
Five-Year Action Plan

Submitted August 11, 2023

Posted August 14, 2023

State of West Virginia

West Virginia Department of Economic Development



INTERNET FOR ALL **West Virginia**



Jim Justice
Governor of West Virginia

August 11, 2023

Alan Davidson, Assistant Secretary
Commerce for Communications and Information
NTIA Administrator
United States Department of Commerce
1401 Constitution Ave., N.W.
Washington, DC 20230

**RE: Infrastructure Investment and Jobs Act: Broadband Equity Access and Deployment
Five-Year Action Plan Letter of Support**

Dear Assistant Secretary Davidson:

I am writing to convey my strong support for the Infrastructure Investment and Jobs Act (IIJA) Broadband Equity Access and Deployment (BEAD) Program.

I am proud to submit West Virginia's Five-Year Action Plan to NTIA on behalf of the citizens of West Virginia. We understand that broadband is essential for the vitality of our communities, education, health care, and the economic future of West Virginia.

This Action Plan represents my commitment to ensuring that all West Virginians have access to broadband connectivity. The Plan reflects the voices of West Virginians, gathered through extensive research, collaboration, and a strong emphasis on community outreach and stakeholder engagement.

Thank you for visiting West Virginia on July 21, 2023, and for taking the time to learn how NTIA's investment of \$1,210,800,969 will transform our State into one of the most connected states in the nation.

The State of West Virginia stands ready to provide any necessary support and cooperation to ensure the successful implementation of the BEAD program. Thank you for your dedication to expanding broadband and for the partnership of NTIA.

Sincerely,

Jim Justice
Governor

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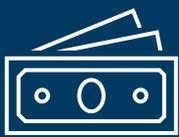
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1. Executive Summary

West Virginia (the State) stands ready to deliver on a historic opportunity to connect the State with high-quality broadband service through once-in-a-generation investments in its infrastructure and its people. This readiness is the product of engagement and planning over the last year at the state level and in communities. It is also the product of years of preparation and foresight by the State to be ready for this moment, first with the creation of the West Virginia Broadband Enhancement Council in 2016, and later with the addition in 2021 of the West Virginia Office of Broadband (Office of Broadband) within the West Virginia Department of Economic Development (WVDED)¹. WVDED will build on its record of expanding broadband service through the West Virginia Broadband Investment Plan, a \$236 million initiative with nearly 40 projects awarded to date, touching 40 counties. This Five-Year Action Plan prepares West Virginia to invest an even larger sum—a \$1.2 billion allocation from the National Telecommunications and Information Administration (NTIA), through its Broadband Equity, Access, and Deployment (BEAD) program.

 <p>Only 64.8% of homes and businesses have access to 100/20 Mbps broadband</p>	 <p>Up to 57% of West Virginians may find broadband internet access unaffordable</p>	 <p>97% of West Virginians are covered by the Digital Equity Act</p>	 <p>Many West Virginians don't have access to digital skills training & resources</p>
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West Virginians need broadband at the ready, but the challenges to make West Virginia broadband ready are real. West Virginia is the only state that lies completely within the Appalachian Mountain region. It has a higher mean elevation than any state in the eastern United States. While West Virginia's topography adds to its beauty, it also proves challenging to deploy broadband across the entire state. The challenges are reflected in the data about locations that have access to broadband up to today's standard. As of December 31, 2022, 64.8% of West Virginia's "broadband serviceable locations" (BSLs) are already fully served under the current federal standard, with at least one internet service provider offering speeds of at least 100 Mbps download and 20 Mbps upload (100/20 Mbps²). West Virginia ranks 3rd-last of all 50 states, Washington, D.C., and Puerto Rico on this measure.³ State and federal initiatives have already

¹ For consistency, WVDED will be used throughout the rest of this document to refer to both the Office of Broadband and the Department of Economic Development as a whole.

² In this plan, when broadband speeds are presented in a pair separated by a slash, the first number is the download speed, the second number is the upload speed.

³ Derived from calculations by WVDED. For more details, please see Section 3.1.

funded projects to deploy affordable and reliable 100/20 Mbps broadband to nearly half of remaining addresses.

The final 19% of BSLs across West Virginia are considered either unserved (speeds lower than 25/3 Mbps) or underserved (with speeds between 25/3 Mbps and 100/20 Mbps). Approximately 25,000 BSLs are considered underserved, with the remaining considered unserved. More details on this breakdown can be found in Section 3: Current State of Broadband and Digital Inclusion.

West Virginia Vision for Digital Equity and BEAD

Achieve universal broadband coverage and digital equity throughout the state through aggressive broadband deployment goals and a commitment to closing the digital divide through robust equity and inclusion initiatives.

WVDED is guided by three core pillars as it strives to achieve universal broadband coverage and digital equity for West Virginia through the planning and implementation of Infrastructure Act funds. These are:

1

Universal
Broadband Access

2

Increase Digital
Equity and Inclusion

3

Leverage Improved
Broadband

For each of WVDED's three pillars, the State will work collaboratively to meet the goals identified below.

1.1 Goals

1.1.1 Universal Broadband Access Goals

Universal Broadband Access

- Goal 1.1:** Ensure all Broadband Serviceable Locations have access to 100/20 Mbps speeds
- Goal 1.2:** Address residential and commercial barriers to broadband projects
- Goal 1.3:** Increase access to Community Anchor Institutions
- Goal 1.4:** Develop a broadband talent pipeline and comprehensive workforce system

1.1.2 Increase Digital Equity and Inclusion

While broadband is a necessary condition to connect all West Virginians, WVDED recognizes that increased broadband infrastructure alone is not sufficient. Digital equity has been a key consideration throughout the broadband planning process to ensure that West Virginians who have been on the wrong side of the digital divide have the tools and support they need to use the internet in a way that allows them to reach their fullest potential.

Increase Digital Equity and Inclusion

- Goal 2.1:** Ensure broadband access is available and affordable for all West Virginians
- Goal 2.2:** Provide quality access to digital literacy skills trainings for West Virginians
- Goal 2.3:** Equip West Virginians to preserve their online privacy and cybersecurity
- Goal 2.4:** Help West Virginians gain access to free and low-cost devices

Note that achieving the State’s vision by 2029 does not mean reaching 100% in every goal and objective. Achieving digital equity is an iterative process, and the specific key performance indicators for these objectives are discussed in Section 2 of the Digital Equity Plan, to be released in September 2023.⁴

To make progress toward these goals, WVDED will align with key stakeholders across West Virginia.

⁴ On July 12, 2023, WVDED published the draft Digital Equity Plan for public comment. The public comment period extends through August 21, 2023. After which, WVDED will plans to submit its final Digital Equity Plan to NTIA in approximately September 2023.

1.1.3 Leverage Improved Broadband

Leverage Improved Broadband

Goal 3.1.1: Expand economic development coordination activities across State agencies and local governments

Goal 3.1.2: Support opportunities to increase online education and workforce development by leveraging funding sources, educators, employers, and school districts

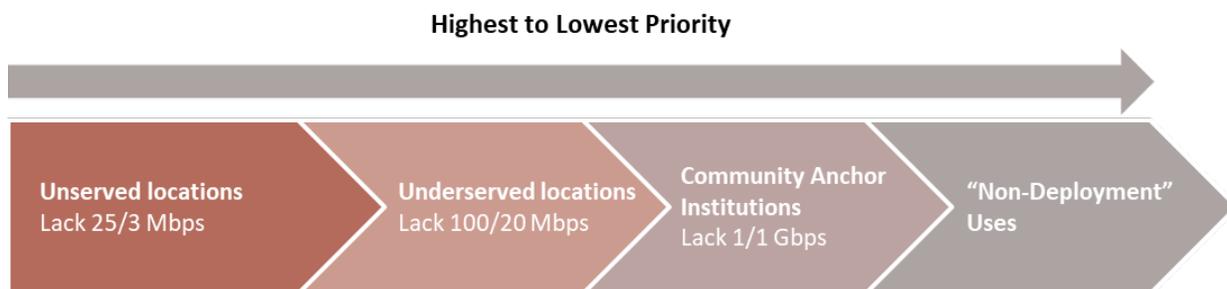
Goal 3.1.3: Provide greater opportunities to revitalize community buildings with economic and tele-healthcare activities

Goal 3.1.4: Leverage universal broadband to attract remote workers and work opportunities

1.2 Strategies and Priority Actions

WVDED's \$1.2 billion BEAD allocation will be part of a comprehensive strategy that complements existing efforts and is dedicated to first serving unserved or underserved locations without an existing federal or state funding commitment.

As WVDED implements this Five-Year Action Plan, it will use a waterfall funding approach to determine how money will flow down from its highest priority projects. The image below depicts NTIA's priority order that WVDED will follow.



1.2.1 Unserved and Underserved Locations

WVDED will fund projects through a **competitive grant process** like its existing West Virginia Broadband Investment Plan programs, with modifications to meet BEAD requirements. **Wherever possible, the State's strategy will favor projects offering Gigabit service delivered over fiber-optic networks.** Where this is not possible due to cost or lack of fiber-based proposals, WVDED will give preference to projects with higher performance capability.

1.2.2 Community Anchor Institutions

WVDED will prioritize connecting Community Anchor Institutions that lack access to 1 Gbps/1 Gbps broadband service. To the extent possible, WVDED will require projects that it funds to serve unserved or underserved locations to also serve nearby Community Anchor Institutions that lack Gigabit service. For remaining, eligible Community Anchor Institution locations, **WVDED will develop a Community Anchor Institution Competitive Grant process** in parallel.

1.2.3 Supporting Infrastructure Investment

Creating a supportive regulatory and permitting environment for broadband infrastructure is a high priority for WVDED. WVDED will work with state, local, and private partners to streamline and expedite permitting by addressing:

1. Dig Once policy
2. Communication of clear standards
3. Pole attachment application process

To do so, WVDED will consider formalizing a state agency working group on permitting that includes county governments in targeted areas, pole owners, and internet service providers. West Virginia will consider proposing that NTIA allow a small portion of BEAD funding to be used for a temporary surge in staff or contracted capacity at relevant state agencies. By investing in processes to eliminate bottlenecks for projects, West Virginia's broadband investments will be more efficiently made and transformational for the State and its residents.

1.2.4 Increasing Digital Equity

As described in WVDED's Digital Equity Plan (available September 2023), the following three strategies will guide the State's efforts to close the digital divide.



Realize Affordable
Connectivity



Secure Device Access and
Affordability



Elevate Digital Skills and
Accessibility of Public Services

1.2.5 Workforce Strategies

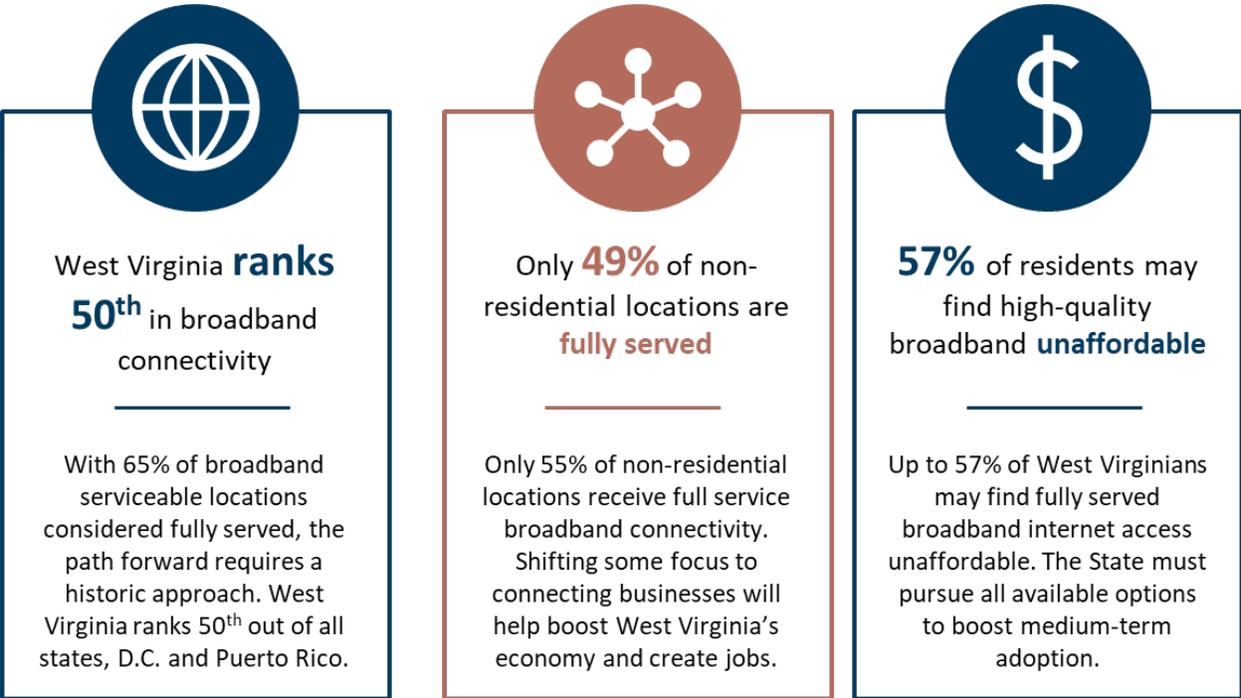
Developed with input from West Virginia’s Broadband Workforce Development Council, interviews with ISPs and other key stakeholders, and listening session input, WVDED will advance the following three workforce development goals:

- 1. Coordinate and convene all broadband industry partners
- 2. Develop industry-driven training programs with work-based learning opportunities
- 3. Develop a career exploration program for K12 students

1.3 Current State of Broadband Deployment

Throughout the development of the Five-Year Action Plan, and in collaboration with Digital Equity planning activities, WVDED conducted a thorough examination of needs and gaps relating to broadband availability, access, and affordability across the State. Figure 1 below provides a high-level overview of these factors.

Figure 1: High-Level Overview of West Virginia Broadband Availability and Affordability



Source: See Section 3.1 for the full analysis, sources, and calculation methods.

Densely populated areas have significantly higher rates of full-service broadband availability than exurban and rural areas across the State. Only 49% of non-residential broadband serviceable locations (e.g., shops, warehouses, public sector buildings, etc.) in West Virginia received at least 100 Mbps download and 20 Mbps upload service. As discussed further in Section 3.1, closing this gap in commercial connectivity offers future economic growth opportunities for the State, and special attention should be paid during

deployment phases to ensure these future customers have their anticipated broadband availability and affordability needs met.

Community Anchor Institutions play a critical role in maintaining community.⁵ As documented in both this Five-Year Action Plan and the Digital Equity Plan, Community Anchor Institutions provide quality-of-life services like healthcare and education, drive growth in economically depressed areas, and offer safe gathering places to foster a sense of connection to neighbors. These Community Anchor Institutions must have reliable, high-throughput, and high-speed access to broadband internet, yet nearly three quarters of individuals in unserved homes and businesses live outside of a reasonable commute to a Community Anchor Institution with this type of connection. This distance barrier in primarily rural communities further reinforces the existing individual broadband gap in West Virginia. As such, connecting Community Anchor Institutions closer to these unserved individuals will be a critical part of the BEAD program.

1.4 Obstacles and Barriers

Through its extensive discussions with community representatives, internet service providers, government leaders, and other key stakeholders, WVDED identified obstacles and barriers in nine subject areas:

1. Legislative and regulatory barriers
2. Labor shortages
3. Supply chain issues
4. Materials availability
5. Industry participation
6. Lack of local digital inclusion programs/expertise
7. Topography
8. Digital literacy
9. Procurement or contracting issues

Of these nine subject areas, both the “legislative and regulatory barriers” and “labor shortages” subject areas stood out as opportunities where the State could have some of the greatest direct policy impact and use momentum gained from the BEAD program to implement long-term statewide change.

1.4.1 Legislative and Regulatory Barriers

While already strong in certain areas, West Virginia can further strengthen its current legislative and regulatory environment to speed deployment of broadband. Section 4.1 examines the causes and impacts of these barriers in detail across eight areas of focus, as well as proposes recommendations to expedite broadband deployment statewide.

⁵ As defined by NTIA, “Community Anchor Institution” means a school, library, health clinic, health center, hospital or other medical provider, public safety entity, institution of higher education, community support organization, or public housing organization.

1.4.2 Labor Shortages

For West Virginia to achieve internet for all, it will need a well-trained, highly skilled workforce of broadband industry professionals spanning many disciplines. Yet the ongoing and highly documented shortage of trained fiber-optic installers, front-line electrical workers, and network & cybersecurity professionals poses a serious obstacle to the universal broadband deployment activities being asked of the fiber industry in the next five years.^{6,7}

This shortage stems from a combination of a tight labor market nationally, a skills gap, and a shortage of standardized training and credentialing for fiber optic technicians.⁸ Policymakers and employers nationwide continue to grapple with these challenges.

West Virginia is known for its loyal workforce. West Virginia's lower cost of living, high rate of home ownership, and plentiful opportunities for outdoor recreation, make the State an attractive location for growing economic sectors, including advanced manufacturing, automotive, technology, and aviation.

