 Introduction

This report documents a comprehensive needs assessment of broadband services in Montgomery County, Virginia and the City of Radford. The assessment includes the Towns of Blacksburg and Christiansburg (the Study Area).

This report identifies forty-one communities in the County, City, and Towns that need assistance in either attaining high-speed internet service or improving the existing service. It would be natural to assume these 41 communities encompass all households to be remediated; it does not. There are certainly households in the study area that are not included in this report. We are confident that we have identified the preponderance of communities in need, but there are certainly outlying households not included in this report. Our recommendations address this and provide a path forward to identify all households in need of service improvement.

### 3.1 Project Area

Montgomery County and the City of Radford are unique among communities in Southwest Virginia. The Study Area has a total population of just under 100,000 and has been experiencing growth – possibly the only region in Southwest Virginia to have a growth story. The Study Area is home to Virginia Tech and Radford University. The student population is estimated at 40,000, which is included in the census population count.



The citizens of the Study Area are on average, younger, more highly educated, and have higher earnings than their peers in Southwest Virginia.

Much of this growth and development is driven by Virginia Tech, a tier-1 technical research and teaching university with a forward-thinking, if not aggressive, approach to the commercialization of technology developed at the University. Virginia Tech is a thought leader in several technology areas that are engines of economic growth including wireless, robotics, advanced manufacturing, and drone aviation. In addition to being a juggernaut of economic development, Virginia Tech was a leader in the development of high-speed Internet and foresaw the disruption the Internet would drive in commerce and social change.

The Blacksburg Electronic Village (BEV) was conceived in 1991 in an effort by the University to expand Internet access to all citizens of Blacksburg. At the time, Virginia Tech had a sophisticated campus-wide voice/data network and was exploring ways to

extend network access to faculty, staff, and students living in Blacksburg. Today, BEV has largely turned over the residential Ethernet operations to the private sector; the job essentially completed. Every data port on the campus, the Corporate Research Center, and in student housing delivers 1 gigabit per second of Internet speeds. Given the early start, the leadership of Tech, and the demographics of Montgomery County, we expected to find a County substantially ahead of the region and nation in broadband availability; however, we were incorrect.

The areas studied are outlined in the following table. The large student population skews the average data, so we attempted to net-out or eliminate the student population from the demographic statistics.

US Census Bureau People Quick Facts	Montgomery County	Radford	Student Pop. Radford and VA Tech	Total - Area of Interest (net of student pop.)	Virginia	United States
Population estimates, July 1, 2018, (V2018)	98,985	18,339	39,900	<b>77,424</b>	8,517,685	327,167,434
Households, 2013-2017	35,577	5,503		<b>41,080</b>	3,105,636	118,825,921
Households with a computer, percent, 2013-2017	91%	85%		<b>90%</b>	89%	87%
Households with a broadband Internet subscription, percent, 2013-2017	84%	76%		<b>83%</b>	80%	78%
High school graduate or higher, percent of persons age 25 years+, 2013-2017	92%	88%		<b>91%</b>	89%	87%
Bachelor's degree or higher, percent of persons age 25 years+, 2013-2017	46%	34%		<b>45%</b>	38%	31%
Median household income (in 2017 dollars), 2013-2017	\$53,424	\$36,082		<b>\$51,101</b>	\$68,766	\$57,652
Per capita income in past 12 months (in 2017 dollars), 2013-2017	\$28,277	\$19,539	\$ 40,780	<b>\$27,106</b>	\$36,268	\$31,177

As noted earlier, there is a large student body component in the population -- nearly 40,000 -- which is included in the census data. Adjusting the per-capita income to exclude the student population and distributing income over the non-student population, the per capita income could be as high as \$40,700, 12% higher than the Commonwealth's per capita income and 31% higher than the national average.

### 3.2 Deliverables

The final deliverables of this study include this written report, as well as two presentations to the broadband management team and County leadership. The first presentation was made in October 15<sup>th</sup>, 2019 and was followed by presentation to the full Board of Supervisors in a public meeting that same day. A second presentation was made on December 11<sup>th</sup>, 2019. A draft final report was prepared for review and comment in January 2020, resulting in this final report. Two separate supplemental deliverables were prepared: 1) an inventory of vertical assets, and 2) a report on public-private-partnerships. A presentation is being coordinated for the City of Radford. All work products are the property of Montgomery County.

### 3.3 Methodology

T&L and Blue Ridge worked with a cross-functional management team of regional leaders to define:

- Community Needs,
- Prioritized List of Communities in Greatest Need,
- Potential Service Providers,
- Remedial Strategies and Associated Costs, and

- Potential Funding Sources and Strategies.

To identify the specific needs of each community, Blue Ridge conducted 32 diagnostic interviews with key stakeholders in the region including City and Town Managers, IT directors, Economic Developers, Educators, and County Leadership, including all members of the Board of Supervisors.

At the time we undertook this project, the New River Valley Regional Commission was in the process of compiling a Community Broadband Survey gauging the citizens service levels, availability, and attitudes about service providers. The survey was very well designed, had geographic identifiers, and had over 1,600 records. The survey was extremely valuable in fleshing out specifics about un-served communities, network reliability, quality of service, and attitudes about price and service providers.

Finally, we interviewed six of the regional service providers to understand their network architecture, coverage areas, concerns, and issues with network deployment in Montgomery County.

## 4 County Needs

To understand the Study Area's preparedness to support technology-enabled, quality-of-life-improving applications, we interviewed key stakeholders throughout the County, the City, and two towns. Regional leaders view broadband as a necessity - a "4th utility." County leaders were consistent in their message to the consulting team:

- Leadership would like every citizen of Montgomery County to have access to high-speed Internet. It is not viewed as a luxury item or a discretionary service. High-speed Internet service is a "must have" to sustain a basic quality of life. Solve the un-served problem first, and then address the under-served communities.
- Families with school-aged children must be a priority. The school systems are moving toward all-digital curricula. Children without access to high-speed Internet at home are being significantly disadvantaged. Make fixing the un-served and under-served communities with school-aged children a priority.
- The workforce in Montgomery County is increasingly becoming a "knowledge-worker" community. As employees who deal with the handling and processing of information, there is an expectation that they will always have access to high-speed Internet. Economic developers' biggest obstacle is ensuring that the workforce has continuous connectivity.
- Finally, the County leadership desires for the solution to this problem be a market-based solution. There are a number of service providers in the region. There is a rich fiber optic backbone infrastructure widely deployed in the County, but not everywhere. There are multiple incumbent providers and competitive start-ups using many different technologies. The Board of Supervisors and the County leaders agree that there is no need for the County or City to take an active investment role in becoming a provider of high-speed Internet services.

These four guiding principles became the mission for the project.

## 5 Identification of Communities

Forty-one (41) communities were identified as needing remediation. Twelve (12) communities are unserved by high-speed Internet service. These twelve communities represent an estimated 3,105 homes in the County and City. Nationally, about 6% of households are un-served with high-speed Internet. This level of unserved homes represents about 7.6% of the housing units in Radford and Montgomery County – a much higher percentage than we would have thought -- given the early actions of Radford University and Virginia Tech to expand the reach of broadband. To validate these findings, we visited several communities and conducted person-on-the-street discussions to validate the finding. Additionally, the Thompson & Litton office this project was worked out of is located in Radford. Several employees validated these finding based upon first-hand experience.

The balance of the 41 communities identified for remediation have some level of [High Speed Internet](#); however, it is either too slow to meet current and emerging bandwidth demands or is unreliable in its system availability. Typically, this might be a DSL (digital subscriber loop) service with a 3 mbps downstream speed and .5 mbps up. These 29 communities are identified in the table to the right. There are an estimated 5,933 households in this group.

Un-Served Communities	Number of Households
Alleghany Springs	183
Christiansburg -- Eastern edge. Woodland Dr.	20
Christiansburg -- Park Dist (S. Franklin south of 81	584
Christiansburg -- Park Street	157
Christiansburg --Trailers off Fairview St at 81	126
McCoy	250
McDonalds Mill	59
Norris Run	111
Shawsville (CDP)	550
Sugar Grove and George's Run	49
Tom's Creek	656
Walton	360
<b>Total</b>	<b>3,105</b>

Under-Served Communities	Number of Households
Belmont	650
Blacksburg Country Club Area	174
Bradshaw	179
Brake Road	174
Brush Mountain	217
Catawba Valley	129
Childress Road (Radford)	202
Dry Valley	56
Ellett Valley	119
Elliston (CDP)	345
Gulberg Estates	55
Indian Valley	65
Lafayette (CDP)	194
Longshop	78
Mt. Tabor	274
Peppers Ferry Road	540
Pilot	168
Plum Creek (CDP)	627
Preston Forest	310
Prices Fork	498
Riner (CDP)	317
Rogers (South of Christiansburg, along Rt. 615)	65
Selu	50
Smith Creek	82
Union Valley	132
Vicker	82
Wake Forest	48
Whitethorn	42
Woodland Hills	61
<b>Total</b>	<b>5,933</b>

## 5.1 Prioritization of Communities

### Methodology

Using the driving principles indentified throughout the project:

- Everyone connected, with completely un-served addressed first,
- School-aged children a priority, and
- Serve the knowledge workers.