The Mountain State is within a one-day drive of 50 percent of the U.S. population and a third of the Canadian market. West Virginia's location gives businesses strategic access to major metropolitan centers without the high costs and inconveniences. Washington, D.C, New York City, Baltimore, Pittsburg, Charlotte, Raleigh, Columbus, Chicago, Lexington and Atlanta are just a short distance away. Transportation corridors include:

- More than 1,900 route miles of railways.
- Six major interstates
- Nearly 420 miles of navigable waterways. Five navigable rivers connect to international shipping ports.
- Eight commercial air service and 25 general aviation airports.



Like many rural states, West Virginia faces challenges—such as a lack of public transportation options in rural areas and reduced population in certain regions due to the decline of major industries.

In keeping with its economic development strategy, West Virginia must be intentional in its efforts to train, attract, and retain a sufficient workforce. The opportunities presented by the BEAD program increase the demand for skilled labor. This demand is intensified by other large-scale federal and state infrastructure investments.

A concerted effort to prepare for infrastructure project demands is needed, but these challenges should be viewed as opportunities rather than obstacles. For successful implementation of the BEAD program,

⁶ Fiber Broadband Association (FBA)

⁷ Telecommunications Interagency Working Group Report January 2023

⁸ ibid FBA

industry best practices, education, and training systems already in place across West Virginia must be leveraged to their utmost potential.

Additional details are available in Section 4.2.

1.4.3 Other Barriers

For details on additional supply chain, middle mile infrastructure, and internet service provider financing requirements, as well as local digital inclusion programs, please see Section 4.

1.5 Plan Development Process

This Five-Year Action Plan, its goals, and its objectives were developed through the following processes:

1. Collecting data and mapping the current state of broadband
2. Determining needs and gaps
3. Inventorying hard and soft assets
4. Assessing legislative and regulatory barriers
5. Understanding West Virginia's workforce development landscape and needs
6. Engaging partners, stakeholders, and members of the public

In compliance with federal requirements, WVDED coordinated processes and efforts across both BEAD and Digital Equity planning. WVDED staff and partners worked together across grant programs to ensure alignment and efficient use of staff time and planning funds.

Meeting West Virginia's ambitious connectivity goals also requires coordination across the public and private sectors to ensure that publicly funded projects are data-informed, contribute to the common good, and are an effective use of taxpayer funds. To achieve its goals and objectives, WVDED commits to:

- a. ongoing collaboration and communication with all stakeholders
- b. ensuring BEAD investments strengthen and promote existing broadband programs
- c. collecting Geographic Information System (GIS) data that broadband internet service providers can use to plan and estimate the cost of their networks

True partnership means committed, continuous engagement for the development of a more connected and equitable West Virginia.

2. Overview of the Five-Year Action Plan

Access to the internet is a requirement of modern life. The very fabric of society—family, commerce, education, public safety, health care, government services, employment, and more—now depends on it. Despite West Virginia’s ever-increasing reliance on the internet, there is no guarantee that every community will have fast, affordable, and reliable access without intentional effort and partnership among state and federal agencies and West Virginia’s private sector partners.

West Virginia’s broadband access gap is significant, and the State currently ranks near the bottom of broadband availability in the U.S.⁹ As of December 31, 2022, Federal Communications Commission (FCC) data shows that only 65.3% of West Virginia’s BSLs are classified as fully served.¹⁰ Ongoing state and federal investments are projected to increase the number of connected BSLs, but there is still a long way to go to reach 100%.¹¹ This gap in broadband access impedes full participation in an increasingly digital society, preventing access to telemedicine, remote work, personal connections, and online news media, among other things. West Virginia’s Five-Year Action Plan serves as a guide to achieve universal connectivity and close the digital divide.

Increasing broadband access is the first step to creating digital equity in all West Virginia communities. However, to truly benefit from increased access to broadband service, West Virginia must also address the issues of service affordability, device availability, and technological skills development through collaboration with a diverse group of stakeholders.

West Virginia leaders agree that broadband connectivity is critical to the State’s overall economic development strategy. In 2021, Governor Jim Justice announced his billion-dollar West Virginia Broadband Investment Plan. Since then, the State has made considerable progress, announcing funding for 24 projects to bring service to 54,000 unserved locations.¹² Nevertheless, as major infrastructure initiatives, individual projects take time to move from the planning to the deployment stage. West Virginia’s climb to connectivity will occur over a period of years.

Therefore, its progress will be measurable and meaningful. The State of West Virginia is prepared to begin the work proposed in this document. When executed, these programs will provide universal broadband access to all citizens in West Virginia and ensure that residents have the resources they need to realize the full potential of broadband connectivity.

⁹ West Virginia is 50th of 50 states, Washington, D.C., and Puerto Rico.

¹⁰ West Virginia’s broadband availability falls short; of all 50 states, the District of Columbia, and Puerto Rico, West Virginia ranks 50th. This number reflects residential broadband availability rankings; the FCC does not provide data for statewide combined residential, mixed-use, and non-residential rankings.

¹¹ Derived from calculations by WVDED. For more details, please see Section 3.1.

¹² The number of projects and the locations served are obtained from the West Virginia’s business/residence data and not reflected in the FCC Location Fabric.

2.1 Vision

West Virginia’s vision is to achieve universal broadband coverage and digital equity throughout the State. West Virginia will drive towards this vision through aggressive broadband deployment goals and a commitment to closing the digital divide through robust equity and inclusion initiatives.

“West Virginia students deserve to be able to do their homework. Our seniors deserve access to telehealth. Our businesses deserve to be able to reach their customers and suppliers. And all our residents deserve to be able to interact with their government, stay informed as citizens, and do all the hundreds of things that take high-speed internet. – Governor Jim Justice

2.2 Goals and Objectives

The National Telecommunications and Information Administration (NTIA) requires that Five-Year Action Plans include goals and objectives to inform the plan’s implementation strategy. For the purposes of this document, and using definitions provided by NTIA, “goals” describe broad, long-term achievable outcomes. In contrast, “objectives” describe specific, measurable, attainable, relevant, and time-based targets that support and build toward goal achievement.

West Virginia’s Five-Year Action Plan is built around the following three pillars:

- 1. Universal Broadband Access**
- 2. Increase Digital Equity and Inclusion**
- 3. Leverage Improved Broadband**

The following sections describe how the three pillars will support West Virginia’s vision to achieve universal broadband coverage and digital equity throughout the State.

1 Universal Broadband Access

Goal 1.1: All Broadband Serviceable Locations in West Virginia will have access to broadband at speeds of at least 100 Mbps download and 20 Mbps upload.

- Deploy broadband service to all BEAD-eligible locations by 2029 by adding services to 10% of unserved and underserved locations each year beginning in 2024.
- Continuously revise estimates of broadband availability through ongoing citizen reporting and enhanced data sets to better inform broadband mapping through the FCC Bulk challenge process.

Goal 1.2: West Virginia will address barriers to broadband infrastructure projects serving residents and businesses in the State.

- Improve Dig Once policies by: (i) creating standards for laying conduit when performing major highway construction or reconstruction and (ii) ensuring professional, responsive management of open conduit available for use.
- All state and local permitting processes and franchises that impact broadband development will have:
 - clear, up-to-date, and published standards; certainty for common construction methods; and
 - rapid turn-around for permits.
- Applications for pole attachments for broadband infrastructure will be processed in an expeditious manner and without undue cost to attachers unrelated to the costs of new development.

West Virginia has made progress in reducing unnecessary permitting and regulatory barriers that have historically impacted the deployment of broadband services to unserved and underserved areas. However, the enormous wave of broadband infrastructure investment means that permitting reforms are more important than ever. West Virginia will continue to identify ways to streamline and facilitate processes to ensure efficient deployment processes.

Goal 1.3: Increase Access to Community Anchor Institutions

- All Community Anchor Institutions in West Virginia will have access to broadband speeds of 1 Gbps/ 1 Gbps by the end of 2029.
- By 2025, 10% of West Virginia’s unserved Community Anchor Institutions will be served with 1 Gbps/ 1 Gbps service.
- Complete an examination of the percentage of West Virginians located within a reasonable proximity of Community Anchor Institutions by the end of 2024.

Schools, libraries, medical providers, public safety entities, public housing organizations, and community support organizations are collectively known as Community Anchor Institutions. Community Anchor Institutions facilitate greater use of broadband service by vulnerable populations, including, but not limited to, low-income individuals, unemployed individuals, children, the incarcerated, and aged individuals.¹³ Community Anchor Institutions are vital to advancing the State’s goals of improving economic opportunities, education access, and healthcare outcomes. As Community Anchor Institutions need a higher level of broadband service to effectively support the services they provide to their community, West Virginia must ensure that all locations are equipped with a high-speed, high-capacity broadband connection.

¹³ NTIA BEAD Notice of Funding Opportunity: <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>

Goal 1.4: Develop a comprehensive broadband workforce system to ensure industry has the talent it needs to advance broadband deployment.

- Coordinate and convene all broadband industry partners.
- Develop industry-driven training programs with work-based learning opportunities.
- Develop a career exploration program for K-12 students.

2

Increase Digital Equity and Inclusion

Goal 2.1: Realize affordable connectivity.

- Increase enrollment in the Affordable Connectivity Program, contingent on the continued funding for the program
- Complete broadband deployment as a part of the BEAD Five-Year Action Plan to increase the number of available internet service providers, increase the pool of their customer sizes, and increase competition

Goal 2.2: Secure device access and affordability.

- Create a program to provide device distribution, lending, and recycling
- Ensure citizens receive technical assistance for their newly acquired devices

Goal 2.3: Elevate digital skills and accessibility of public services and economic opportunity.

- Make digital literacy training in cybersecurity, privacy, telehealth, and more, available to all West Virginians, including all covered populations
- Ensure websites and online services hosted by state agencies are accessible for all West Virginians

High quality, accessible, and affordable broadband for all is critical for a more just and equitable West Virginia, a healthier society, and an economy that offers opportunity for everyone. West Virginia's low rate of access to broadband, coupled with its demographic profile, creates many challenges for digital equity¹⁴:

1. 97% of West Virginians are covered by the Digital Equity Act.
2. More than 35% of its citizens live in unserved or underserved areas as defined by the NTIA.¹⁵
3. West Virginia has the highest rate in the U.S. of individuals living in a rural area (90%).¹⁶

¹⁴ NTIA defines digital equity as a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy. Digital equity is necessary for access to essential services, civic and cultural participation, employment, and lifelong learning.

¹⁵ Calculated using National Broadband Availability Data provided by the Federal Communications Commission, available at <https://broadband477map.fcc.gov/#/data-download>.

¹⁶ Ibid.

West Virginia is committed to digital equity and inclusion. This Five-Year Action Plan incorporates digital equity planning efforts into its goals and objectives. This coordinated effort will help advance WVDED's vision for digital equity:

West Virginia Vision for Digital Equity

Ensure that all West Virginians have the resources they need to participate in the digital world and achieve the economic benefits of digital equity

Note: As of August 11, 2023, the Digital Equity Plan is still open for public comment. As such, the Vision and its other contents are still subject to change.

For more information about West Virginia's digital equity efforts, please see WVDED's Digital Equity Plan, available September 2023.

3

Leverage Improved Broadband

Goal 2.1: West Virginia will use broadband as a driver of economic development opportunity.

- Connect West Virginia's workforce to broadband-delivered opportunities for training, and continuing education that support the needs of the State's businesses and employers.
- Ensure that workers in West Virginia have the digital skills and knowledge to fill job openings across industries.
- Develop best practices that support remote workers and incentivize employers to offer remote work opportunities.

Broadband infrastructure investment will both provide jobs in West Virginia and create networks that expand business development and employment opportunities to the State. This broadband investment plan is aligned with the State's economic development strategy.

Goal 2.2: West Virginians will have access to online education opportunities and telehealth services.

- West Virginia schools and health-care institutions will deliver, and students and patients will have broad access to broadband-delivered online education opportunities and telehealth services.

Universal, accessible, and affordable high-quality broadband service makes it possible for West Virginia's education and health care systems to reimagine delivery of health care services and education to expand care and learning for West Virginia residents. Improved broadband opportunities mean that West Virginians can have fewer limitations imposed by distance on these essential services.

3. Current State of Broadband and Digital Inclusion

To assess the resources available for BEAD implementation, WVDED conducted a thorough inventory of broadband deployment activities, infrastructure assets, financial resources, programs, and personnel. This section provides an overview of those resources and an analysis of gaps and barriers. This process informs future planning, program implementation, and the activities WVDED needs to undertake to meet the State’s broadband goals. This sequence is illustrated in more detail in Figure 2.

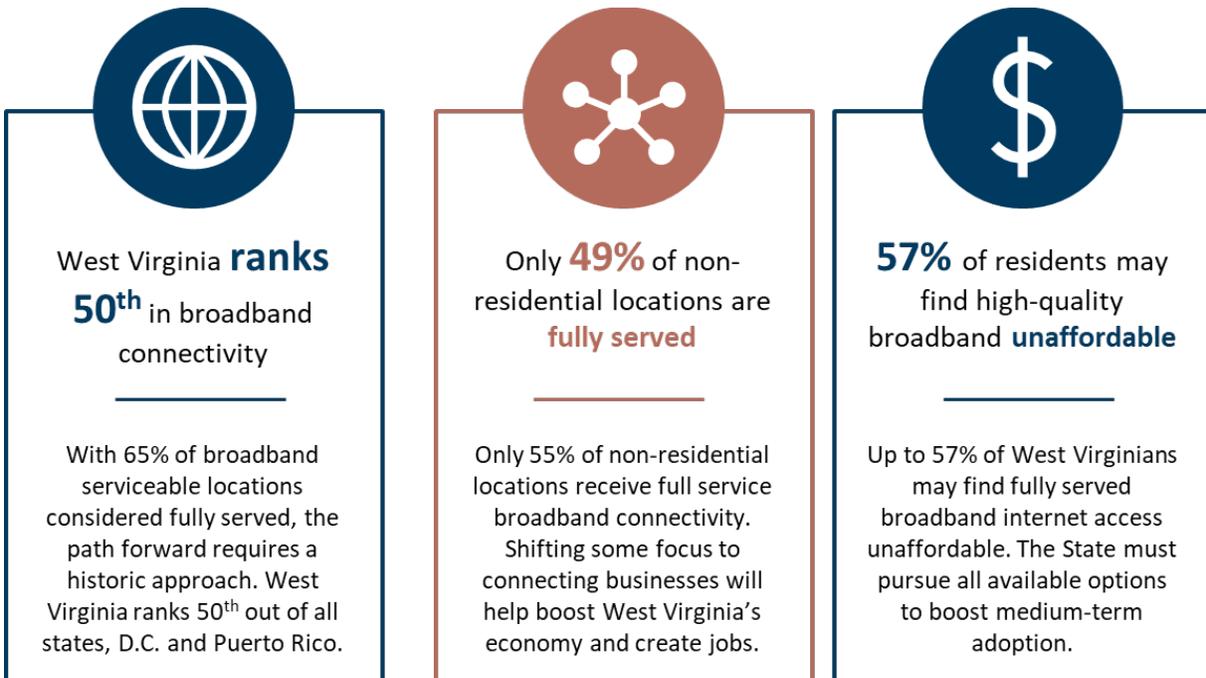
Figure 2: Sequence of the Five-Year Action Plan



3.1 Needs and Gaps Assessment

WVDED’s comprehensive needs assessment is crucial for meeting key requirements of the BEAD program and ensuring the efficient and equitable allocation of resources. By employing a data-driven approach, the State can target its investments and engage in meaningful collaboration with private sector partners, fostering a more inclusive and sustainable broadband ecosystem that benefits all West Virginians. Figure 3 provides three key takeaways derived from the needs and gaps assessment.

Figure 3: Quick Needs and Gaps Facts



Source: See the remainder of this section for the full analysis, sources, and calculation methods.

3.1.1 Current Broadband Deployment

BEAD Service Categories and Definitions

As mandated by Congress, the Federal Communications Commission (FCC) released a new National Broadband Map beginning in November 2022. The new map displays broadband service availability at individual locations instead of census blocks as presented in prior FCC maps. Data collection is required through a bi-annual reporting schedule from internet service providers called the Broadband Data Collection (BDC) process. Throughout the BDC process, entities, including states, are given opportunities to challenge the accuracy of reported data. To obtain data that would assist in this process, the FCC contracted with CostQuest Associates, a broadband consulting firm, to provide a base layer, or map, of all business and residential locations across the nation. This map is known as “the Fabric” because it weaves together numerous data sources to determine Broadband Serviceable Locations (BSLs), locations where fixed broadband is or can be installed, throughout the United States. According to the FCC, the Fabric is a, “mix of aerial and satellite imagery, address databases, land and local tax records, and other sources.” As required by the BEAD program, Fabric data must be the sole method of determining BSLs. The number of underserved and unserved BSLs determines the share of funds states and territories receive through the BEAD program. The federal map informs WVDED’s investment of BEAD funding to unserved or underserved locations.

Additional information about the limitations associated with the Fabric database will be provided later in this section.¹⁷

Pursuant to BEAD program requirements, broadband deployment analyses in this section rely almost entirely on the FCC BDC data released in June 2022, as well as underlying BSL data updated in December 2022.¹⁸

To provide additional context to interested parties and policymakers, WVDED broke the Unserved category into two sub-categories: “Unserved – No Service” and “Unserved – Slow Service”. The State defines Unserved as having no service to terrestrial or licensed fixed wireless providers, whereas Unserved – Slow Service locations have connections at speeds less than 25 Mbps download and 3 Mbps upload, referred to herein as 25/3 Mbps. This same nomenclature applies to all other broadband speeds discussed throughout this section, i.e., “download/upload unit.”

To be considered fully served, a BSL must have a terrestrial or licensed fixed wireless internet service provider that provides, or could easily provide, a minimum connection speed of 100/20 Mbps, with latency less than or equal to 100 milliseconds. Underserved locations are subsequently defined as BSLs with maximum speeds between 25/3 Mbps, and 100/20 Mbps. Finally, unserved locations are defined by the BEAD program as BSLs with speeds less than 25/3 Mbps.¹⁹ Note that unserved and underserved locations exclude those with existing enforceable federal, state, or local commitments to provide service.²⁰

This section does not consider unlicensed fixed wireless or satellite internet services. NTIA’s statutory requirements clarify that neither technology meets the Reliable Broadband Service standard and thus may not count towards underserved or fully served broadband service.²¹ In West Virginia, 83,522 BSLs have access to unlicensed fixed wireless service with speeds of 25 Mbps download; 3,454 BSLs have access to service at 100 Mbps down.

Broadband Deployment in West Virginia

As of December 31, 2022, 583,180 (64.8%) of West Virginia’s BSLs are classified as already fully served under the BEAD program.

The Office of Broadband has already launched efforts to deploy broadband to some of the approximately 317,227 unserved and underserved addresses. As the administrator of funding provided through the American Rescue Plan Act (ARPA), Capital Projects Fund and State Local Fiscal Recovery Fund, as well as funds provided by the Appalachian Regional Commission and the U.S. Department of Housing and Urban Development, the Office of Broadband has direct responsibility for the execution of projects under these funding sources.

¹⁷ BSLs are defined by NTIA as a business or residential location in the United States at which fixed broadband Internet access service is, or can be, installed.”

¹⁸ Using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

¹⁹ <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>, p16 and p17

²⁰ NTIA, Notice of Funding Opportunity (NOFO) Broadband Equity, Access, and Deployment Program, <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>, p36

²¹ <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>, p28

Of the remaining 35.2% locations, 149,262 (or an additional 16.6% of all addresses) are currently unserved or underserved but are part of previously funded project areas that, by virtue of the federal award, establish a federally enforceable funding commitment. The NTIA BEAD program regulations direct states to “deconflict” and remove previously funded locations from BEAD eligibility.²² These locations are funded by other federal programs that are not within the direct responsibility of the Office of Broadband. Some examples of these funding sources include, the FCC Rural Digital Opportunity Fund, ARPA Capital Projects Fund, ARPA State Local Fiscal Recovery Fund, USDA ReConnect, and USDA Community Connect. Importantly, the Office of Broadband is considering remediation options for areas that currently have a federally enforceable mandate but may not receive full service.

According to the NTIA BEAD program regulations, these locations are not eligible for BEAD funding, as they are expected to meet the BEAD program’s fully served standards in the future.²³ However, should these projects fail to move forward, the State retains the discretion to evaluate progress and provide a response that will bring service to these locations.

The remaining 18.7% of locations are divided up into 140,334 unserved and 27,631 underserved locations. Underserved locations have service which falls between 25/3 Mbps and 100 Mbps; unserved locations either have service which falls below the 25/3 Mbps cutoff or have no Reliable Broadband Service offered by providers. Table 1 breaks down the location type and funding, as determined by the Federal Communications Commission Fabric database.

Table 1: BSLs by service category and funding category

BEAD Service Category	Funded Project	# of BSLs	% of total BSLs
Unserved – No Service	No	27,281	3.0%
Unserved – No Service	Yes	34,875	3.9%
Unserved – Slow Service	No	113,053	12.6%
Unserved – Slow Service	Yes	96,414	10.7%
Underserved	No	27,631	3.1%
Underserved	Yes	17,973	2.0%
Fully Served	N/A	583,180	64.8%
Total BSLs	N/A	900,408	100%

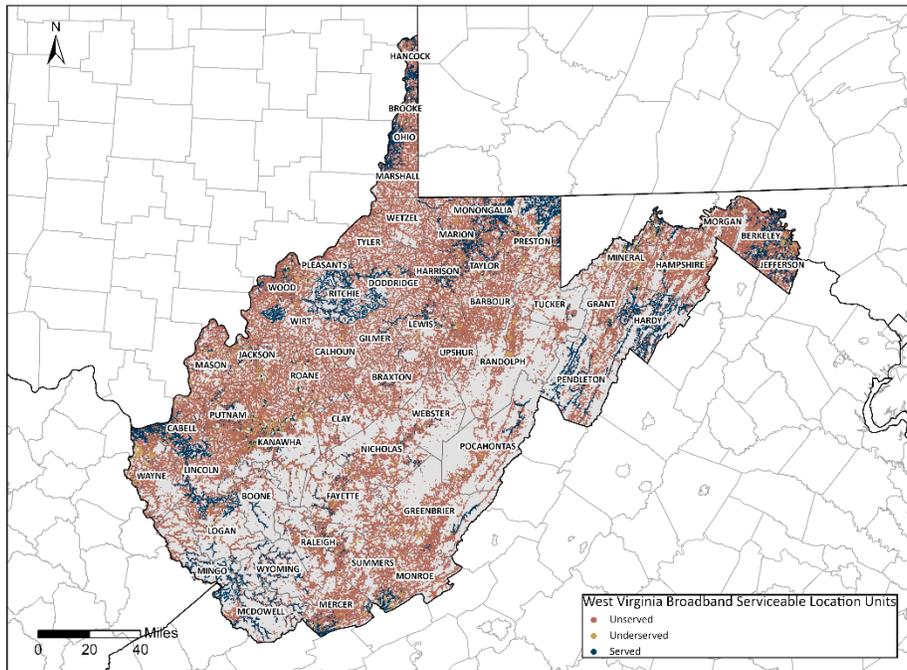
Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

As discussed at greater length in Section 3.3.2, West Virginia has already launched multiple programs and has committed some of its federal funds to provide broadband infrastructure in 52% of these underserved and unserved locations. WVDED is factoring in this difference in its implementation plan, discussed further in Section 5. Figure 4 maps the distribution of BSLs by BEAD service classification.

²² NTIA, Broadband Equity, Access, and Deployment Program, Notice of Funding Opportunity, May 2022. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>, page 36. NTIA states that, “In identifying an Unserved Service Project or Underserved Service Project, an Eligible Entity may not treat as “unserved” or “underserved” any location that is already subject to an enforceable federal, state, or local commitment to deploy qualifying broadband as of the date that the challenge process...”

²³ Id. Pages 36-37.

Figure 4: Broadband Serviceable Locations by BEAD Service Classification



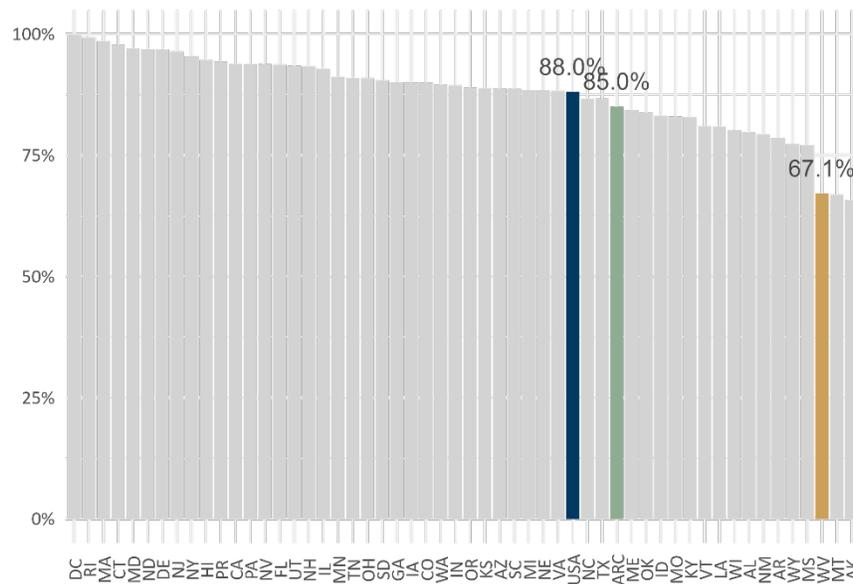
Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

With only 65% of locations currently fully served, as visualized in Figure 4, West Virginia’s current broadband availability is a barrier that must be eliminated. Of all 50 states, the District of Columbia, and Puerto Rico, West Virginia ranks 50th.²⁴ With the third lowest rate of broadband availability in the U.S., deploying broadband to all serviceable locations in West Virginia will require a significant statewide effort and collaboration by all levels of government, service providers, and community organizations.

Figure 5 expands on this national comparison in more detail with a bar graph denoting the percentage of residential locations in each state/territory that are fully served. The graph also includes a comparison of the national average (blue) and the peer Appalachian counties served by the Appalachian Regional Commission (green).

²⁴ This number reflects residential broadband availability rankings; the FCC does not provide data for statewide combined residential, mixed-use, and non-residential rankings as of April 2023.

Figure 5: Percent of Residences with Access to at Least 100/20 Mbps Residential Broadband Availability by State



Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

Access to 100/20 Mbps speeds is necessary but insufficient to advance broadband adoption. As discussed in WVDED’s Digital Equity Plan (available September 2023), affordability, reliability, technical proficiency, and availability of low-cost devices all impact broadband adoption. While broadband is simply not available in some areas of West Virginia, other areas may only have access to an inferior product, at a high cost relative to income, which further impedes adoption.

BDC Location Challenges

With comparatively low rates of broadband availability, the Fabric in West Virginia must be as accurate as possible—any residences and businesses that exist but are not included in the dataset result in fewer BEAD dollars in West Virginia. Analysis by WVDED and other nationwide broadband agencies determined that the Fabric is neither exhaustive nor accurate.²⁵

In response, the FCC created a bulk challenge process. Following the Governor’s directive that all West Virginians should be accurately represented on the National Broadband Map, the State of West Virginia challenged inaccurate information to the maximum extent provided by law: WVDED has issued 138,586 challenges to include new locations in the underlying Fabric, as well as 38,812 challenges to amend the FCC’s broadband availability data.

²⁵ FCC Chair Says it Received 1.1M Location Challenges to Broadband Map, Fierce Telecom, February 2023. <https://www.fiercetelecom.com/broadband/fcc-chair-says-it-received-11m-location-challenges-broadband-map>, FCC Launches New National Broadband Map; West Virginia Prepares to Challenge by January 13, 2023, WVDED: <https://broadband.wv.gov/news/fcc-launches-new-national-broadband-map-west-virginia-prepares-to-challenge-by-january-13-2023/>

To develop a more accurate map of BSLs and their available broadband speeds, West Virginia encouraged residents to complete a survey and speed test from their place of work or residence. WVDED and the Governor’s Office collaborated to issue notifications through press releases, social media, and radio advertising to urge West Virginia residents to submit individual challenges.

WVDED will continue to challenge new releases of the Fabric and BDC dataset at six-month intervals to ensure the accuracy of the data.

Location Characteristics: Density

To better understand West Virginia’s anticipated deployment needs, WVDED conducted a geographical analysis of unserved and underserved BSLs to determine whether they were residential, mixed-use, or non-residential. WVDED first produced an analysis of fully served BSL units on a county-by-county basis, as seen in Figure 6 below. Each BSL represents at least one unit, which can be any combination of residential, non-residential, or mixed-use space. For example, an apartment building will only count towards one BSL but will contain many individual units. An analysis of broadband service availability at the unit level helps demonstrate population-level need while correcting for population density. As such, the following analyses will primarily focus on unit-level availability.

As predicted, densely populated areas have significantly higher rates of full-service broadband availability. An analysis of West Virginia’s most-connected counties (Figure 6 below), matches almost identically to a list of the most population-dense counties in West Virginia.

West Virginia Counties with Greatest Percentage of BSL Units Considered Fully Served

1. Ohio County (with 94% of BSL units considered fully served)
2. Monongalia County (91%)
3. Jefferson County (90%)
4. Cabell County (90%)
5. Hancock County (90%)

The most notable exception to the above list is Berkeley County; despite ranking in the top 5 for population density, it is the 7th-most-served county in West Virginia at 86%. Table 2 alphabetically lists all counties in West Virginia and their corresponding percentage of fully served BSL units.

Table 2: Percentage of BSL Units in Each County Considered Fully Served

County	% full served	County	% full served
Barbour County	7%	Mineral County	75%
Berkeley County	87%	Mingo County	62%
Boone County	68%	Monongalia County	92%
Braxton County	34%	Monroe County	29%
Brooke County	89%	Morgan County	43%
Cabell County	90%	Nicholas County	44%
Calhoun County	3%	Ohio County	94%
Clay County	12%	Pendleton County	59%
Doddridge County	39%	Pleasants County	47%
Fayette County	54%	Pocahontas County	20%
Gilmer County	33%	Preston County	56%
Grant County	37%	Putnam County	75%

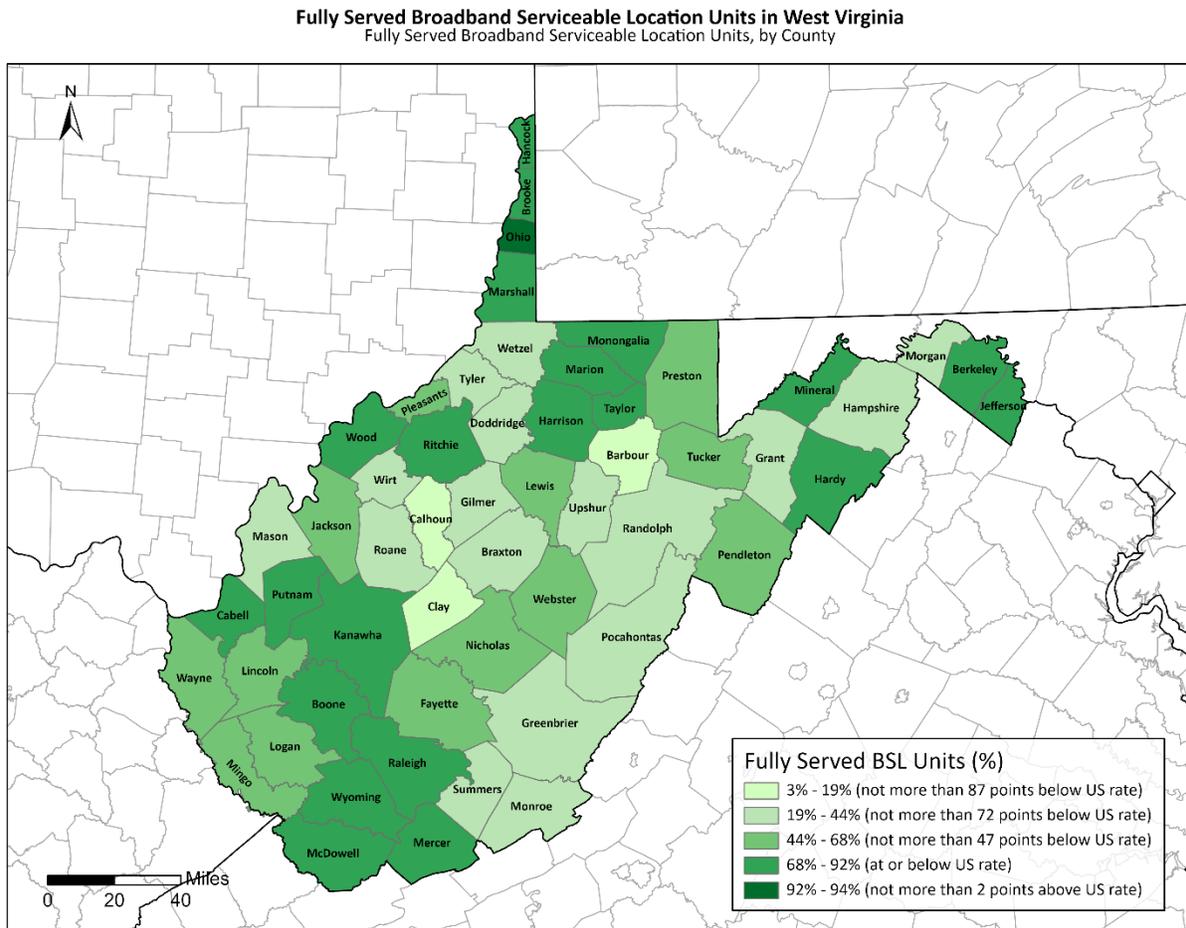
Greenbrier County	41%	Raleigh County	74%
Hampshire County	23%	Randolph County	34%
Hancock County	90%	Ritchie County	81%
Hardy County	81%	Roane County	26%
Harrison County	78%	Summers County	25%
Jackson County	50%	Taylor County	69%
Jefferson County	90%	Tucker County	59%
Kanawha County	76%	Tyler County	20%
Lewis County	60%	Upshur County	42%
Lincoln County	50%	Wayne County	60%
Logan County	52%	Webster County	49%
McDowell County	86%	Wetzel County	43%
Marion County	82%	Wirt County	24%
Marshall County	71%	Wood County	83%
Mason County	43%	Wyoming County	84%
Mercer County	73%		

Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission and data from WVDED.