As well as some factors the consulting team knows to be important in network deployment:

- Economies of scale - the more dense the housing units and the greater the number of house units, the bigger the impact for the fixed cost of developing a fiber-optic lateral.
- The captial expense (CAPEX) estimate per household to serve a community is driven by the length of the fiber drop from the street to the home.

We developed the following ranking model:

Criteria	Weighting	Maximum Value	Minimum Value
Un-served or Under-served	40 points	Un-served = 40	Under-served = 20
Number of Households (HH)	20 points	656 HH is the largest = 20 pts	20 HH is the smallest = 1 pt
% of HH with Children	20 points	32% = 20 pts	14% = 1 pt
Income per HH (as a proxy for knowledge workers)	10 points	\$106,161 = 10 pts	\$33,425 = 1 pt
CAPEX est per HH (note lower cost per HH is a better value than higher cost)	10 points	\$2,500 = 10 pts	\$8,000 = 1 pt

Based upon this ranking methodology, we developed a model that rates and ranks all 41 communitites of interest. The community that generates the highest score should, theoretically, be the one that is addressed first. Of course, in network deployments there are always additional circumstances to consider – a new trench may be opening for a water project that would provide more cost-effective network deployment, or a unique

grant may become available for a certain condition that changes the order of communities. This prioritization is a guideline only to be used to prioritize focus.

Rank	Community	Total Score
1	Christiansburg -- Park Dist (S. Franklin south of 81)	86.7
2	Shawsville (CDP)	82.3
3	Walton	76.0
4	Tom's Creek	72.6
5	Christiansburg --Mobile Homes off Fairview St at 81	72.3
6	McCoy	71.9
7	Christiansburg -- Park Street	71.6
8	Belmont	70.5
9	Christiansburg -- Eastern edge. Woodland Dr.	69.0
10	Alleghany Springs	68.5
11	Norris Run	67.5
12	Riner (CDP)	67.2
13	Plum Creek (CDP)	64.4
14	Sugar Grove	64.3
15	McDonalds Mill	62.1
16	Peppers Ferry Road	61.0
17	Prices Fork	59.7
18	Elliston (CDP)	57.6
19	Mt. Tabor	56.1
20	Bradshaw	53.1
21	Childress Road (Radford)	51.9
22	Catawba Valley	51.5
23	Pilot	50.8
24	Union Valley	49.7
25	Lafayette (CDP)	48.3
26	Brake Road	48.2
27	Indian Valley	47.6
28	Dry Valley	47.3
29	Selu	47.1
30	Vicker	46.6
31	Longshop	46.5
32	Wake Forest	45.6
33	Whitethorn	45.4
34	Preston Forest	44.9
35	Smith Creek	44.5
36	Rogers (South of Christiansburg, along Rt. 615)	43.9
37	Gulberg Estates	43.6
38	Brush Mountain	39.5
39	Blacksburg Country Club Area	37.9
40	Ellett Valley	34.6
41	Woodland Hills	31.7

## 6 Capital Cost Estimate

It is impossible to precisely forecast the Capital Expenditure (CAPEX) to solve the problem without a network design basis to use for cost estimating. However, we have a sufficiently large frame-of-reference with other projects that can be used to develop a credible cost estimate. A general cost estimate will be a useful tool for regional planners.

### Cost Estimating Assumptions:

The following assumptions were used for developing the frame-of-reference for both a Fiber to the Home (FTTH) and a wireless deployment:

<b>Base-case Planning assumptions for Montgomery County projects:</b>	
<b>Backbone Aerial:</b>	
Cost per mile to Engineer, Design, and Permit a BACKBONE network	\$ 3,000
Cost per mile for Aerial backbone build	\$ 20,000
Cost per mile for make-ready on existing poles	\$ 3,000
<b>Fiber Drop:</b>	
Cost per foot for aerial drop to premises	\$ 2.30
Cost per foot for UG drop to premises	\$ 4.00
Survey	\$ 75
NID	\$ 165
ONT	\$ 176
Cables	\$ 6
Inside installation	\$ 300
<b>Wireless:</b>	
Cost to turn up a Wireless backbone site	\$ 2,000
Cost to turn up a Wireless customer	\$ 300
<b>Shelter and Electronics if needed</b>	
Cost of electronics set for POP	\$ 25,000
POP shelter building without generator	\$ 20,000

Housing density is a major driving factor for FTTH deployments. The length of the fiber drop from the backbone to the residence is the single largest variable cost in the overall deployment. The length of fiber extension from the existing backbone to the community to be served is the also a density-driven variable. All other costs are fixed costs and do not vary with density: The Optical Network (ONT) terminating device, the Network Interface Device (NID), etc., are all fixed costs.

Density is also a factor in wireless deployments; the greater the density, the lower the cost-per-home.

To develop a CAPEX estimate, we used ranges of CAPEX based upon density, then applied the appropriate CAPEX for each community based upon the housing density in that census tract.

<b>Estimating CAPEX Values</b>		
<b>Housing Density</b>	<b>Estimated Wireless CAPEX per Home</b>	<b>Estimated FTTH CAPEX per home</b>
Less than 20 Housing Units per Sq. Mile	\$ 2,500	\$ 8,000
Greater than 20 and less than 250	\$ 1,000	\$ 4,000
Greater than 250 Housing Units per Sq. Mile	\$ 500	\$ 2,500

Thompson & Litton selected six communities from the 41 and designed an actual FTTH network. We compared our frame-of-reference estimate with the six designs and found the frame of reference to be about 20% higher than the actual design-cost estimate. So, we can realistically expect this CAPEX estimate to be credible.

**CAPEX:**

Using the methodology described above, we formulated the CAPEX estimates for both an FTTH and a wireless deployment. The County can expect to spend between \$7 Million and \$31 Million to solve the un-served and under-served problem in the entire Study Area. \$7 Million represents a complete wireless solution; \$31 Million represents a complete Fiber to the Home network solution.

While Fiber-to-the-Home is the gold standard for network deployment, in actual practice, the County can expect some hybrid solution of FTTH and wireless, depending upon the community’s distance from the backbone, the community density, and the geography (topography) of each community. If we applied a density factor of 200 homes-per-square-mile as the cutoff for FTTH, the resulting solution will be a hybrid CAPEX estimate of about \$16.4 Million.

**Estimate of CAPEX by Community:**

Community	CAPEX Estimate	
	FTTH	Wireless
Alleghany Springs	\$ 732,000	\$ 183,000
Belmont	\$ 1,625,000	\$ 325,000
Blacksburg Country Club Area	\$ 435,000	\$ 87,000
Bradshaw	\$ 716,000	\$ 179,000
Brake Road	\$ 696,000	\$ 174,000
Brush Mountain	\$ 868,000	\$ 217,000
Catawba Valley	\$ 516,000	\$ 129,000
Childress Road (Radford)	\$ 808,000	\$ 202,000
Christiansburg -- Eastern edge. Woodland Dr.	\$ 50,000	\$ 10,000
Christiansburg -- Park Street	\$ 392,500	\$ 78,500
Christiansburg -- Parke Dist (S. Franklin south of 81)	\$ 1,460,000	\$ 292,000
Christiansburg --Mobile Homes off Fairview St at 81	\$ 315,000	\$ 63,000
Dry Valley	\$ 224,000	\$ 56,000
Ellett Valley	\$ 476,000	\$ 119,000
Elliston (CDP)	\$ 862,500	\$ 172,500
Gulberg Estates	\$ 220,000	\$ 55,000
Indian Valley	\$ 260,000	\$ 65,000
Lafayette (CDP)	\$ 776,000	\$ 194,000
Longshop	\$ 312,000	\$ 78,000
McCoy	\$ 1,000,000	\$ 250,000
McDonalds Mill	\$ 472,000	\$ 147,500
Mt. Tabor	\$ 1,096,000	\$ 274,000
Norris Run	\$ 444,000	\$ 111,000
Peppers Ferry Road	\$ 2,160,000	\$ 540,000
Pilot	\$ 672,000	\$ 168,000
Plum Creek (CDP)	\$ 1,567,500	\$ 313,500
Preston Forest	\$ 1,240,000	\$ 310,000
Prices Fork	\$ 1,992,000	\$ 498,000
Riner (CDP)	\$ 1,268,000	\$ 317,000
Rogers (South of Christiansburg, along Rt. 615)	\$ 260,000	\$ 65,000
Selu	\$ 200,000	\$ 50,000
Shawsville (CDP)	\$ 1,375,000	\$ 275,000
Smith Creek	\$ 328,000	\$ 82,000
Sugar Grove	\$ 196,000	\$ 49,000
Tom's Creek	\$ 2,624,000	\$ 656,000
Union Valley	\$ 528,000	\$ 132,000
Vicker	\$ 328,000	\$ 82,000
Wake Forest	\$ 192,000	\$ 48,000
Walton	\$ 900,000	\$ 180,000
Whitethorn	\$ 168,000	\$ 42,000
Woodland Hills	\$ 244,000	\$ 61,000
<b>TOTAL ESTIMATE</b>	<b>\$ 30,998,500</b>	<b>\$ 7,330,000</b>