The most densely populated counties have become the most connected areas of West Virginia, illustrating the advantage enjoyed by urban areas in comparison to their rural counterparts.

Including units with funded projects in addition to units already fully served, seen below, yields similar results. See Figure 6 for a detailed map of this data.

Figure 6: Percent of Broadband Serviceable Location Units with Access to at Least 100/20 Mbps Broadband Availability by County



Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

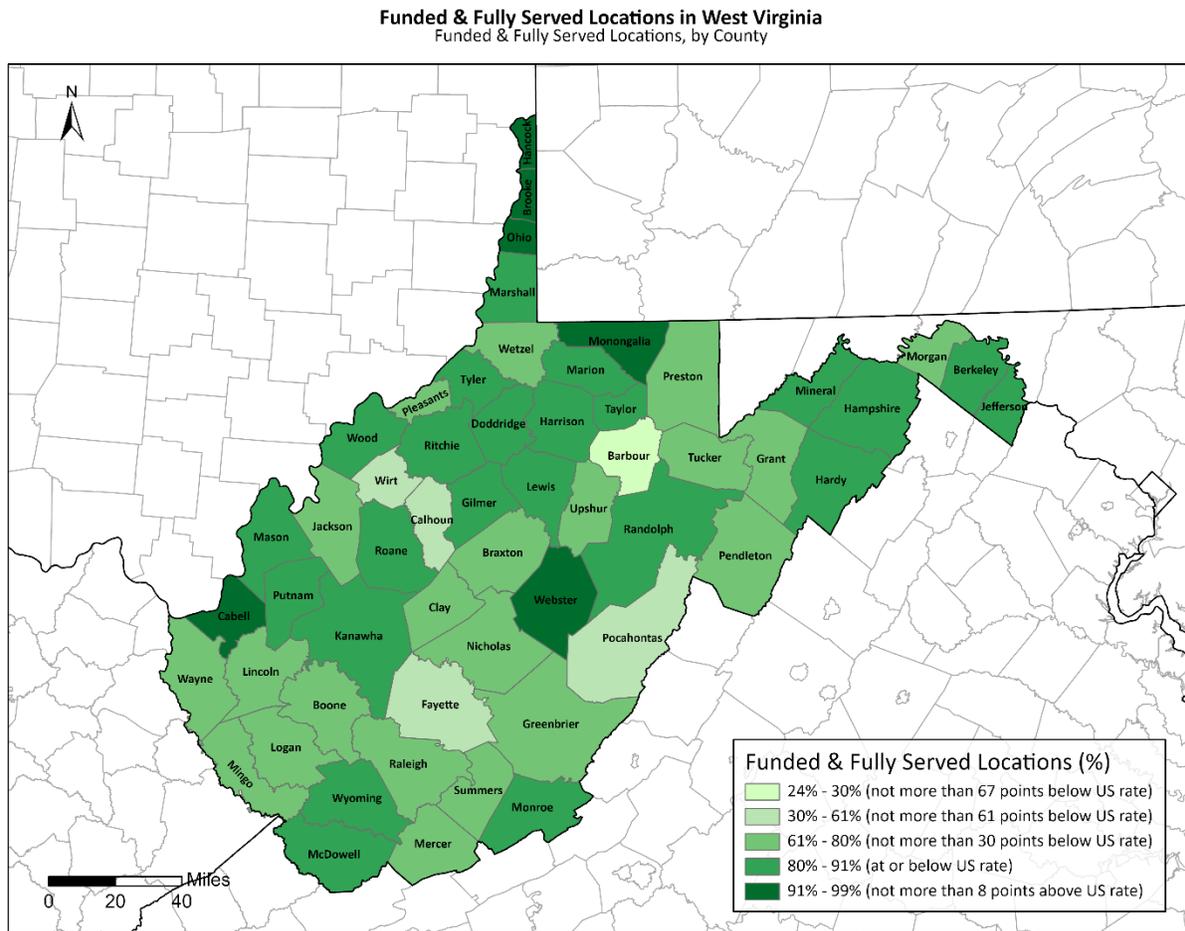
The most densely populated counties have become the most connected areas of West Virginia, illustrating the advantage enjoyed by urban areas in comparison to their rural counterparts.

Including units with funded projects in addition to units already fully served, seen below, yields similar results. See Figure 7 for a detailed map of this data.

West Virginia Counties with Greatest Percentage of BSL Units Served and Funded

1. Brooke County (with 98% of BSL units funded or fully served)
2. Hancock County (98%)
3. Ohio County (97%)
4. Monongalia County (95%)
5. Cabell County (92%)

Figure 7: Percent of Funded and Full Service Broadband Serviceable Location Units by County, Current and Future



Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission and data from WVDED.

While availability in these urban areas meets or exceeds the national average, many counties in West Virginia fall well below national fully served broadband availability rates. Some of the counties with the lowest deployment rates include Calhoun County (with only 3% of BSL units considered fully served), Barbour County (7%), and Clay County (12%).

Including already-funded units significantly alters county broadband availability rankings. Clay County jumps from 12% served units to 76% served or funded units. Tyler County, Calhoun County, and Hampshire County have similarly sized jumps. Barbour County, previously ranked second-lowest, did not see the same magnitude increase—only 26% of its BSL units are fully served or funded, the lowest across all counties in West Virginia. Table 3 alphabetically lists all counties in West Virginia and their corresponding percentage of fully served BSL units.

Table 3: Percentage of BSL Units in Each County Considered Fully Served or Funded

County	% fully served or funded	County	% fully served or funded
Barbour County	26%	Mineral County	90%
Berkeley County	89%	Mingo County	71%
Boone County	79%	Monongalia County	95%
Braxton County	64%	Monroe County	83%
Brooke County	98%	Morgan County	70%
Cabell County	93%	Nicholas County	80%
Calhoun County	56%	Ohio County	97%
Clay County	76%	Pendleton County	77%
Doddridge County	89%	Pleasants County	74%
Fayette County	58%	Pocahontas County	56%
Gilmer County	86%	Preston County	78%
Grant County	79%	Putnam County	85%
Greenbrier County	78%	Raleigh County	79%
Hampshire County	81%	Randolph County	87%
Hancock County	98%	Ritchie County	87%
Hardy County	84%	Roane County	80%
Harrison County	88%	Summers County	74%
Jackson County	72%	Taylor County	83%
Jefferson County	91%	Tucker County	79%
Kanawha County	85%	Tyler County	81%
Lewis County	82%	Upshur County	69%
Lincoln County	79%	Wayne County	68%
Logan County	64%	Webster County	92%
McDowell County	90%	Wetzel County	73%
Marion County	87%	Wirt County	59%
Marshall County	86%	Wood County	87%
Mason County	81%	Wyoming County	89%
Mercer County	80%		

Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission and data from WVDED.

Of all currently unserved broadband serviceable locations, 92% (278,054) of all units are in Census-designated rural areas demonstrating that rurality is one of the biggest barriers to infrastructure construction.²⁶ Typically, rural locations do not provide enough density for internet service providers to economically justify building networks or even extend existing ones. Additionally, these rural areas typically have far lower incomes than the national average, creating affordability barriers further discussed in the State’s Digital Equity Plan.

²⁶ Here, “Census-designated rural areas” is defined as 2010 vintage Census blocks classified as rural by the Census Bureau. This is distinct from the Digital Equity Act definition of rural areas in West Virginia.

Location Characteristics: Types of Buildings

The Fabric dataset also categorizes Broadband Serviceable Locations by purpose and use. These location types fall into four categories:

Table 4: Types of Buildings

Category	Description
Residential	Dwellings, including single and multi-family homes.
Non-residential	All non-residential building types that can be considered BSLs, including businesses.
Mixed use	Both residential and non-residential.
Other	Although not formally defined by the FCC, this represents a collection of what are likely incorrectly classified. This data will likely be removed, reclassified, or otherwise changed in subsequent data releases.

Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

Residential buildings constitute the majority of Broadband Serviceable Location units in West Virginia: 79.1% of Broadband Serviceable Locations are solely residential, and an additional 3% of units are mixed use. Below, Table 5 displays the distribution of Broadband Serviceable Location units by location type at a high level. The residential location type represents an extremely high proportion of all units in West Virginia.

Table 5: BSL Unit Counts

Location Type	BSL Units	
	Count	% of total units
Residential	821,149	79.1%
Non-residential	136,836	13.2%
Mixed use	79,932	7.7%
Other	761	<0.1%

Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

The subset of these location units that are underserved or unserved are broken out by location type and service type in Table 6 below. Note that the rates of slow and no service are much higher in non-residential locations than in residential or mixed-use locations.

Table 6: BSL Unit Counts - Detailed

Location Type	BEAD Service Type	BSL Units	
		Count	% of Location Type
Residential	Underserved	32,540	4%
	Unserved – No Service	47,640	6%
	Unserved – Slow Service	160,513	20%
Non-residential	Underserved	8,520	6%
	Unserved – No Service	14,032	10%
	Unserved – Slow Service	47,926	35%
Mixed use	Underserved	4,031	5%
	Unserved – No Service	5,442	7%
	Unserved – Slow Service	16,203	20%
Other	All	590	NA

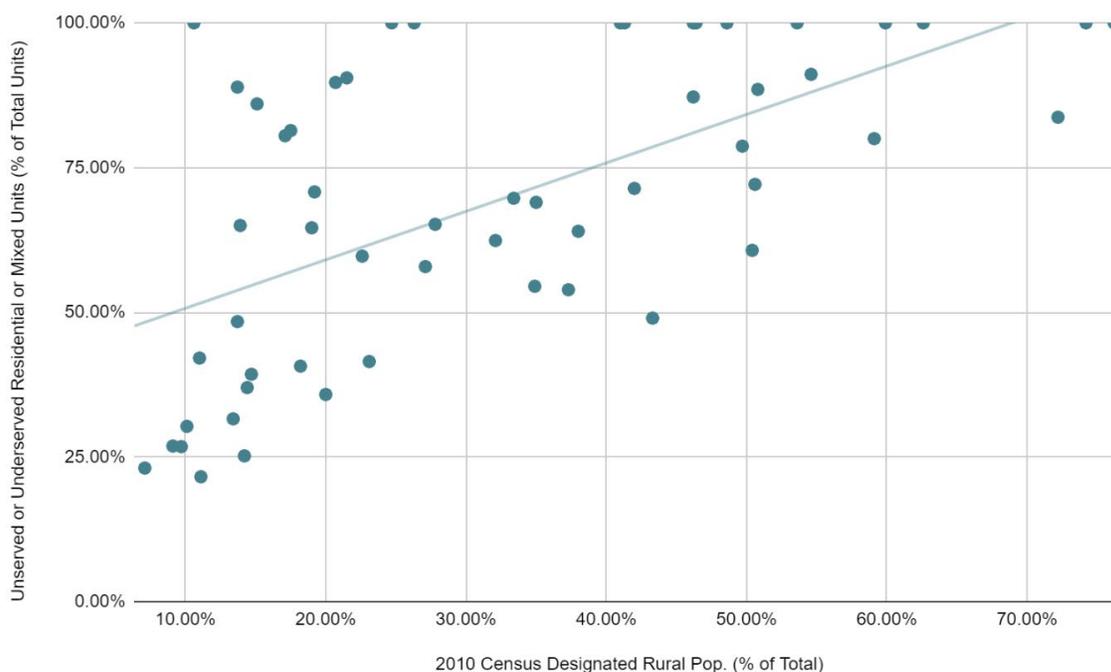
Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

Of the roughly 821,000 residential units across West Virginia, 580,000 (70%) have full-service broadband availability under BEAD. Similar calculations reveal that 68% of mixed-use units have full service, and 49% of non-residential units do.

While traditional analyses of the urban-rural divide in West Virginia focus primarily on serving un- or under-connected residential locations, analysis by WVDED demonstrates an increasing need to focus on business and mixed-use customers. With an ever-increasing need for broadband access to connect with customers, and expand into new markets, for example, a lack of business and mixed-use broadband access creates a drag on the State’s economic growth.

While there is no single narrative for West Virginia’s lack of business connectivity, WVDED analysis confirms the urban-rural divide explains the pattern of broadband connectivity in residential locations. Figure 3 clearly demonstrates the link between the percentage of each county’s residential and mixed use BSLs considered unserved and underserved and the percentage of the population of each county that is considered rural. As highlighted in Figure 8, there is a clear correlation between the rurality of a county and the percentage of residential and mixed-use units not fully served. Through further exploration, it was found that this correlation likely stems more-so from population density, or lack thereof.

Figure 8: Correlation Between How Rural a County is and the % of BSL Units not Fully Served



Source: Calculated using December 31, 2022 National Broadband Data Collection Availability Data provided by the Federal Communications Commission and 2010 Census-Designated Rural Population (Table P2)

Location Characteristics: Proximity to Community Anchor Institutions

As defined by NTIA, schools, libraries, medical providers, public safety entities, public housing organizations, and community support organizations are collectively known as Community Anchor Institutions (CAIs). CAIs play a critical role in creating and maintaining a community. They provide a gathering place for the exchange of information, drive growth in economically depressed areas, and provide access to quality-of-life services like health care and education. Notably, CAIs facilitate greater use of broadband service by vulnerable populations, including, but not limited to, low-income individuals, unemployed individuals, children, the incarcerated, and aged individuals.²⁷

During the COVID-19 pandemic, CAI WiFi access points served an essential role in connecting West Virginians to critical services. CAIs are vital to advancing the State’s goals of improving economic opportunities, education access, and healthcare outcomes. CAIs also serve as the hub for technology training. West Virginia’s Digital Equity planning efforts include collaboration with CAIs in planning activities that address barriers to adoption, including evaluating service affordability, the need for low-cost devices, and basic-to-advanced technology training.

Currently, three quarters of unserved individuals live outside of a reasonable commute to a CAI; many users report a commute to a CAI of 20 minutes or more in each direction. Such a distance creates a barrier for many West Virginians and most adversely affects people in rural and low-income areas.

²⁷ NTIA BEAD Notice of Funding Opportunity: <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>

In total, and in keeping with the NTIA definition, there are 4,988 CAIs across West Virginia. These fall into one of five categories: medical providers, educational institutions, public safety entities, public housing organizations, and community support organizations. Counts of these locations as of July 2023 are detailed below in Table 7:

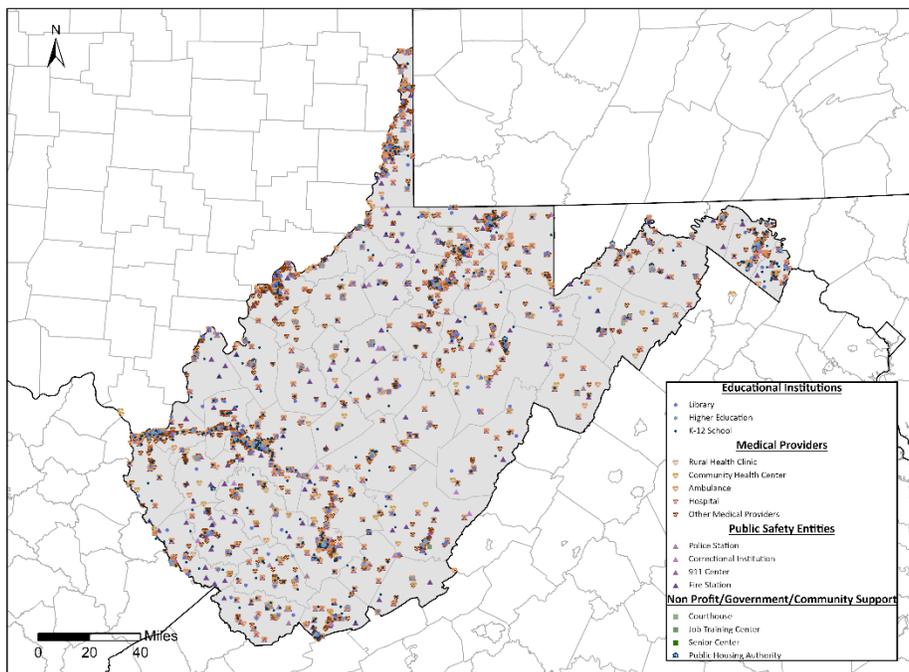
Table 7: Community Anchor Institutions by Category

Category	Community Anchor Institutions	
	Count	% of total
Medical Providers	2,672	53.6%
Educational Institutions & Libraries	1,154	23.1%
Public Safety Entities	1,022	20.5%
Public Housing Organizations	31	0.6%
Community Support Organizations	109	2.2%

Source: WVDED analysis

WVDED and its partners are still collecting and analyzing CAI data. Additional CAI data on jails/prisons, public housing, and EMTs will be added as West Virginia moves from planning to implementation. Statewide geographic distribution of these CAI is displayed in Figure 9.

Figure 9: Community Anchor Institutions across West Virginia



Source: WVDED analysis

With many expected concurrent connections, CAIs require broadband service at higher speeds and larger bandwidth than many residential buildings. CAIs also create guaranteed points of demand in communities

and may act as anchor customers for expanding broadband internet service providers. Considering the importance of CAIs in increasing adoption, WVDED is examining the percentage of West Virginians located within a reasonable proximity of CAIs.

Table 8 details the distribution of drive-time distances of broadband serviceable locations from West Virginia libraries by BEAD service type. Almost all fully served location units are within a 20-minute drive of a West Virginia library, whereas only three quarters of location units with no offered broadband service are within the same drive time. This disparity likely reflects the relative lack of population density among unserved location units with no service and is an important consideration in future State actions to offer easy access to stopgap high-speed broadband for rural residents.

Table 8: Community Anchor Institution Driving Proximity

BEAD Service Type	Within 15 min (%)	Within 20 min (%)	Within 30 min (%)
Unserved – No Service	56.5%	75.4%	94.9%
Unserved – Slow Service	57.1%	81.6%	97.9%
Underserved	74.1%	90.2%	97.4%
Fully Served	91.7%	96.5%	99.5%

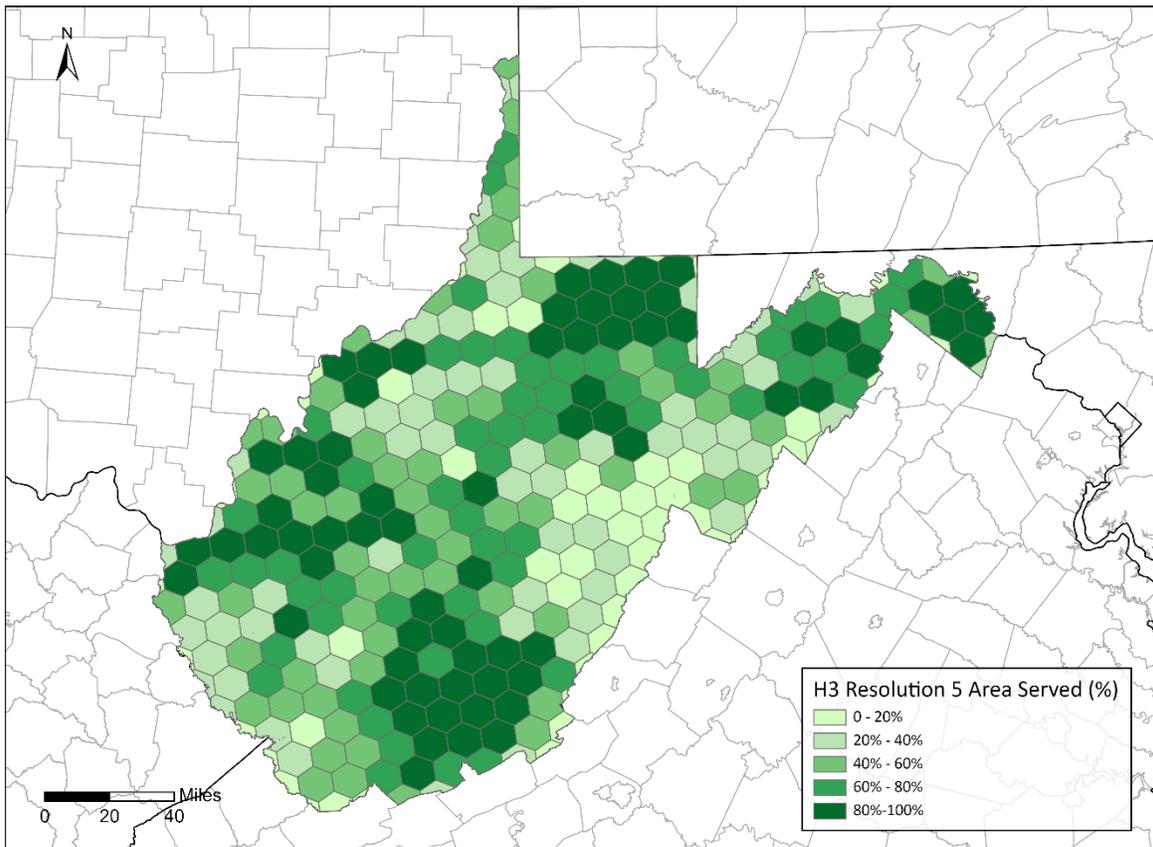
Source: Data Driven WV analysis

Location Characteristics: Other

Although cellular broadband is not considered by the BEAD program, individuals without reliable fixed wireless or terrestrial broadband connectivity may currently rely on cellular service as a backup. To that end, WVDED analyzed cellular service at a high level in West Virginia as a useful tool in assessing current supply and demand for broadband in rural areas.

By area, the FCC reports that 4G coverage (5/1 Mbps) currently covers 58.69% of the State, as of June 2022. Figure 10 illustrates 4G (5/1 Mbps) coverage in the State. 5G cellular coverage covers 36.5% and 14% of the State at 7/1 Mbps and 35/3 Mbps respectively. As terrain plays a large role in limiting both terrestrial and cellular coverage across the State, WVDED thus considers it unlikely that many rural households or businesses rely on high-speed cellular coverage to supplement existing, lacking, or non-existent fixed broadband connectivity across the State.

Figure 10: 4G (5/1 Mbps) Coverage in West Virginia



Source: Calculated using December 31, 2022, National Broadband Data Collection Availability Data provided by the Federal Communications Commission

3.1.2 State of Broadband Workforce

For West Virginia to achieve internet for all, it will need a well-trained, highly skilled workforce of broadband industry professionals spanning many different disciplines. As identified in a 2021 Brookings Institution report, West Virginia will need additional talent in the following broadband industry disciplines:

- infrastructure and operations,
- maintenance and repair,
- electrical and electronic equipment mechanics,
- installation,
- computer occupations, and
- engineering.²⁸

²⁸ Escobari, Gandi, Strauss, How Federal Infrastructure Investment Can Put America to Work, March 2021. Accessed: <https://www.brookings.edu/articles/how-federal-infrastructure-investment-can-put-america-to-work/>

Below, Table 9 describes the level of demand for those occupations, and the education and training required.

Almost all the occupations listed below do not require more than a high-school degree or a GED; however, they do require specialized on the job training (OJT).

Table 9: West Virginia Demand Occupations, 2016-2026

SOC	Description	Demand	Education	Training
49-2022	Telecommunications Equipment Installers and Repairers Except Line Installers	Moderate	Post-secondary	Moderate OJT
49-9052	Telecommunications Line Installers and Repairers	Moderate	HS or GED	Long-term OJT
47-2061	Construction Laborers	High	< HS	Short-term OJT
49-9051	Electrical Power-Line Installers and Repairers	Moderate	HS or GED	Long-term OJT
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	-	-	-
49-1011	First-Line Supervisors of Mechanics Installers and Repairers	High	HS or GED	N/A
17-2072	Electronics Engineers Except Computer	Limited	Bachelor's	N/A
15-1231	Computer Network Support Specialists	-	-	-
47-2073	Operating Engineers and Other Construction Equipment Operators	High	HS or GED	Moderate OJT
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	High	HS or GED	N/A
15-1241	Computer Network Architects	-	-	-
15-1244	Network and Computer Systems Administrators	-	-	-
15-1232	Computer User Support Specialists	-	-	-
47-2111	Electricians	High	HS or GED	Apprenticeship

Source: Escobari, Gandi, Strauss, How Federal Infrastructure Investment Can Put America to Work, March 2021.

Source: Kent Sowards, Marshall University, March 2023 presentation to the Workforce Development Council.

Investments in expanding education and training opportunities will generate a high rate of return for West Virginia's economy, as described in the bullets below.

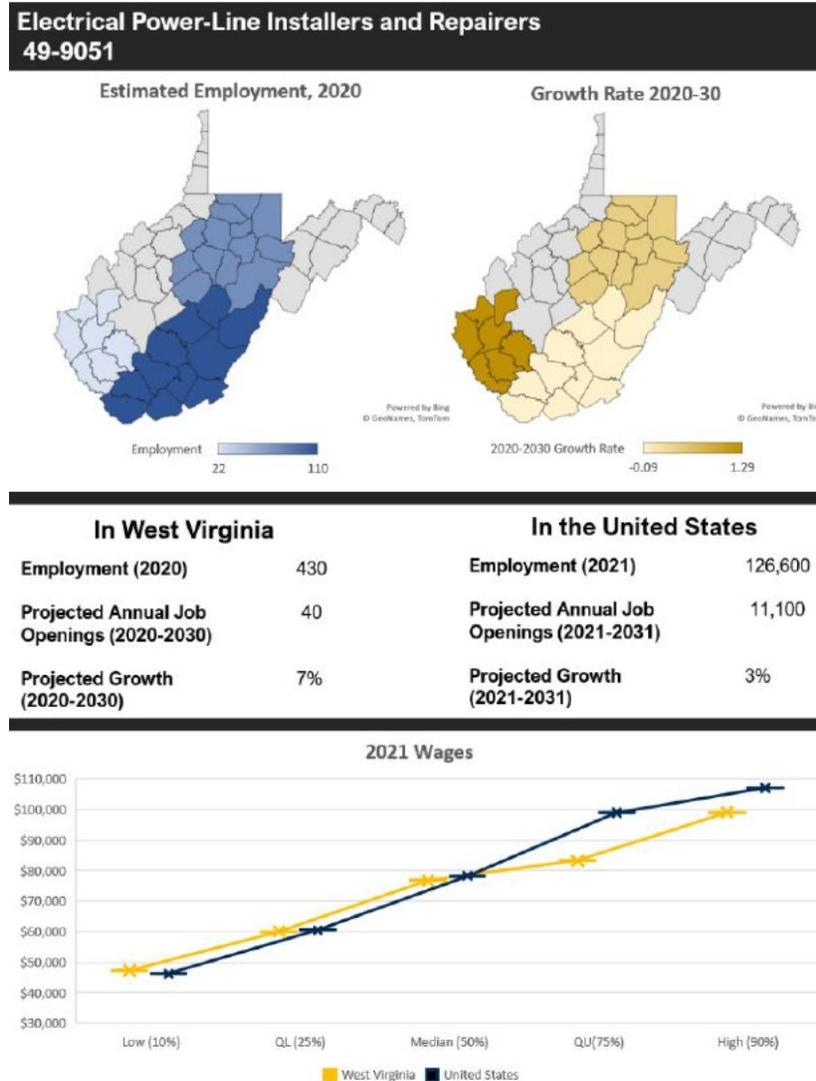
Broadband industry jobs in West Virginia:

- a. Make up approximately 5% of total employment in West Virginia (31,000 jobs)
- b. Account for roughly 6% of total payroll (\$1.7 billion)
- c. Pay, on average, 22% more than the State average (\$56,679 vs. \$46,489)
- d. Have a projected growth of at least 7% over the next decade
- e. Have high variability among regions both in employment and wages²⁹

²⁹ Sowards, Kent. Marshall University. Presentation to the WVDED Workforce Council on March 28, 2023.

Figure 11 shows the high demand for electrical power line installers and repairers in West Virginia as compared to the rest of the United States. The line graph shows the increase in wages over time for these workers.

Figure 11: Estimated Employment, Growth Rate, and Wages for Electric Power-Line Installers and Repairers



Source: Kent Sowards, Marshall University, March 2023.

West Virginia has a strong workforce development system that can be leveraged to strengthen the broadband workforce. For example, West Virginia’s Learn and Earn Program helps workers acquire associate degrees at the State’s community and technical colleges and pays them for training they complete in an associated part-time job.³⁰ During FY22, 270 students and 81 businesses participated in Learn and Earn, providing significant financial benefit to those businesses while helping connect skilled

³⁰ Learn and Earn Program, Bridge Valley Community and Technical College, <https://www.bridgevalley.edu/career-services-learn-earn>

West Virginians with quality employment opportunities. In addition to work-based learning assets, the State's 22 community colleges and 12 four-year public institutions governed by the West Virginia Higher Education Policy Commission will be key partners in developing additional workforce programs that meet employers' needs.

Specifically, West Virginia will benefit from and partner closely with the State's nine existing telecommunications-related community college programs. It will also coordinate with its 19 career and technical education facilities, including its technical training programs which are located in comprehensive high schools. While they are not specifically designed with the broadband and 5G sectors in mind, they serve as a strong foundation from which to build upon:

1. The certification obtained through Bridge Valley Community and Technical College's Building Industry Consulting Service International BCSI Installer program is recognized globally.
2. Five Community and Technical Centers offer Cyber Security programs providing an Associate's Degree in the Applied Science of Computer Information Technology, an emerging need in the broadband industry.
3. Mount West Community and Technical College Utility Construction offers both a one-year certificate and a two-year associate degree program.
4. New River Community and Technical College offers a 30-credit hour Electric Distribution Engineering Technology certificate program.
5. Three West Virginia Department of Education Career and Technical Centers offer CISCO certification.
6. Four West Virginia Department of Education Career and Technical Centers offer commercial driving license programs.
7. West Virginia Department of Education Career and Technical Centers offer CompTIA ITF+ certifications.
8. West Virginia Department of Education Schools of Diversion and Transition offer Cable Management certifications in four facilities. Certifications include Telecommunications Technology, Copper-Based Systems; Network Cabling; Fiber-Optics-Based Systems; and Wireless Systems.

The neighboring state of Ohio has set the pace for broadband workforce development efforts. Ohio developed and launched a 5G sector curriculum at the state's public higher-education institution and has invested state funds in a telecom-specific curriculum. Once graduates complete the coursework, they are connected directly with industry partners for job opportunities.

WVDED will take advantage of other existing programmatic assets and entities located in the State or otherwise available to West Virginians, including:

- International Union of Operating Engineers
- Construction Industry Training & Certification Academy
- WV Carpenter Training Center
- Safety LMS
- Satellite Broadcasting & Communications Association
- Mountwest Community and Technical College
- WVU Parkersburg (Community and Technical College)

- Telecommunications Industry Registered Apprenticeship Program
- Telecommunication Workforce Center
- In-building Wireless Solutions
- Telecommunications Education Center
- NATE National Association of Tower Erectors
- WIA Broadband Workforce resources
- Northwood Technical College Wisconsin
- State Technical College of Missouri
- Warriors 4 Wireless
- Regional Optical Communications
- Broadband Fiberforce WV
- C-Tech
- Fiber Broadband Association
- Telecom Tech School
- ATS Specialized Training
- Fiber Broadband Association
- Power & Communication Contractors Association
- Fiber Instrument Sales

In addition to the education and training assets, WVDED has built its own workforce development assets by creating formalized processes to understand the workforce landscape and advance broadband workforce development goals described in Section 5.

WVDED Workforce Planning Team & Workforce Development Council: WVDED has prioritized the development of the State’s broadband industry workforce by forming a Workforce Planning Team consisting of WVDED staff members and contracted partners. The Planning Team supported the development and facilitation of WVDED’s Broadband Workforce Development Council. See the chart in Section 5.1 for the organizations represented on the Council.

The Council met monthly starting in January 2023. Meetings were structured to inform the Council of the scope of the BEAD and Digital Equity initiatives, discuss the landscape of the existing workforce and projected needs in the future, and make strategic recommendations for the Five-Year Action Plan, the initial proposal, and the final proposal.

Structured Interviews of Internet Service Provider Employers: The Workforce Planning Team conducted 19 structured interviews with internet service provider employers in West Virginia to establish a baseline of the current workforce and projected needs through the perspective of West Virginians. Employers also shared concerns regarding recruitment, training, credentialing, and relationships with the West Virginia workforce development system. These interviews not only provided critical information that informed the recommendations described in Section 5 but also opened important dialogue and grew relationships between WVDED and internet service providers.³¹

³¹ Interviews conducted in partnership by WVDED and Marshall University in Spring 2023.