## 7 Recommendations and Next Steps

Beyond creating an inventory of communities-in-need of high-speed Internet service, there are several recommendations the consulting team formulated, stemming from our interaction with community leaders, stakeholders, and service providers. These recommendations are presented in descending order of importance, or urgency, and are presented in a general timeframe for implementation.

### Immediate Action:

1. We recommend the County **allocate a resource** to manage addressing the communities in need and pursue both funding and partnerships with service providers to solve the problem of un-served and under-served communities. Addressing the problem will be neither easy nor quick. An individual must be identified and tasked with a single purpose – to reduce the number of unserved and under-served households in the service area. While there are several functional areas in County government where this position could reside – Public Service Authority, Information Technology, Economic Development, etc. -- we recommend this be a direct report to the County Administrator to increase the visibility and authority of the individual. As a direct report to the Administrator, this position will enjoy much greater traction when negotiating with carriers and service providers. An additional benefit of creating this position is the carriers will have a single-point-of-contact to discuss network deployments. To this point, some of the service providers have been frustrated by the lack of engagement and difficulty in understanding whom to petition regarding their outside-plant requirements. This position will also be a focal point for compiling a comprehensive inventory of all households in need of service improvement (there are certainly outlying households without service who were not identified in this study). Finally, we recommend this person be tasked with solving a specific number of the 9,000 households with no or insufficient high-speed Internet service. While it is not a widespread practice in County government, we recommend this individual's compensation be directly linked to the number of households solved and that number be tracked and reported on a regular basis. The goals established for this position must be measurable and time specific. We estimate that solving the entire problem is most likely a 10-year process. We know there will be some "low-hanging fruit" that can be addressed easily, but some communities will present great challenge.
2. **Consider forming/joining a Broadband Authority**, under the agency conveyed in the *Virginia Wireless Service Authorities Act*. This should be one of the first considerations of the new position created to address the broadband availability issue. Forming an Authority will provide access to funds through the Virginia Resources Authority (VRA) who provides innovative, and cost-effective financing to build infrastructure projects. Broadband has become an

area of interest for VRA investment. There is an existing Authority in the region – The New River Valley Network Wireless Authority – which includes Giles County, Pulaski County, and Radford. The only hesitation in recommending joining an existing Authority is that it could distract attention from Montgomery County and Radford. Forming the Authority will also send a powerful signal to the service-provider community that the County is serious about addressing the problem and if necessary willing to take an active role.

**Intermediate Action:**

1. Consider conditioning the permitting of new housing developments with a requirement for a Fiber to the Home (FTTH) conduit system. While a new subdivision is under construction, the incremental cost of installing an FTTH conduit system is very low. Trenches are open, crafts people are on site, and traffic control is in place. The cost of installing an FTTH network after the homes are complete is significantly more complicated, costly, and disruptive. This has been done successfully in a number of California major subdivisions with much success. The County attorney was going to conduct research to see if the California best practices can be applied in Virginia.
2. When opening a trench for any reason, consider installing telecommunications conduit in the trench for future use. The Public Service Authority (PSA) is aware of the potential for such an initiative and has had some discussions with service providers about specifying materials and construction practices, but nothing has occurred. The truth of the matter is that telecommunications is not core to the mission of the PSA. They are focused on the delivery of reliable and safe water and wastewater. The coordination of additional utility lines is simply not in their current mission. The PSA has recommended that the service providers keep a watchful eye on upcoming PSA projects; that has had a similar unsuccessful outcome for precisely the same reason.
3. Review the local franchise requirements for service providers and consider exceptions. Some service providers expressed that the franchise obligations prevent them from offering residential service in some markets. The franchise agreements typically come with an affirmative obligation to build network where certain density thresholds are met. The service providers readily admit they are “cherry picking” select neighborhoods that are near their backbone and have favorable demographics. If service providers could be exempted, selectively, from executing the franchise agreements there would be less unserved residents in Montgomery County.

**Long-Term Action:**

1. As mentioned throughout this report, Fiber to the Home (FTTH) is the gold standard for network deployment. With the University delivering 1 GBPS speeds to all student housing, campus facilities, and the Corporate Research

Center, the bar has been set. Community leaders have already heard complaints from new residents moving to the area from other markets where FTTH is widely deployed, and express dissatisfaction / surprise that it's not available in Blacksburg. The County must adopt policies, procedures, and permitting practices that encourage FTTH deployments by the service providers for the long-term. This recommendation is out of the current scope of work for the consulting team. We were tasked with identifying the un-served and under-served markets and propose cost estimates for addressing those projects. However, we would be doing the County a disservice if we did not mention where the future of this marketplace is most certainly headed.

2. Finally, the County must take action to improve the competition in the County. Competition drives price reduction and improves service levels. We have seen this first-hand in a number of different markets. There are at least eight facilities-based providers in the County. The County needs to eliminate policies and practices that hinder competition and adopt those that encourage new entrants and fosters competition.

In summary our recommendations are presented in descending order of urgency for action:

- **Immediate Action:** Allocate a resource to solve the problem. Consider forming/joining a broadband authority.
- **Intermediate Action:** Require new major subdivisions to build FTTH conduit systems. Install telecom conduit whenever a trench is opened. Revise local franchise requirements to foment more competition.
- **Long-Term Action:** Plan for and encourage FTTH deployment. Improve competition in the County.