Structured Interviews with Relevant State Agencies: WVDED and its Planning Team also conducted interviews with West Virginia state agencies concerned with workforce development. Interviews included:

- West Virginia Department of Education
- West Virginia Department of Labor
- West Virginia Department of Veteran’s Assistance
- West Virginia Bureau of Senior Services
- West Virginia Department of Transportation
- West Virginia Department of Tourism
- West Virginia Herbert Henderson Office of Minority Affairs
- West Virginia Department of Environmental Protection
- West Virginia Department of Homeland Security
- West Virginia Statewide Independent Living Council³²

2023 West Virginia Broadband Summit: WVDED hosted a broadband summit to bring together relevant stakeholders to discuss current issues, workforce data, and WVDED’s workforce development strategies. Summit participants included internet service providers, suppliers and engineers, key workforce stakeholders, state and local leaders, federal representatives, and federal agencies including NTIA, the FCC, Appalachian Regional Commission (ARC), and the United States Department of Agriculture (USDA).

Taken together, these efforts have developed WVDED’s understanding of the Mountain State’s broadband industry needs, informing its broadband strategies and actions described in Section 5.

To accurately understand the state of broadband deployment and digital equity in West Virginia, WVDED collected both quantitative and qualitative data from a wide range of independent sources, including information derived from the FCC’s BDC efforts, surveys, and listening sessions. These data not only contributed to the findings in this report but will inform WVDED’s Initial and Final Proposals. Digital Equity related assets are included in the State’s Digital Equity Plan (available September 2023). This section details these efforts, separated into three categories:

1. Quantitative and tabular data, such as data from the FCC, U.S. Census Bureau, and internet service providers operating in West Virginia
2. Stakeholder data using an asset inventory approach as recommended by NTIA
3. Information and feedback from citizens

3.1.3 Digital Equity Needs and Gaps

WVDED and its partners sought to identify barriers to digital equity under the guiding principle of meeting people where they are. To that end, WVDED pursued information through community listening sessions and is currently preparing a randomized statewide survey. Listening sessions across West Virginia were completed by June 2023; preliminary evidence from these sessions suggests that the target populations in West Virginia face many of the same issues relating to digital equity. The systemic barriers to digital equity include high-speed internet service affordability, securing a low-cost internet enabled device, technical support opportunities, and acquiring digital literacy skills. Overall, poor internet quality and poor

³² Interviews conducted in partnerships by WVDED and Startup West Virginia in the Spring of 2023.

internet reliability are the main barriers to high-speed internet access in West Virginia, reported across all demographics, including aging adults and veterans.

RPDC Listening Sessions

Recognizing the need to develop partnerships to engage citizens, WVDED collaborated with the 11 West Virginia Regional Planning and Development Councils (RPDCs) as trusted community partners to solicit digital equity needs and gaps across the state.

In 1971, Regional Planning and Development Act divided the State into 11 regions to serve as development districts “to more effectively utilize funding resources and maximize small communities’ chances of attracting funds from federal, state, and local organizations to foster community and cooperation throughout the State.”³³ As stated by the West Virginia Association of Regional Councils, the RPDCs focus on expanding and improving water and sewer facilities, infrastructure, transportation, employment, industry, housing, health care, education, and recreation.³⁴ Within the past decade, the RPDCs have included broadband as an area of emphasis.

To support and facilitate local meetings, WVDED developed a comprehensive set of questions addressing both access and digital equity questions, a listening session format with instructions, and a target number of individuals from whom to solicit information. WVDED then created and sent out an RFP for RPDCs to apply for funds. WVDED required that the listening sessions contain a representative sample of seven of the eight target populations from each region of the eight digital equity target populations. Federal Human Subject Research Guidelines forbid collecting data from incarcerated residents in such a manner.

RPDCs could either pursue a representative sample directly or they could aim to have a minimum number of attendees of any kind. WVDED developed the minimum number of attendee recommendations based on how many people could randomly be sampled from the population to nearly guarantee that at least five individuals from each target population would be in attendance. Table 10 lists the suggested number of recommended attendees provided to RPDCs to meet this requirement (See more on target populations in the State’s Digital Equity Plan, available September 2023).

³³ West Virginia Association of Regional Councils, <https://www.wvregionalcouncils.com/>. Accessed May 23, 2023

³⁴ West Virginia Association of Regional Councils, “A Statewide Network that Moves West Virginia Forward,” October 12, 2022, <https://storymaps.arcgis.com/stories/9a07f00993404d25a6c46e68e49850df>.

Table 10: Minimum Recommended Number of RPDC Listening Session Attendees

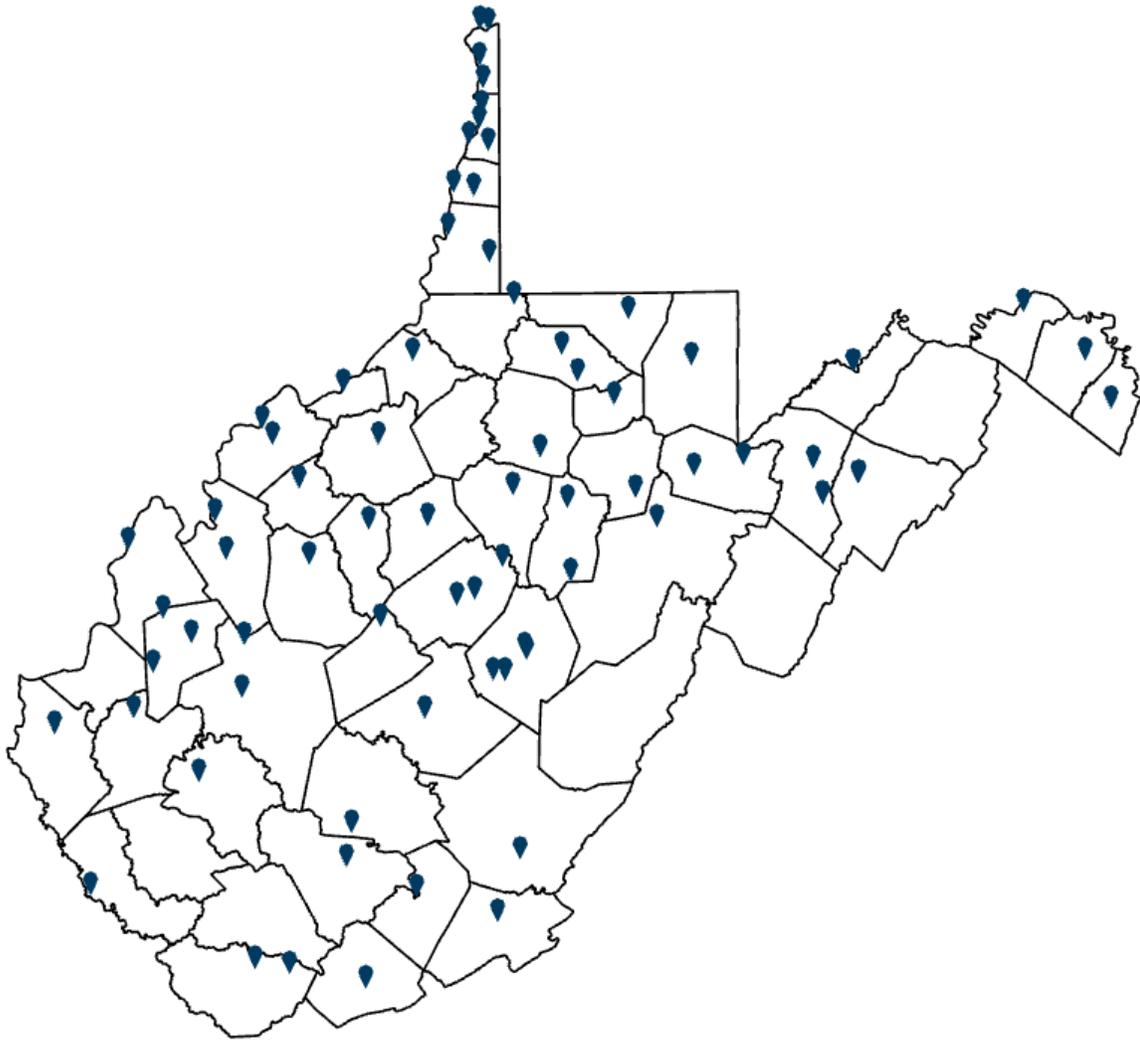
RPDC #	Total RPDC pop.	Min. rec. attendees
1	207,466	204
2	241,198	265
3	268,114	232
4	119,508	240
5	165,900	350
6	250,825	240
7	114,726	216
8	82,673	239
9	192,337	171
10	113,399	213
11	51,280	241

Source: WVDED

In February 2023, WVDED hosted a Digital Equity Plan kick-off conference which included a model listening session to prepare RPDC staff to host and moderate local meetings. The RPDCs began holding their listening sessions in March 2023 and concluded them in June 2023. The results of the listening sessions primarily pertain to Digital Equity, however, some of the topics overlap and anecdotally confirm the lack of broadband access and reliability for many citizens across the State. Because, however, they primarily pertain to Digital Equity, the results of the sessions are discussed at additional length in the Digital Equity Plan.

The RPDCs are still reporting data to WVDED; however, RPDC staff attended and facilitated a total of 143 in-person events and small-to-mid-sized listening sessions were held with broad representation from members of covered populations and organizations that serve them. A total of 1,906 West Virginians attended these public events and dedicated listening sessions. Attendance ranged from 1 to 111 community members, with an average of 11.9 attendees per listening session. Figure 12 maps the locations of most of these listening sessions.

Figure 12: Map of Where RPDCs Held Listening Sessions



Source: Data Driven WV

A full needs assessment can be found in Section 3.3.2 of the State’s Digital Equity Plan, to be published in September 2023.

3.2 Asset Inventory

In line with statutory requirements, WVDED collected and analyzed both:

- a. **soft assets:** e.g., programs, activities, strategies, skills, and technical assistance
- b. **hard assets:** e.g., towers, buildings, and utility poles

Table 11 provides a summary of these assets. The programs prefaced with “Multiple” are detailed thoroughly in the subsection Soft Assets by Covered Population. All of the other assets are covered fully in Sections 3.2.1 and 3.2.2 below.

Table 11: Summary of Soft and Hard Assets in West Virginia

Type	Asset	Description
Soft	Multiple: Digital literacy and skills training	Programs that provide skills people need to live, learn, and work in an increasingly digital society
Soft	Multiple: Subsidized or low cost-devices	Programs that provide digital devices, such as computers, tablets, and phones, that are provided at lower costs or for which subsidies are provided.
Soft	Multiple: Digital Navigator(s)	These programs offer individuals who assist with digital skills, accessing subsidized or low-cost devices, performing tasks online, and more. Ex. A dedicated person at a library who helps patrons with digital tasks and questions.
Soft	Multiple: Awareness and outreach activities of digital inclusion programming and resources	Activities, such as marketing campaigns, that bring awareness to resources related to digital inclusion.
Soft	Multiple: Public computer labs	Programs that provide computers that remain on site but that can be used by members of the public.
Soft	Multiple: Public internet access	Programs that offer internet access to the public, such as through Wi-Fi or direct ethernet connection.
Soft	Multiple: Loaner computers/hotspots	Programs that provide computers or internet hotspot devices that can be rented or loaned out to members of the public.
Soft	Multiple: One-to-one computers	Programs that provide all members of an organization or target group—such as students in a school, district, or state—with their own laptop, netbook, phone, or other digital device.
Soft	Community Listening Session results	Feedback from West Virginia residents provided during community listening sessions hosted by RPDCs
Soft	Survey data from over 1,000 citizens	Survey data from over 1,000 citizens, including members of covered populations, on topics such as broadband access, connectivity, cost, and digital equity
Hard	Quantitative, tabular, and speed test data	Data collected by the FCC, WVDED, or Ookla on broadband deployment, access, and speeds

Hard	Electric Utility Middle Mile Initiative	Electric utilities in West Virginia are permitted to conduct feasibility studies and construct middle mile networks using existing power infrastructure. Studies must be reviewed and approved by the Broadband Council and the West Virginia Public Service Commission. As of 2023, Appalachian Power and its partners are in the process of constructing over 1,000 fiber miles to serve over 33,000 new customers using federal middle mile infrastructure funds.
Hard	Vertical Real Estate Management and Availability act	The Vertical Real Estate Management and Availability Act of 2020 requires the West Virginia Department of Administration to request proposals to manage state-owned Vertical Real Estate. Utilizing this new law, the West Virginia Office of Technology is in the process of examining the locations and condition of publicly owned tower assets and completing an asset inventory initiative.
Hard	West Virginia Network for Educational Telecomputing (WVNET)	West Virginia Network for Educational Telecomputing (WVNET) is a dynamic service organization providing telecommunications and computing services within West Virginia. Currently focused on state colleges and universities and administered by these entities, WVNET is transitioning to expand its impact by offering services to State Government, K-12, public libraries, and county government.
Hard	State Interoperable Radio Network	The West Virginia Statewide Interoperable Radio Network is a partnership of municipal, county, state, and federal public safety entities to establish and maintain a statewide interoperable radio network. Currently, the SIRN has over 100 tower sites operational and provides coverage throughout most of West Virginia.

3.2.1 Soft Assets

Examples of soft assets in the Five-Year Action Plan Guidance included programs, activities, strategies, skills, and technical assistance that can be leveraged to close the digital divide. Since each community approaches broadband from a different perspective, WVDED emphasized gathering qualitative information from citizens through a series of local gatherings conducted by RPDCs. Importantly, WVDED stressed the need to conduct meetings in each of West Virginia’s 55 counties with the overall goal of “meeting people where they are.” Further information on this process can be found in Section 3.1.3.

The following section provides a further overview of methods used to collect soft assets across the state in addition to statewide listening sessions conducted by RPDCs. Please refer to the Digital Equity Plan for more information about WVDED’s soft asset inventory.

West Virginia Digital Access and Equity (DAE) Survey

The DAE survey is designed to collect information regarding existing programs, activities, and skill-development opportunities in West Virginia. The survey was targeted to organizations representing or serving at least one of the eight covered populations.

Nineteen respondents completed the survey from mid-January 2023 to May 12, 2023. The 60-question survey included questions regarding digital literacy, plans that overlap with the goals and objectives of the BEAD and Digital Equity programs, and broadband service subsidies. Please note that depending on the type of respondent, the survey asked different questions to reduce length and complexity.

West Virginia rigorously marketed the survey but acknowledges the barriers preventing individuals from completing it. However, West Virginia was able to supplement the survey results with other data collections methods, for example: discussions with organizations that included the survey material. Importantly, these included meetings with Internet Service Providers of various sizes that operate in West Virginia, including Armstrong, Micrologic, Citynet, Prodigy, GigaBeam, Comcast, and Frontier, as well as other stakeholders such as Appalachia Power, the West Virginia Department of Education, NTIA, EducationSuperHighway, and more. Barriers to data collection are discussed in detail in Section 4.

WVDED asked all non-Internet Service Provider DAE survey respondents for information on programs or services they offer, and which covered populations they target. They were provided the following list of potential services to choose from:

- Digital literacy and digital skills training
- Subsidized or low cost-devices (e.g., computers, tablets) with affordable maintenance costs
- Awareness and outreach activities related to digital inclusion
- Public computer labs
- Digital Navigator programs
- Loaner computer/hotspot programs
- Computer refurbishing programs
- Discount or subsidized broadband service and equipment programs
- Public Wi-Fi and networks (public access points)
- One-to-one computer training programs

Figure 13 depicts the types of services these entities provide. This figure includes services that are offered on a formal, regular basis and ones that are offered on an ad-hoc basis.

Figure 13: West Virginia DAE Survey Responses: Distribution of Services by Population Groups

Type of program	Persons who belong to the following groups									
	Anyone	Low-income	Veterans	Aging	Disabilities	Rural	Racial or ethnic minority	Incarcerated	With a language barrier	Other
Digital literacy and skills training	6	3	1	3	3	3	2	0	2	0
Subsidized or low-cost devices	1	2	0	1	1	1	1	0	1	0
Digital inclusion awareness or outreach activities	8	5	2	4	4	4	2	0	2	0
Public computer labs	4	2	1	2	2	2	1	0	1	0
Digital navigators	2	0	0	0	0	0	0	0	0	0
Loaner computer/hotspots	3	1	0	1	1	1	1	0	1	0
Computer refurbishment	0	0	0	0	0	0	0	0	0	0
Discount or subsidized broadband service or equipment	0	0	0	0	0	0	0	0	0	0
Public Wi-Fi and networks	5	3	1	2	2	2	1	0	1	0
One-to-one computer programs	1	1	0	1	1	1	1	0	1	0

Source: WVDED

47% of respondents did not respond regarding programs/services, 37% identified formal program(s) they offer, and the remaining 16% of respondents offer programs informally on an ad-hoc basis. Note that a few entities and programs may be missing because of missing or unprovided data.

Citizen Survey

In addition to listening sessions, WVDED procured a professional survey firm to perform a randomized survey of at least 1,000 citizens across the State. The survey sample will be weighted to reflect the digital equity target populations. The selected firm and WVDED worked collaboratively to create the survey, which launched on June 30, 2023. Final survey analysis will extend beyond the August 11, 2023, due date of the Five-Year Action Plan. This survey will complement the findings of the RPDC listening sessions.

Soft Assets by Covered Population

The following subsections examine the current state of digital equity regarding covered populations, including existing programs and needs. Detailed breakdowns of each of the programs are provided in Appendix A.5 of the West Virginia Digital Equity Plan, available September 2023.