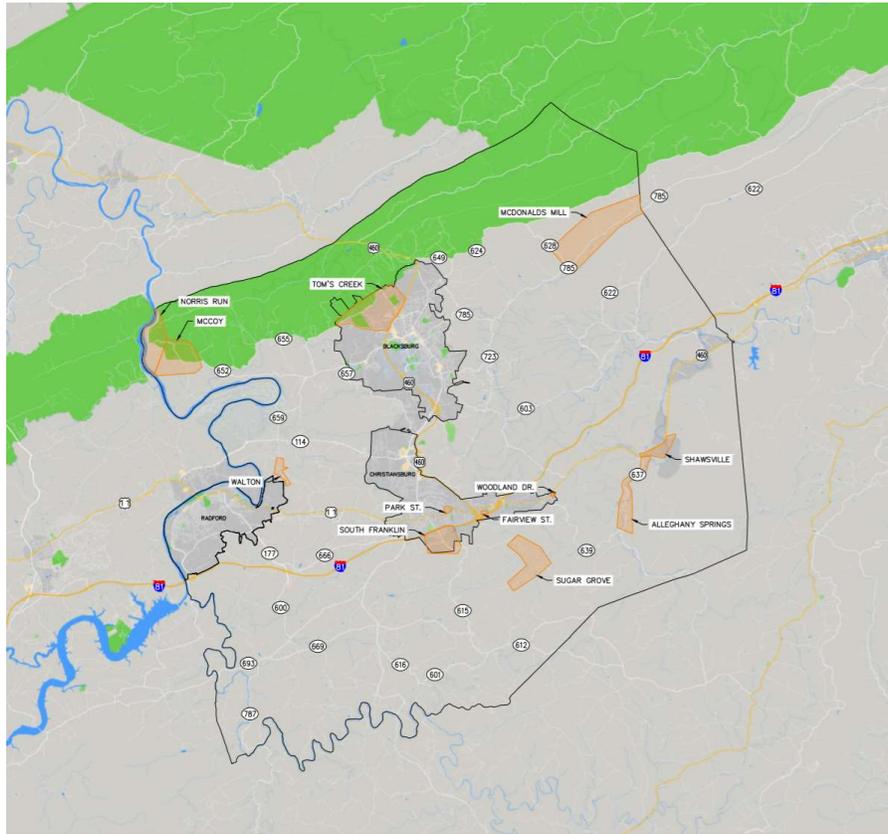
## 8 Attachments and Appendices

### 8.1 Regional Maps with Needs Appendix

#### Un-served Communities:

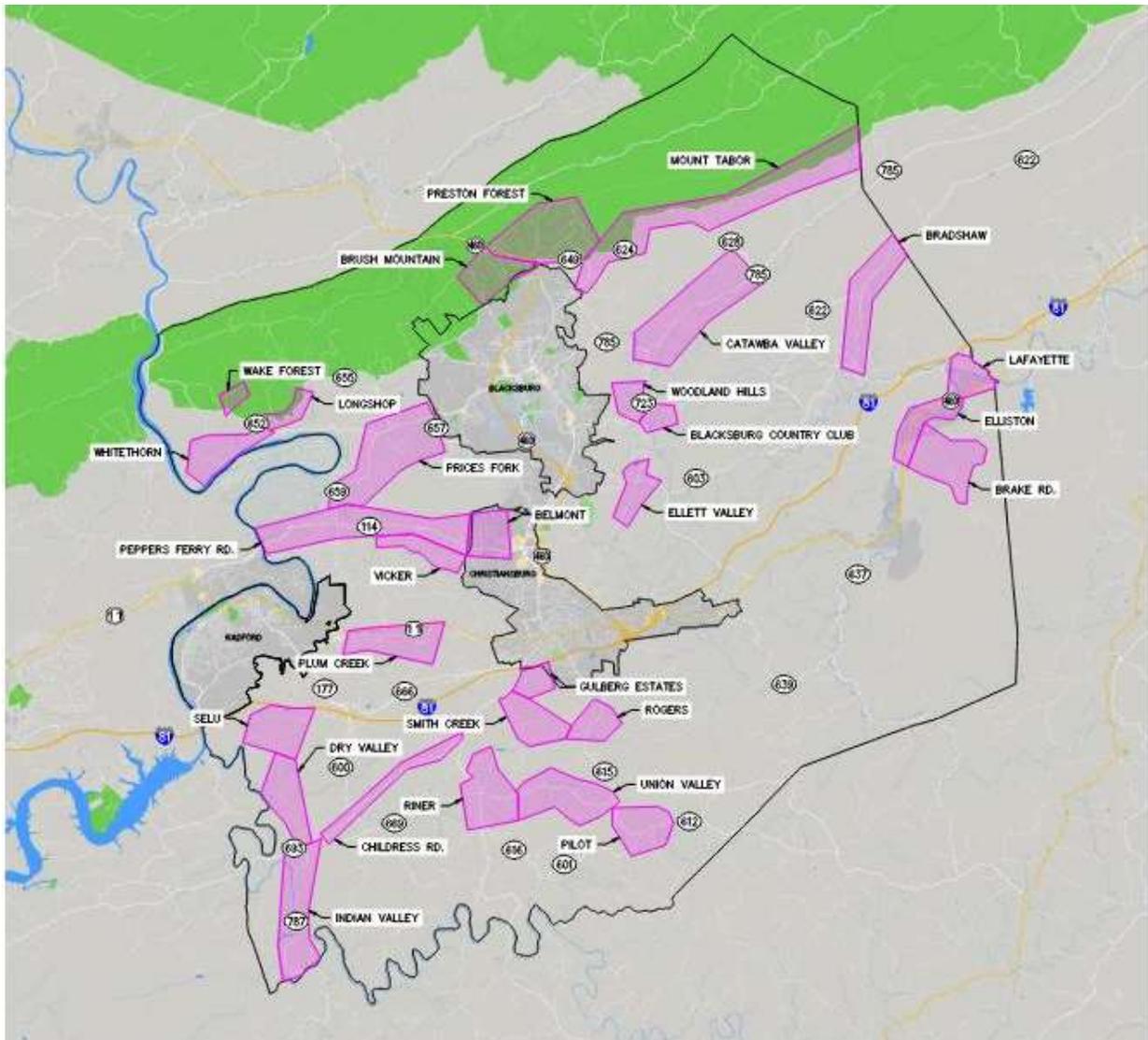
The following table and corresponding map identify the un-served communities in the Study Area:

Un-Served Communities	Number of Households
Alleghany Springs	183
Christiansburg -- Eastern edge. Woodland Dr.	20
Christiansburg -- Park Dist (S. Franklin south of 8	584
Christiansburg -- Park Street	157
Christiansburg --Trailers off Fairview St at 81	126
McCoy	250
McDonalds Mill	59
Norris Run	111
Shawsville (CDP)	550
Sugar Grove	49
Tom's Creek	656
Walton	360
Total	3,105



**Under-served Communities:**

<b>Under-Served Communities</b>	<b>Number of Households</b>
Belmont	650
Blacksburg Country Club Area	174
Bradshaw	179
Brake Road	174
Brush Mountain	217
Catawba Valley	129
Childress Road (Radford)	202
Dry Valley	56
Ellett Valley	119
Elliston (CDP)	345
Gulberg Estates	55
Indian Valley	65
Lafayette (CDP)	194
Longshop	78
Mt. Tabor	274
Peppers Ferry Road	540
Pilot	168
Plum Creek (CDP)	627
Preston Forest	310
Prices Fork	498
Riner (CDP)	317
Rogers (South of Christiansburg, along Rt. 615)	65
Selu	50
Smith Creek	82
Union Valley	132
Vicker	82
Wake Forest	48
Whitethorn	42
Woodland Hills	61
<b>Total</b>	<b>5,933</b>



## **8.2 Sources of Funding Appendix**

### **National Funding**

In December 2019, US Department of Agriculture (through RUS) announced a second round of \$600 million grant and loan Broadband Program availability through the ReConnect Program to assist with building rural broadband infrastructure. Telecommunications companies, rural electric cooperatives, 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 10x1 MBPS. Loan applications are due late January through March 16, 2020.

### **State Level Awards Granted**

The Commonwealth 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. The Governor, through his FY2020-2022 budget proposal to the money committees of the Virginia General Assembly, has recommended increasing funding for broadband to \$35 Million for each year of the biennium budget.

There will be numerous grant opportunities for Montgomery County over the life of this initiative. The individual tasked with managing the effort to close the digital gap will have to become familiar with the funding programs, determine where the high-potential communities are in Montgomery County that fit the many differing criteria of each program and vigilantly go after funding with an operating partner.

### 8.3 Addressable Market Appendix

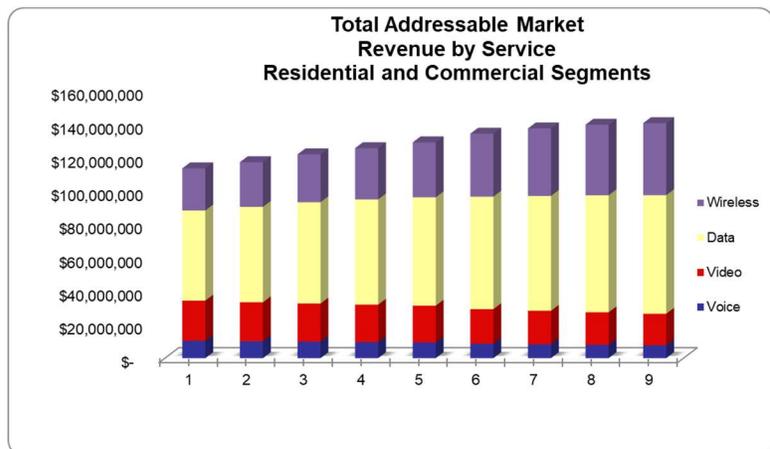
#### Market Overview

The telecommunications market in the Study Area is estimated at roughly a \$114 Million annually for voice, video, data, and wireless services. This excludes the Universities and the student population and student housing.

Total Addressable Market for Retail Telecom Services for Montgomery County, Virginia				
Includes City of Radford and Towns of Christiansburg and Blacksburg				
Telecom Service	Annual Revenue at Year 1	Annual Revenue at Year 5	Annual Revenue at Year 10	Cumulative 10 Year Revenue
Voice	\$10,408,095	\$9,372,255	\$8,011,459	\$91,079,870
Video	\$24,073,205	\$22,079,075	\$19,465,230	\$215,338,374
Data	\$54,021,652	\$64,988,686	\$70,150,086	\$643,787,662
Wireless	\$25,265,924	\$32,926,229	\$42,358,055	\$343,498,071
<b>Total</b>	<b>\$113,768,876</b>	<b>\$129,366,245</b>	<b>\$139,984,830</b>	<b>\$1,293,703,978</b>

Most of the growth will be occurring in the high-speed Internet service and wireless services (commonly called cellular). Both traditional voice services (circuit switched telephony) and multi-channel video services (CATV) are in rapid decline as customers migrate to wireless voice services (so-called cord cutters) and streaming video services (so-called cable cutters).

The market of interest for Montgomery County is the high-speed Internet service. That market is currently about a \$54 million annual market, with about 37% coming from the residential segment and 63% from the commercial segment. The residential high-speed Internet market has about a 4% compound annual growth rate.



## **8.4 Service Provider Appendix**

Following is a brief description of the regional service providers and their capabilities:

### **All Points Broadband**

All Points Broadband (APB) is a fixed wireless service provider that offers services throughout the New River Valley. Based in Northern Virginia, APB has an office in Christiansburg with customer service and field technicians in the immediate area. APB expressed a strong interest in partnering with the County to address the un-served and under-served communities. In fact, the senior management team suggested that if Montgomery County partnered with APB exclusively, they would solve all of the un-served and under-served problems. In our experience (and we have such exclusive arrangements in practice), competition drives lower prices and improved services. Nonetheless, APB is willing and anxious to work in collaboration with the County to address the issue.

### **Citizens Telephone Cooperative**

Citizens is a regional Incumbent Local Exchange Carrier (ILEC) with full-service communications offerings, including land-line telephone, VoIP, IPTV Video, web and e-mail hosting, DSL, FTTP (Fiber to the Premises), and Business Ethernet. Citizens 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 in several 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 Route 58 to Route 16 (BVU/Sunset) and U.S. Route 221 to Sparta. They just completed a build on U.S. Route 221 (North) to Roanoke Co., passing over 1,000 homes with FTTH.

### **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 principally in Radford and Blacksburg. Comcast is respected as a solid operator. We were unable to speak to a local executive about a public-private partnership to pursue a publicly-funded opportunity. We are unaware of any public-private collaboration involving Comcast.

### **Gigabeam Networks**

Gigabeam Networks, a wireless Internet service provider, or WISP, provides service in Southwest Virginia, West Virginia and southeastern Kentucky. Their network was, until recently, completely wireless, including the backhaul. Gigabeam has recently begun to integrate fiber backhaul into their network and is piloting a large program with an investor owned electric utility in Giles County to expand the reach of broadband using the utilities' middle-mile network. Gigabeam is a small, highly entrepreneurial venture that has

experienced some impressive successes. Gigabeam expressed a strong interest in partnering with Montgomery County to address the broadband issue.

### **GoGig**

GoGig is a fiber and wireless provider in the town of Blacksburg. Little is known about GoGig and their corporate structure. It is believed they utilize the Town of Blacksburg's municipal fiber network and serve a handful of commercial customers. We interviewed one technology company who uses GoGig service and their CIO was very upbeat about quality, price, and service. At this point it is premature to say if GoGig will be an influence in addressing the un-served and under-served communities in Montgomery County.

### **LIT Networks**

LIT is a facilities-based long-haul network that spans the Commonwealth. LIT has facilities in Equinix Ashburn, 56 Marietta in Atlanta, and the transatlantic cable landing in Virginia Beach. LIT operates extremely high-capacity circuits typically connecting carriers to carriers and data centers. Their network travels through Montgomery County and their POP is on Prices Fork Rd. LIT is not a retail service provider, but they are worth noting because of their ability to facilitate any local carriers' access to Tier 1 Network Access Points for wholesale Internet.

### **SEGRA**

Segra is the recently acquired LUMOS Networks, a large facilities-based service provider with network from Pittsburgh to Atlanta. Segra is headquartered in Waynesboro, Virginia and has significant network in Montgomery County. Segra is both a residential and commercial service provider with FTTH experience. We believe Segra has high potential to be a partner for Montgomery County. We reached out to a regional executive but were unable to schedule a meeting prior to completion of the project.

### **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 has significant network in Montgomery County, is the franchised CATV operator in Christiansburg, and offers multi-channel video, Internet, and voice services. Shentel has recently filed for franchises in several Comcast markets in Virginia and appears to be becoming aggressive in their competitive threat to other operators. Shentel is developing

a FTTH offering. Senior managers at Shentel said they would welcome an opportunity to partner with Montgomery County to pursue grant funding to solve the broadband issues in the County.

### **Verizon**

Verizon is the Incumbent Local Exchange Carrier (ILEC) in most of Montgomery County. Verizon has DSL service in much of Montgomery County and it is generally considered to be unreliable and of insufficient speeds to meet future demands. We did not speak to a Verizon Executive. However, our dealings with Verizon in other Virginia markets as well as other parts of the country have led us to the following conclusions:

- Verizon is re-inventing itself as a wireless company.
  - Verizon Wireless recently bought out its minority partner – Vodafone – for \$130 Billion.
- Verizon is divesting of many rural markets to others.
  - Verizon sold its Texas, California, Florida, and West Virginia markets to Frontier,
  - Maine, New Hampshire, and other New England markets to Fair Point Communications; and
  - Hawaii to the Carlyle Group.
- Verizon has not deployed any significant FIOS (their FTTH network) since 2010.

We have concluded that Verizon is not a high-potential partner for Montgomery County.

### **WideOpen Networks**

WideOpen Networks (WON), based in Blacksburg, describes itself as a “transport provider” of layer 1 and layer 2 services. The actual consumer services are provided by any number of service providers who ride the WON network. For example, in Blacksburg, ISP services are provided by Biz Net Technologies. According to its founder, Andrew Cohill, WON is presently available in two Blacksburg area neighborhoods providing gigabit speeds over fiber-optic connections. WON has plans to extend to other parts of Blacksburg and throughout the New River Valley.

Design Nine, a related consulting firm, asserts it “*helps communities build their own networks*” and specializes in assisting communities such as a master-planned subdivision or a property-owners association with a self-help business model.

Based upon its size and technology, WON might be a high-potential partner for Montgomery County.