1 Aging Individuals

Skills

Senior Centers and Libraries in West Virginia provide digital skills training for older adults, assisting with tasks like emailing, online bill payments, internet navigation, online form filling, driver's license renewal, and benefit requests or renewals through public websites.

Pendleton Senior and Family Services offers digital literacy and skills training, conducts digital inclusion awareness and outreach activities, and provides public computer labs and Wi-Fi networks.

Older Adults Technology Services (OATS), an AARP West Virginia affiliate, helps aging individuals learn and use technology to improve their quality of life through their program, Senior Planet, which offers free virtual training lessons, best practices for engaging older adults in virtual programming, in-person training plans, and guides for developing train-the-trainer network resources to build local organization capacity

CyberGenerations, also known as the Senior Citizens' Cyber Safety Initiative, teaches aging adults the skills to protect themselves from cybercrimes either through workshops or a self-paced course.

2 Racial and Ethnic Minorities

Skills and career training

Grow with Google is a national initiative providing free digital skills workshops, tools, resources, and one-on-one coaching. The initiative is considering partnering with West Virginia's Community and Technical Colleges to offer free Google Career Certificates for students in cybersecurity, IT support, digital marketing, and e-commerce. It enrolled over 330 West Virginians in its IT Support program in 2020, with 60% of attendees being Black, Latino, women, or veterans.

West Virginia State University, an HBCU, has partnered with Grow with Google through its HBCU Career Readiness Program. This program provides digital skills training and career workshops to Black students at over 30 institutions, equipping them for meaningful careers. It also provides funding to HBCU Career Centers for a semester-long digital skills program, which includes virtual and in-person training sessions and workshops, guest speakers, and a cloud-compatible Rocketbook Panda Planner for each participant.

3 Rural Residents

Skills and career training

Grow with Google collaborates with numerous community institutions in rural West Virginia for digital skills development, including libraries, commerce chambers, workforce organizations, schools, and more. Some of the participating entities include Brooke County Economic Development Authority, Cabell County Public Library, Goodwill Industries of KYOWVA Area, Inc., and West Virginia Northern Community College.

Mary H. Weir Public Library, in partnership with Goodwill and West Virginia Northern Community College, offers an initiative where computer science students provide tech support as interns. Goodwill also offers training on the library's electronic resources.

4 Incarcerated Individuals

Skills and career training

The West Virginia Schools of Diversion & Transition Adult Educational Programs (AEP) support currently incarcerated individuals and those transitioning out of the system. AEP provides career readiness initiatives, academic education classes, and technical skills training. Participants earn industry-recognized credentials, partake in U.S. Department of Labor apprenticeships, and get connected to jobs through local community agencies and partners.

Workforce West Virginia, a state agency, oversees a 12-month pilot called the Digital Inclusion Program, designed to support the state's reentry population. The program loans smartphones to help these individuals conduct online job searches and communicate with employers. It offers digital inclusion orientation, a career readiness assessment, job search activities, ongoing career coaching, assistance with participation in federal programs, high-school equivalency courses, and connections to substance use disorder treatment resources.

5 Veterans

Skills and career training

West Virginia Veterans Upward Bound provides Digital Equity programs for veterans, offering six-week basic and intermediate computer skills classes. Upon completion, veterans receive a Computer Skills Certificate. The organization also recently donated 10 computers to the Shepherd University Martinsburg Center for veterans and students.

Device access

Tech For Troops helps veterans develop computer skills and provides them with refurbished computers. They offer three types of programs: IT Training, Electronics Recycling, and Hardware Upcycling. Their Veteran Improvement Program provides low-cost refurbished computers, up-to-date software, and scholarships to qualifying Veterans and Veterans Assistance Organizations.

The West Virginia Department of Veterans Assistance manages the West Virginia Veterans Home program, providing displaced veterans with a temporary home, meals, nursing care, housekeeping, and recreational services, along with assistance in securing permanent housing, stable income, and educational services. A technology lab is also included in the program.

6 Individuals with Disabilities

Skills and device access

The West Virginia Division of Rehabilitation Services (WVDRS) is a state agency providing Digital Equity programs for individuals with disabilities, offering comprehensive and individualized skills training. They also offer access to low-cost devices through the Technology-Related Assistance Revolving Loan Fund, allowing for the purchase of computers with assistive software and hardware.

The West Virginia Schools for the Deaf and Blind (WVSDB) offer comprehensive educational programs for children with hearing and visual impairments. The WVSDB Career and Technical Education Department offers Computer Repair Systems courses that focus on hands-on, real-world applications to prepare them for post-graduation employment.³⁵

³⁵ West Virginia School for the Deaf and Blind (WVSDB) <https://www.wvsdb2.state.k12.wv.us>, Accessed July 5, 2023

Devices and materials access

The Library for the Blind and Print Disabled provides library services to individuals unable to use traditional print materials due to various impairments. Services include assistive technology loans, braille books, descriptive videos, talking book players, and talking magazines.

The WVU Center for Excellence in Disabilities operates the West Virginia Assistive Technology System (WVAST) Loan Library, a device loan and reuse program for individuals with disabilities. WVAST allows users to borrow assistive technology for 30 days, procure used devices for free, and participate in device demonstrations.

7 Individuals with a Language Barrier

Skills

The West Virginia Department of Education, through West Virginia Adult Education and the Adult Education/Literacy Programs, offers services to improve literacy skills of adults with low-literacy levels and English Language Learners (ELLs). Many counties in West Virginia have local volunteer literacy programs.

Literacy Volunteers of Monongalia and Preston Counties, an affiliate of ProLiteracy, offers free, confidential support services to native English speakers and ELLs to improve reading, writing, listening, speaking, and computer skills.

Summers County Adult Education (SCAE) provides in-person or online classes to help individuals with low-literacy levels and ELLs improve their English language, reading, writing, and technology skills. The program offers weekly computer classes at the Summers County Public Library and provides Digital Badges, a Computer Certificate of Achievement, and Microsoft Office Specialist and Internet and Computer Core Certificates (IC3) upon completion of training.

8

Assets Relevant to All Populations

Affordability

The Affordable Connectivity Program (ACP), overseen by the Federal Communications Commission (FCC), provides eligible households in West Virginia with up to \$30 per month toward internet service and up to \$100 to purchase a computer or laptop from participating providers. West Virginia is taking steps to increase ACP enrollment by partnering with higher education institutions, conducting listening sessions, and using FCC broadband maps to identify and reach areas with coverage gaps. Internet Service Providers in West Virginia actively promote ACP enrollment, with some offering specific programs for qualifying households, such as Comcast's Internet Essentials, providing discounted internet service packages.

Skills

The West Virginia Department of Education offers a range of digital literacy courses and has pioneered a statewide Computer Science K-12 pathway to ensure students have access to computer science education from an early age. The West Virginia Department of Education also provides professional development opportunities for teachers in digital skills.

CodeWV at WVU, in partnership with the West Virginia Department of Education, Code.org, and Apple, provides training for West Virginia educators to teach coding and computer science in classrooms. As of 2021, it has trained 905 teachers at 328 schools.

The **NASA IV&V Educator Resource Center (ERC)** offers professional development opportunities for West Virginia educators in coding, robotics, and other technologies.

The West Virginia Department of Education provides a three-credit hour online course called Digital Citizenship to active West Virginia teachers/educators and administrators, covering nine elements of digital literacy.

West Virginia's Career Technical Education (CTE) programs, provided by WVDE, offer hands-on technical training in various fields including Information Technology (IT). Students can earn various industry-recognized certifications upon completion.

Several **higher education institutions in West Virginia**, such as Marshall University and Eastern West Virginia Community and Technical College, offer basic, intermediate, and advanced digital literacy courses.

Skills and digital navigator programs

The Randolph County Housing Authority and Homeownership Center, in partnership with Highland Community Builders and Rural LISC, have launched a Digital Navigator Program. This initiative provides individualized support to community members in North Central West Virginia, assisting them in securing affordable internet service and devices, and helping them develop fundamental digital skills.

The Morgantown Public Library System is planning to train its library staff to become Digital Navigators. This train-the-trainer model aims to equip library staff with the skills necessary to aid West Virginians in enhancing their digital literacy.

Device affordability

The Federal Communications Commission, the **WVU Center for Excellence in Disabilities**, and the **West Virginia Division of Rehabilitation Services** offer programs that provide a subsidy payment for securing an internet-capable device, devices for loan, and a low-interest loan to secure devices. These programs cover households and individuals with disabilities. WVDED is exploring partnering with Digitunity, a national organization focused on eliminating the technology gap, to see how it might align with West Virginia's efforts.

Device access

Public libraries and senior centers provide access to computers and devices

Broadband access

The **West Virginia Broadband Enhancement Council**, the **West Virginia Office of Technology**, and the **West Virginia National Guard** have developed a public, interactive map of public Wi-Fi hotspots across the state. The map was created in collaboration with local education boards, libraries, and Internet Service Providers.

The **WV Kids Connect Initiative** was established to support K-12 students without home internet access by providing connections to a network of 1,000 Wi-Fi hotspot locations across the state. The program is a collaboration between the West Virginia Department of Education, the West Virginia Office of Technology, the West Virginia Higher Education Policy Commission, and West Virginia Network.

WVU provided Wi-Fi hotspot resources to students and community members during the COVID-19 pandemic.

Comcast, in collaboration with 10 not-for-profit organizations in West Virginia, established Lift Zones. These zones provide free high-capacity internet connectivity and digital educational content to communities, and

	<p>according to Comcast, they have significantly contributed to increasing digital equity in the state.</p> <p>Bluefield State University, an HBCU in West Virginia, hosted a “Kids Connect” Wi-Fi hotspot at Bluefield State College in one of its field parking lots.³⁶ The hotspot was created for southern West Virginia public school students who may not otherwise have internet access. The “Kids Connect Initiative” offered by West Virginia Governor Jim Justice’s office was developed to expand broadband internet availability.</p>
Device refurbishment	<p>The West Virginia Department of Education has been running the secondlaunchWV initiative since 2015. This program collects and refurbishes unused equipment from state agencies and other partners like the West Virginia National Guard, Toyota Motor Manufacturing, and Mountaineer Gas. The updated equipment is then donated to early childhood programs and K-12 schools. As of now, almost \$7 million in technology savings has been realized through the donation of 19,843 refurbished items.³⁷</p>
Digital Equity Coalition	<p>Organizations such as Black by God participate in national coalitions like the Black Churches for Digital Equity (BC4DE). BC4DE advocates for digital equity in under-represented communities by promoting broadband assistance programs, increasing internet connectivity, training leaders for digital equity, and supporting the Affordable Connectivity Program.</p>

3.2.2 Hard Assets

Examples of hard assets provided in NTIA’s Five-Year Action Plan guidance document include towers, buildings, and utility poles. Creating a categorization process for assets, WVDED expanded this definition to include information on rights-of-way, fiber deployment, and any other data that internet service providers are required to provide to the FCC as a part of its BDC data collection process. To collect this data, WVDED leveraged its position as a government entity to request additional statewide or regional governmental datasets and resources. These included capturing and analyzing rights-of-way, tower locations, utility infrastructure, and anchor institution location data.

Broadband Deployment Data: Quantitative, Tabular, and Speed Tests

WVDED and its partners collected purely tabular datasets, primarily from existing repositories. These included Census data, FCC BDC and Fabric information, state-level emergency 911 addresses, and more. This dataset informed the work in Section 3.1, and per BEAD requirements, was then used to determine

³⁶ Bluefield State University, “WiFi Hotspot for Southern WV Public School Students Now Available at Bluefield State College,” <https://bluefieldstate.edu/community/news-and-events/wifi-hotspot-southern-wv-public-school-students-now-available-bluefield>.

³⁷ West Virginia Department of Education, “secondlaunchWV”, <https://wvde.us/infrastructure-and-network-operations/second-launch/>, Accessed July 10, 2023.

gaps in broadband service and create high-level broadband infrastructure deployment designs. This data was then paired with local data to create detailed network buildout plans. While much of this information was already analyzed by WVDED as part of its FCC BDC challenge process, data analysis required a significant amount of processing, organization, and reconciliation on the State's part. Some of the other data collected and analyzed by WVDED included adoption rates of broadband and monetary charges for broadband.

WVDED collected supplementary data directly from cooperating internet service providers. To verify that the Federal Communications Commission was not incorrectly processing provider-submitted availability data, WVDED formally requested internet service providers provide copies of these raw availability data provided to the FCC. As detailed in the FCC BDC Data Specifications, these requests were to provide WVDED:

- a. Fixed Wireline – All “Fixed Broadband Availability Data,” as detailed in Section 6 of the Data Specifications³⁸
- b. Mobile Wireless – “Mobile Broadband and Mobile Voice Availability Data,” as detailed in Section 8 of the Data Specifications³⁹
- c. Fixed Wireless – “Fixed Wireless Propagation Modeling Information” through “Fixed Wireless Clutter Category Data,” as detailed in Section 7.3-7.7.⁴⁰

West Virginia has been a champion for broadband speed testing. The West Virginia Broadband Enhancement Council has licensed Ookla⁴¹ speedtest data for West Virginia every year since the Council's inception in 2016. The Council values speed testing because it provides consumers with a voice and a method for reporting broadband data. While FCC data is reported by internet service providers, Ookla data is reported by end users. Having both sets of data results in a better picture of actual broadband availability and performance.

The Council recently approved the licensing of Ookla's Mobility data, including Cell Analytics and Tower Source Data. This license was executed in anticipation of the Federal Communications Commission's Mobility Fund Phase II, and to assist the West Virginia Office of Broadband with any state challenges to reported mobile data.

West Virginians typically take about one million speed tests per year through the State's speed test portal located at <https://broadband.wv.gov>, which includes a custom State survey, or directly through the Speedtest apps for iOS and Android as well as on the web via Speedtest.net at <https://www.speedtest.net>.

³⁸ FCC, “Broadband Data Collection: Data Specifications for Biannual Submission of Subscription, Availability, and Supporting Data”, March 30, 2023, <https://us-fcc.app.box.com/v/bdc-availability-spec>

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ “Ookla is a global leader in connectivity intelligence and network insights. For almost two decades, Ookla has set the industry standard for both fixed and mobile network testing and analysis. From its world-renowned Speedtest and Dwnndetector platforms to an accompanying and growing suite of end-to-end enterprise solutions, Ookla's mission is to measure, understand, and help improve connected experiences.” Ookla, “About”, <https://www.ookla.com/about>.

Infrastructure Assets

Examples of hard assets provided in NTIA's Five-Year Action Plan guidance document include towers, buildings, and utility poles. Creating a categorization process for assets, WVDED expanded this definition to include information on rights-of-way, fiber deployment, and any other data that internet service providers are required to provide to the FCC as a part of its BDC data collection process. To collect this data, WVDED leveraged its position as a government entity to request additional statewide or regional governmental datasets and resources. These included capturing and analyzing rights-of-way, tower locations, utility infrastructure, and anchor institution location data.

Collected hard asset data was produced out of necessity while completing other portions of the BEAD assessment. In 2021, the United States Economic Development Administration and the Appalachian Regional Commission awarded Regional Optical Communications (ROC) grant funds to create a set of high-level broadband designs and conduct cost analysis for all 55 counties. In anticipation of the BEAD and Digital Equity programs, WVDED strongly supported this grant funding. These high-level designs provided WVDED with an overview of what types of broadband projects would be necessary to provide full coverage to each county and were subsequently used to generate the universal broadband cost estimate, discussed in Section 5.3. This mapping initiative and its concurrent public outreach strategy are being leveraged as part of the BEAD and Digital Equity implementation plan. Additionally, in its agreement, ROC was required to create the high-level designs using existing utility poles. As no complete database with this information exists in West Virginia, ROC manually mapped the locations of many of these poles. This not only allowed ROC to perform its high-level design tasks but created a virtual catalog of many relevant pole locations across the State.

Electric Utility Middle Mile Initiative

Under legislation adopted in 2019, West Virginia electric utilities began reviewing the feasibility of constructing and operating a middle mile infrastructure project within the electric utility distribution system. Electric utilities are permitted to conduct feasibility studies to include:

- a. the route of the middle mile infrastructure proposed for the project
- b. the number of fiber strands that would be utilized in connection with the proposed project and dedicated to serve as the middle mile
- c. the location of the electric utility's distribution infrastructure that will be utilized in connection with the proposed project
- d. the capacity of the middle mile broadband infrastructure that will be available to lease to last mile broadband internet providers upon completion of the proposed project
- e. the estimated cost of the proposed project, including but not limited to engineering costs, construction costs, permitting costs, materials and labor, right-of-way costs, and a reasonable rate of return to the electric utility
- f. the proposed schedule of construction of the proposed project
- g. the method of attachment and connection of the middle mile broadband fiber assets to the electric utility's distribution infrastructure

In 2019, Appalachian Power Company and Wheeling Power Company (AEP) prepared a Broadband Feasibility Study for the construction of a middle mile fiber optic network in Logan and Mingo Counties, known as the Logan-Mingo Broadband Project. Studies must be reviewed and approved by the Broadband Council and the West Virginia Public Service Commission.