# **Broadband Assessment Montgomery County, Virginia**

**Includes City of Radford and Towns of Christiansburg and  
Blacksburg**

**Supplement to Final Report**

**Vertical Assets**

April 2020

Prepared by



*and*



# Vertical Assets

Number	Name	Type	Suitable for Wireless	Available Space	Notes	Latitude	Longitude
1	Lafayette Water Tank	Water Tank	Yes	Yes	Not many trees, most are short, not much foliage	37.23341	-80.20696
2	Brake Road Water Tank	Water Tank	Yes	Yes	Tall trees/Foliage taller than the tank	37.20552	-80.20653
3	East Montgomery High School	Building	Yes	Yes		37.20430	-80.23071
4	Shawsville Water Tank	Water Tank	Yes	Yes		37.17539	-80.24073
5	Kirk Hollow Water Tank	Water Tank	No	Yes	Trees taller than Tank	37.16248	-80.26652
6	Allegheny Spring Water Tank	Water Tank	No	Yes	Tall trees	37.12927	-80.26024
7	Camp Christi Water Tank	Water Tank	Yes	Yes	Low trees/foliage	37.14701	-80.31934
8	Falling Branch Water Tank	Water Tank	Yes	Yes	Little to none trees/foliage.	37.11488	-80.37414
9	T-2 Water Tank Hubble	Water Tank	Yes	Yes	Tank much taller than trees/foliage.	37.14038	-80.37244
10	T-3 Water Tank Food-lion	Water Tank	Yes	Yes	Little to none trees.	37.13919	-80.38517
11	Montgomery County School Administration	Building	Yes	Yes	Building	37.13071	-80.39218
12	Montgomery County Government Center	Building	Yes	Yes	Building	37.13087	-80.39286
13	Montgomery Museum	Building	Yes	Yes	Building	37.12871	-80.40378
14	Montgomery County District Court House	Building	Yes	Yes	Building	37.13059	-80.40743
15	Montgomery County Public Safety	Building	Yes	Yes	Building	37.13003	-80.40799
16	T-5 Water Tank Gran View	Water Tank	Yes	Yes	Foliage/Trees same height as tank.	37.11993	-80.42812
17	Old Christians-burg Middle School	Building	Yes	Yes	Building	37.12849	-80.41417
18	Christiansburg Elementary School	Building	Yes	Yes	Building	37.13517	-80.41640
19	Christiansburg High School	Building	Yes	Yes	Building	37.14531	-80.41829
20	Lewis-Gale Montgomery Hospital	Building	Yes	Yes	Building	37.18715	-80.41078
21	Blacksburg Planning/Engineering/GIS	Building	Yes	Yes	Building	37.22680	-80.41162
22	Clay St Water Tank	Water Tank	Yes	Yes	Moderate Trees/foliage	37.23567	-80.39928
23	North Main Water Tank	Water Tank	Yes	No	No trees or foliage in the way	37.25421	-80.40779
24	Riner Water Tank #2	Water Tank	Yes	Yes	Few tall trees.	37.05576	-80.43914
25	Riner Water Tank #1	Water Tank	Yes	Yes	Few tall trees.	37.05584	-80.43901
26	Auburn High School	Building	Yes	Yes		37.05975	-80.44291
27	Auburn Middle School	Building	Yes	Yes		37.06179	-80.44200
28	Worldview Water Tank	Water Tank	No	Yes	Surrounded by tall trees.	37.11286	-80.47507
29	Carillon NRV Medical Center	Building	Yes	Yes		37.08910	-80.50572
30	Bethel Water Tank #2	Water Tank	Yes	Yes		37.10551	-80.51071
31	Bethel Water Tank #1	Water Tank	Yes	Yes		37.10543	-80.51088
32	Plum Creek Water Tank	Water Tank	Yes	Yes		37.12332	-80.49476
33	Bicker Pentecostal Water Tank	Water Tank	Yes	Yes		37.17095	-80.48216
34	NRV Regional Water Authority	Building	Yes	Yes		37.17111	-80.51912
35	Water Tank T-2	Water Tank	Yes	Yes		37.13582	-80.56361
36	Water Tank T-3	Water Tank	Yes	Yes		37.13559	-80.56381
37	Water Tank T-4	Water Tank	Yes	Yes	Abandoned concrete tank	37.14290	-80.55709
38	Milton Water Tank	Water Tank	Yes	Yes		37.13059	-80.54628
39	Water Tank T-5	Water Tank	Yes	Yes		37.12368	-80.54297
40	Water Tank T-6	Water Tank	No	Yes	Surrounded by tall trees.	37.11385	-80.56179
41	Charmont Water Tank	Water Tank	Yes	Yes		37.10517	-80.56290
42	Water Tank T-7	Water Tank	Yes	Yes		37.09764	-80.57499
43	Water Tank T-1	Water Tank	N/A	N/A		37.10805	-80.57080
44	Prospect Hill	Vacant Lot	N/A	N/A	No longer Water Tank	37.11087	-80.58432
45	Prices Fork Water Tank	Water Tank	N/A	N/A	Privately owned by VT. Couldn't gain access.	37.18819	-80.48214
46	Parrott Water Tank	Water Tank	N/A	N/A	Road couldn't be driven up.	37.21705	-80.62610
47	Water Tank T-8	Vacant Lot	N/A	N/A	No longer Water Tank	37.12232	-80.54097

# Vertical Assets Locations

**Legend**

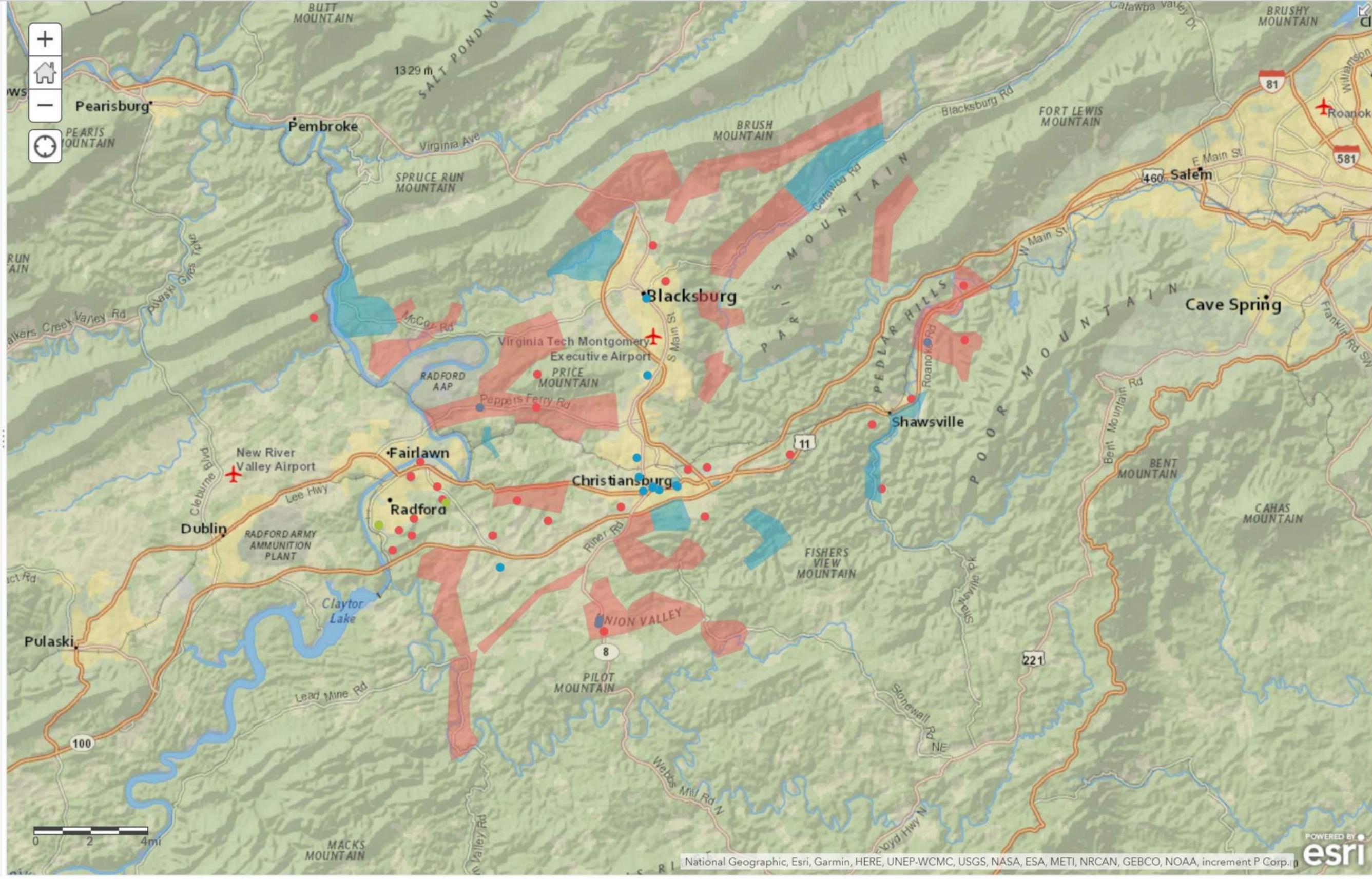
Montgomery County  
Project Areas 021020

- UNDERSERVED PROJECT AREA
- UNSERVED PROJECT AREA

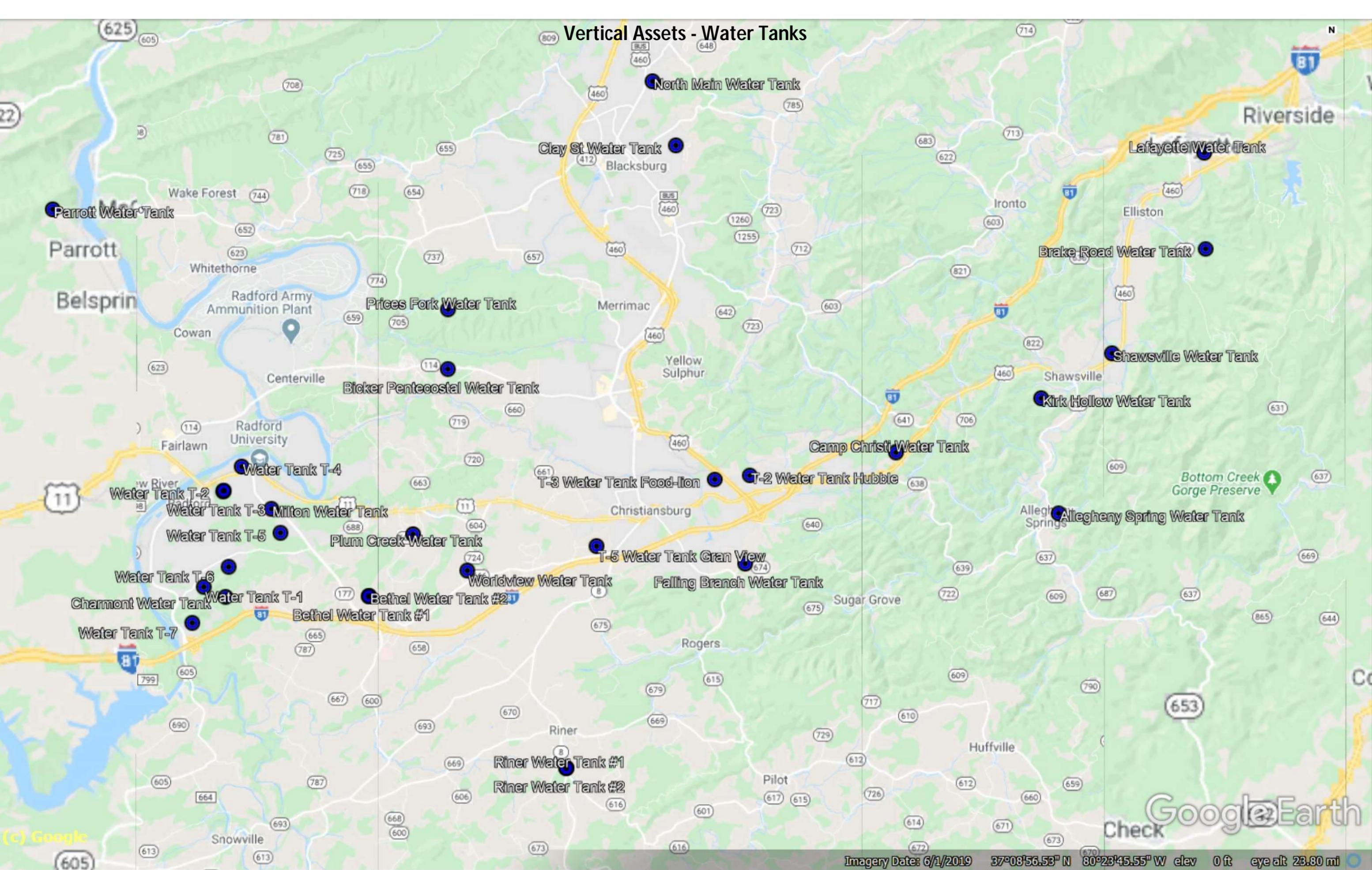
**Vertical Assets\_gdb**

- Water Tank
- Building
- Vacant Lot

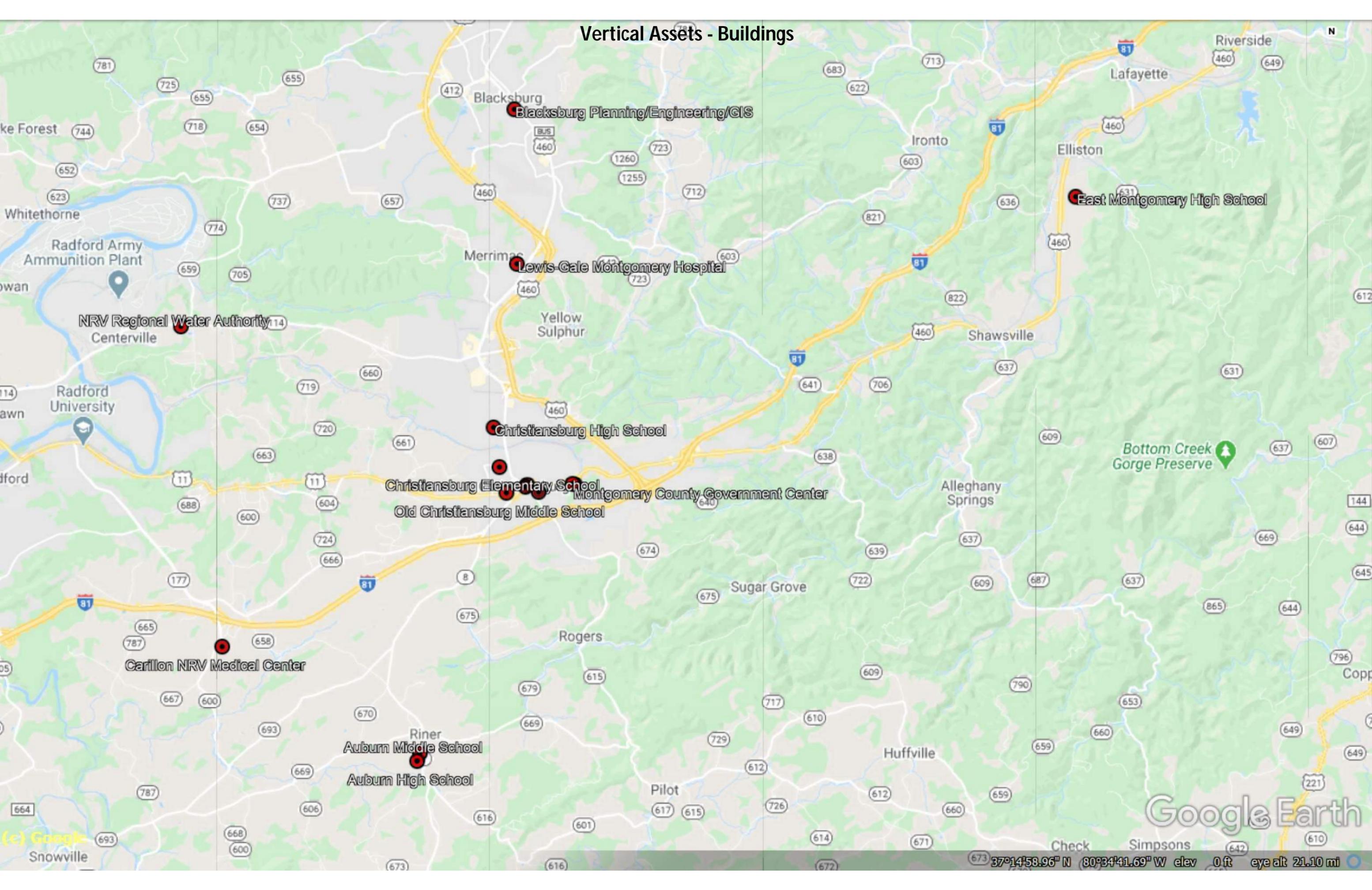
Trust Center | Contact Esri | Report Abuse



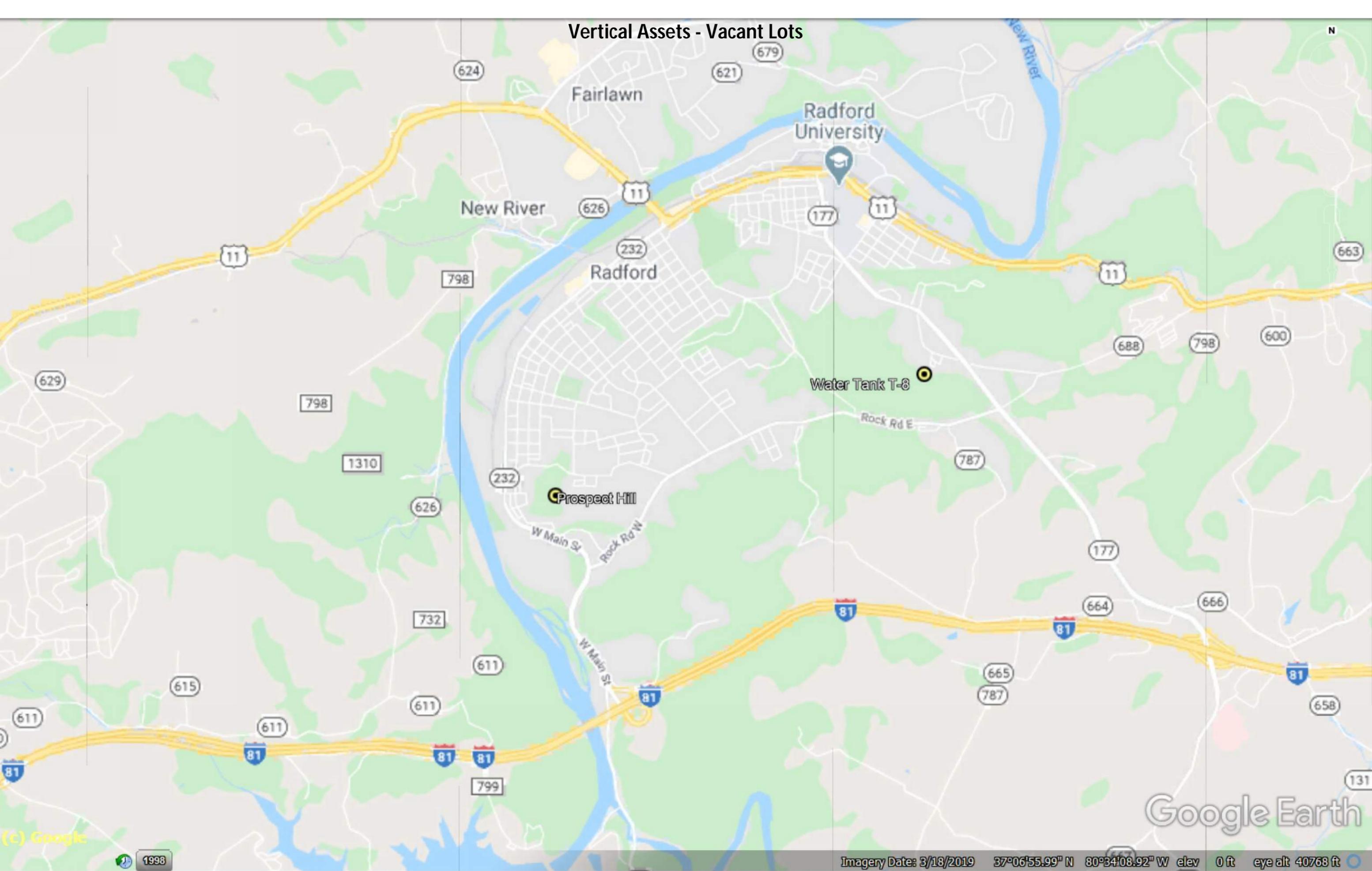
# Vertical Assets - Water Tanks



# Vertical Assets - Buildings



Vertical Assets - Vacant Lots



Google Earth

(c) Google

1998

Imagery Date: 3/18/2019 37°06'55.99" N 80°34'08.92" W elev 0 ft eye alt 40768 ft

# 1 - Lafayette Water Tank



## 2-Brake Road Water Tank



# 3-East Montgomery High School



4-Shawsville Water Tank



# 5-Kirk Hollow Water Tank



# 6-Allegheny Spring Water Tank



## 7-Camp Cristi Water Tank



# 8-Falling Branch Water Tank



# 9-T-2 Water Tank Hubble



# 10-T-3 Water Tank Food Lion



# 11-Montgomery Co. School Administration



# 12-Montgomery Co. Government Center



# 13-Montgomery Museum



# 14-Montgomery Co. District Court House



# 15-Montgomery Co. Public Safety



# 16-T-5 Water Tank Gran View



**NO  
TRESPASSING**  
PRIVATE PROPERTY  
TOWN OF CHRISTIANSBURG  
CONTACT: (540) 382-9129  
AFTER HOURS: (540) 382-4340

PROPERTY  
PROTECTED  
BY  
24 HOUR  
SURVEILLANCE

# 17-Old Christiansburg Middle School



# 18-Christiansburg Elementary School



# 19-Christiansburg High School



**20-Lewis-Gale Montgomery Hospital**



## 21-Blacksburg Planning/Engineering/GIS



## 22-Clay St. Water Tank



# 23-North Main Water Tank



## 24-Riner Water Tank #2



25-Riner Water Tank #1



# 26-Auburn High School



# 27-Auburn Middle School



## 28-Worldview Water Tank



## 29-Carillion NRV Medical Center



30-Bethel Water Tank #2



31-Bethel Water Tank #1



# 32-Plum Creek Water Tank



**33-Bicker Pentecostal Water Tank**



# 34-NRV Regional Water Authority



# 35-Water Tank T-2



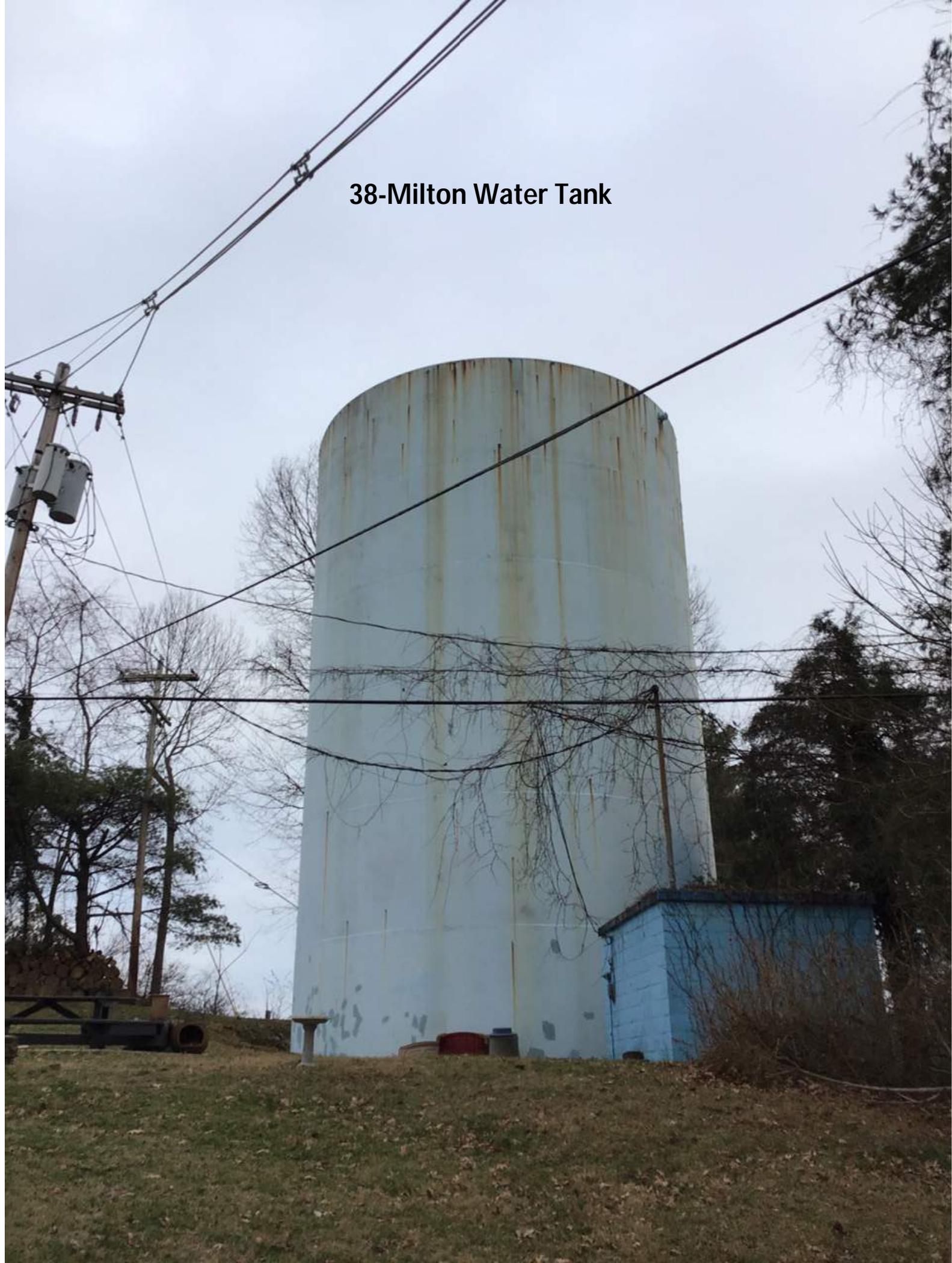
# 36-Water Tank T-3



37-Water Tank T-4



**38-Milton Water Tank**



39-Water Tank T-5



# 40-Water Tank T-6



# 41-Charmont Water Tank



6-3377  
8-7011  
58

NO ADDITIONAL  
LOCKET  
PERMITTED

PRIVATE  
PROPERTY  
NO  
PASSING  
YOUR BILL

42-Water Tank T-7



# 43-Water Tank T-1



# 44-Prospect Hill



# 45-Prices Fork Water Tank



# 46-Parrott Water Tank



47-Water Tank T-8