The proposed network will provide utility communications and contain fiber optic strands that AEP could lease to internet service providers who would provide broadband internet service to end-user, “last mile” customers through the construction of more than 400 new fiber miles and the utilization of approximately 200 existing fiber miles to reach more than 13,000 unserved and underserved locations.

AEP’s study included a review of statutory requirements authorizing electric utilities to prepare such studies. It also identified regulatory and public policy hurdles, a number of which were addressed in legislation enacted into law in 2020. In 2020, the West Virginia Legislature passed HB 4619, which amended §24-2-1 of the W. Va Code and added a new section, §24-2-10, both of which concern the powers and duties of the West Virginia Public Service Commission (WVPSC). HB 4619 allows electric utilities to install “middle mile” broadband fiber on their existing infrastructure to facilitate the expansion of broadband service into unserved and underserved areas of the State.

AEP conducted a Request for Proposal process and selected GigaBeam Networks, LLC, as an internet service provider partner. The project continued with formal submission to the WVPSC, in 2020.

In 2022, NTIA announced the award of \$19.6 million to complete a fiber to the premise project to bring qualified broadband to more than 12,000 unserved households across the region. This application was submitted by the Logan County Commission in partnership with the Mingo County Commission and GigaBeam Networks, LLC. The project team held an official construction kickoff event in July 2022.

Following the success of the Logan-Mingo project, AEP developed a second feasibility study in 2022 which included five counties in southeastern West Virginia, including Raleigh, Mercer, Wyoming, McDowell, and Summers counties. The West Virginia Broadband Enhancement Council approved this study in March 2023.

AEP applied to the NTIA Middle Mile Expansion Program and received a \$25 million grant for this project in June 2023. Upon completion, the project will result in 658 miles of new middle mile fiber and will utilize nearly 300 miles of the company’s existing fiber infrastructure to reach more than 20,000 unserved and underserved locations.

Vertical Real Estate Management and Availability Act

In 2020, HB 4015 created a new article of the W. Va Code, § 31G-1-3; §§ 31G-5-1 – 4, known as the **Vertical Real Estate Management and Availability Act**, which requires the West Virginia Department of Administration to request proposals to manage state-owned Vertical Real Estate. “Vertical Real Estate” is defined as towers or other structures mounted on rooftops or other prominent places, and any facilities associated with that structure, including ground facilities.

All funds in excess of management fees will be deposited by the West Virginia Office of Technology (WVOT) as follows: 50% to the Technology Infrastructure Reinvestment Fund for reinvestment in Vertical Real Estate or other infrastructure supporting broadband on state-owned property, and 50% to the Broadband Expansion Fund established in § 31G-1-5 and under the control of the Council.

WVOT is currently researching opportunities and potential relationship links of the vertical real estate initiative with other state technology initiatives, such as modernization of the State Interoperable Radio Network (SIRN) and the State's Wide Area Network. A professional services firm has been procured to address the full range of requirements to be completed as part of this project.

WVOT is currently examining the locations and condition of publicly owned tower assets and completing an asset inventory initiative.⁴² In April 2023, WVOT announced that it planned to finalize a draft RFP that will:

- a. create a valuation method for space on towers
- b. allow for the completion of needed tasks such as tower engineering
- c. review policies and processes for how the partnership will work
- d. enable local jurisdictions to build on the process to increase asset availability

West Virginia Network for Educational Telecomputing (WVNET)⁴³

West Virginia Network for Educational Telecomputing (WVNET) is a dynamic service organization providing telecommunications and computing services within West Virginia. Currently focused on state colleges and universities and administered by these entities, WVNET is transitioning to expand its impact by offering services to State Government, K-12, public libraries, and county government. As a centralized state resource, WVNET reacts to customer needs by providing efficient and cost-effective deployment of technology, training, and support.

WVNET is a centralized resource taking the lead in providing quality technology services and support to the citizens of West Virginia. WVNET supports and promotes the missions of its member institutions by providing telecommunications capabilities and enhanced access to resources and programs for their supported communities. WVNET will provide such access through the effective use of the appropriate information technology networks at a cost affordable to its users. The goals of WVNET include the following:

1. Support an information superhighway within the State of West Virginia. Connect WV information superhighway to networks within the National Information Infrastructure.
2. Serve as an information technology center for the colleges, universities, K-12, and government in West Virginia to promote the use of information technology throughout WV.
3. Monitor the purchasing and supporting hardware, software, and information technology services in a cost-effective manner, and within the framework of a cooperative association with its members.
4. Ensure and promote that professional knowledge base among all WVNET agencies and central staff by encouraging professional development, providing training opportunities and literature.⁴⁴

WVNET fills a number of key niches in the context of this broadband plan. WVNET aggregates the broadband traffic of a range of educational and other institutional users in the State, allowing the creation of educational and institutional Wide Area Networks. This aggregation has a number of beneficial effects:

⁴² West Virginia Legislature, House Bill 2002, May 27, 2021, https://www.wvlegislature.gov/Bill_Status/bills_history.cfm?INPUT=2002&year=2021&sessiontype=RS

⁴³ This subsection on WVNET is a modified version of a section on the same subject in the West Virginia State Broadband Plan 2020-2025, https://broadband.wv.gov/wp-content/uploads/2020/01/West_Virginia_State_Broadband_Plan_2020-2025.pdf.

⁴⁴ WVNET, "About WVNET," <https://wvnet.edu/about/>.

1. It permits WNET and other institutions to support applications and content used by individual sites in a centralized manner, increasing the level of technical capacity available to support them, especially for smaller sites.
2. It provides educational and research institutions access to the nationwide Internet2 network developed by leading higher educational institutions in the country.
3. It allows a single nonprofit entity with an educational focus to knit together services and facilities available from different projects and service providers into a unified Statewide network for the institutions it serves. WVNET can use its purchasing power to seek improved broadband services for its institutions (and communities) Statewide while supporting local projects that provide incremental progress toward that goal.
4. It provides a mechanism for a public-interest entity to respond to a State Department of Education-issued RFP for funding for E-rate support from the FCC's Universal Service Program. WVNET is currently receiving E-rate support for services provided to schools and libraries in year four of a five-year contract. The next window for bidding on these services will provide an important window of opportunity for the State to seek support for projects offering a high level of service to schools (and indirectly, communities).

State Interoperable Radio Network

The West Virginia Statewide Interoperable Radio Network is a partnership of municipal, county, state, and federal public safety entities to establish and maintain a statewide interoperable radio network. This radio network is comprised of a UHF digital P25-compliant trunked radio system that utilizes some of the latest technologies. Currently, the SIRN has over 100 tower sites operational and provides coverage throughout most of West Virginia.

3.3 Existing Programs and Partnerships

3.3.1 The Office of Broadband, Department of Economic Development

Created in 2021 by an act of the West Virginia Legislature, the West Virginia Office of Broadband is organized under WVDED as outlined in West Virginia Code § 31G-1A-1, et seq. The Office of Broadband is managed by a director, who reports to the Secretary of Economic Development.

The Office of Broadband works cooperatively with the West Virginia Broadband Enhancement Council. Both the Office of Broadband and Council are formed under WVDED. The agencies work collaboratively with a shared mission: to expand and improve broadband connectivity in West Virginia.

The Council was created in 2017 under the West Virginia Department of Commerce. In 2020, the Council was transferred to WVDED for administrative, personnel, and technical support services to improve coordination with the Office of Broadband.

The Council has 13 voting members; as well as two Senate Appointees and two House of Delegates Appointees, one from each party, to serve as ex officio, nonvoting advisory members. The Council conducts a regular open meeting on the second Thursday of each month, at 10:00 a.m., in the West Virginia Department of Commerce offices in Building 3 at the State Capitol Complex or virtually.

The Council builds upon input from numerous state agencies and recognizes the value of representation from urban and rural communities throughout West Virginia. The Council's composition, which includes a cross-section of state agency directors, legislative advisory members, business community leaders, and both urban and residential users, ensures that multiple voices are heard, that West Virginia's needs are represented, and that viable solutions are thoughtfully pursued.

In 2021, the West Virginia Legislature amended West Virginia Code §31G to outline specific duties and authorities of the Office of Broadband and the Council. This legislation transferred some duties and authority from the Council to the Office, assigned some distinct responsibilities to the Office, and identifies some areas in which the Council and the Office share responsibilities.

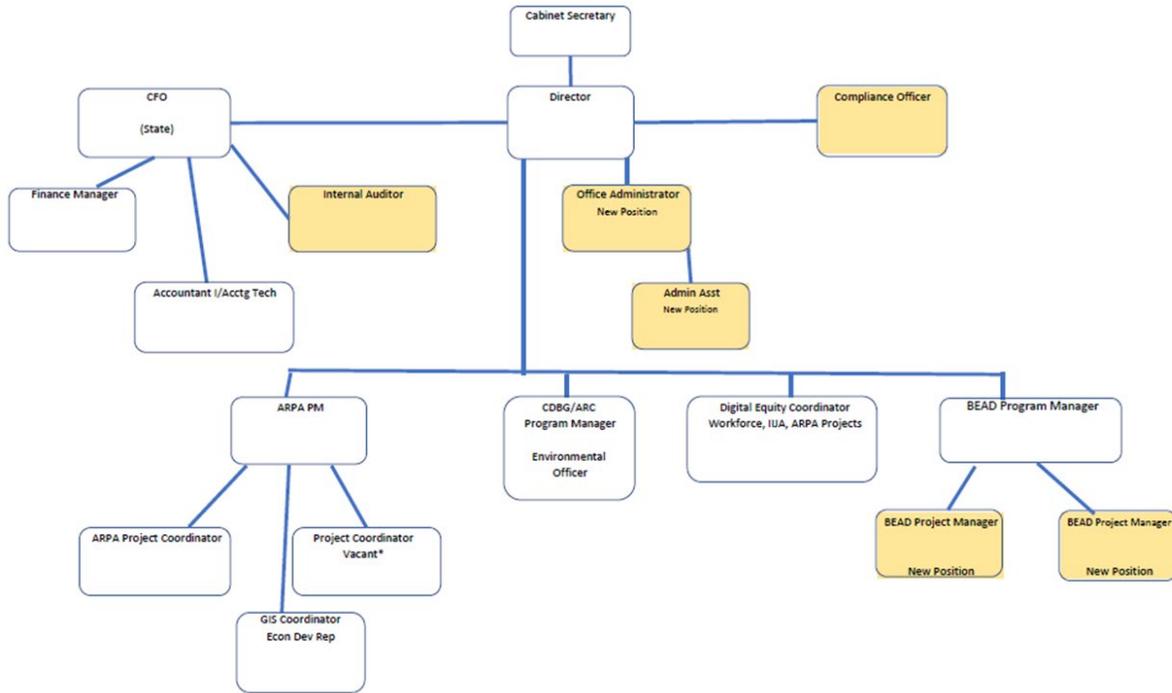
Distinct duties of the Office of Broadband include:

- a. gathering and reporting data regarding adoption rates of broadband by speed and community, residential and non-residential
- b. gathering data regarding prices and fees charged for broadband, residential and non-residential
- c. public awareness of issues concerning broadband service
- d. reporting to the Joint Committee on Government and Finance annually
- e. mapping, including annual publication of a statewide assessment, with the broadband availability map to be available online for public access, and centralized AREA mapping in GIS form for use by the private sector
- f. creating guidelines and recommendations regarding voluntary donation program for easements for broadband service
- g. making recommendations to the Legislature

The Office of Broadband is the lead agency for most efforts described throughout this document and continues to spearhead the BEAD and Digital Equity programs for the State. For consistency, WVDED will be used in reference to the Office of Broadband in all but the following sections.

The Secretary of WVDED oversees all activities within the Office of Broadband. Figure 14 offers a full organizational chart of the Office of Broadband.

Figure 14: Office of Broadband Organizational Chart



More specifically, Table 12 details the roles of each of the five Office of Broadband BEAD team members. These BEAD team members will specifically support the implementation of BEAD funding alongside existing Office of Broadband staff to implement the BEAD program.

Table 12: Core Office of Broadband Team Members

Current/planned time	Full/part-	Position	Role
Current (1) Planned (2)	Full	Program Manager (1) Project Manager (2)	The Program Manager and Project Managers will support Office of Broadband staff with processing data requests; implementing BEAD activities; managing community outreach and stakeholder activities, events, and workshops; and ensuring that grantees and subgrantees complete deliverables in a timely manner and meet BEAD Program objectives, including alignment with the Digital Equity Planning Grant.
Current (1)	Full	Accounting Technician	The Accounting Technician will be responsible for completing and submitting grant reports in coordination with the Finance Manager, Administrative Professional, Office Administrator, and Office of Broadband staff (as allowable and appropriate); preparing for any activities related to grant monitoring, audit, or compliance requests; processing invoices and other grant-related financial documents; and compiling, reconciling, and managing the submission of subgrantee reports and documents.
Planned (1)	Full	Administrative Professional	The Administrative Professional will be in charge of completing and submitting grant reports on behalf of, or in coordination with, the Finance Manager, Accounting Technician, Office Administrator, and Office of Broadband staff (as allowable and appropriate); archiving

grant-related documents and documentation; preparing for, and supporting, any activities related to grant monitoring, audit, or compliance requests; and compiling, reconciling, and managing the submission of subgrantee reports and documents.

For efficiency and subject matter expertise, the Office of Broadband and Council also procure professional consulting services. Contracted partners include: Bowles Rice LLP, providing legal assistance; The Thrasher Group, providing engineering consulting services; Tilson Technology Management, Inc., (Tilson) providing overarching broadband consulting services; and Ookla, providing speed testing data and analytics. Tilson has provided support to WVDED throughout the BEAD process and has assisted WVDED in the development and administration of the West Virginia Broadband Investment Plan, discussed in the subsequent section.

3.3.2 Existing Infrastructure Programs

To date, the State has launched or otherwise participates in nine programs to spur investment in broadband infrastructure, with each program addressing a different component or type of broadband deployment. Each of the following programs has already been awarded funding, unless otherwise specified. In some cases, this funding has already led to additional broadband deployment; in other cases, broadband deployment activities are in process.

West Virginia has a long-standing focus on broadband mapping and speed testing. All known broadband investment has been tracked and mapped for several years. In addition, the WVDED staff administers several federal broadband development programs. As a result, WVDED is able to coordinate the administration of BEAD with other federal programs.

The majority of existing programs in West Virginia are supported by federal funds. Some are administered by WVDED, and some are administered directly by the Federal Government. For instance, the Rural Digital Opportunity Fund (RDOF), Connect America Fund II Auction (CAF II Auction), USDA ReConnect, and Community Connect programs are funded by and managed by the Federal Government.

In addition, projects funded by the Community Development Block Grant (CDBG) are recommended and administered by WVDED. Projects funded by the Appalachian Regional Commission (ARC) may be approved directly by ARC through its Partnerships for Opportunity and Workforce Economic Revitalization Initiative (POWER) program, then managed and administered by WVDED. WVDED is also directly responsible for two funding streams established by ARC: Central Appalachian Broadband and Northcentral Appalachian Broadband. WVDED may accept applications and recommend approval of projects under these two funding sources. The ARC grants are unique in that POWER projects are approved directly by ARC whereas Central Appalachian and Northcentral Appalachian funds are granted to WVDED for administration of a state-led program in which WVDED has a more direct role in project selection. In either scenario, WVDED is the Responsible State Basic Agency (RSBA) for ARC broadband infrastructure projects.

In addition, the Community Development Block Grant (CDBG) Program, and most grant programs associated with the ARC are federally funded but managed and administered by WVDED. The ARC grants are unique in that some money is granted directly by the agency whereas other funds are granted via the State. These already-funded programs complement the forthcoming infrastructure program developed

for BEAD. The subsequent bullets offer an overview of these programs and their outcomes in West Virginia and are summarized in Table 13.

Table 13: Summary of Broadband Infrastructure Programs in West Virginia

Program Name:	Administered By:	Description	Expected Outcome(s):
Rural Digital Opportunity Fund	FCC	FCC RDOF offers internet service providers funding to extend service to underserved areas. Centers on a reverse auction in which service providers compete for grants to connect underserved Census tracts.	Ensure comparable telecommunications services at affordable costs to rural Americans
Connect America Fund II Auction	FCC	Precursor to the FCC RDOF auction. Areas where certain incumbent carriers did not accept previous federal funding were brought to a competitive reverse auction.	Expand broadband and voice service to unserved rural areas
USDA ReConnect	USDA	Funds projects with sustainable business models that provide high-speed broadband to rural homes, businesses, farms, and more.	Increased broadband access in rural areas
Community Development Block Grant	United States Department of Housing and Urban Development/WVDED	Broad program for housing and economic opportunity projects that can be used for broadband-related projects.	Further closing the digital divide with emphasis on low- to moderate-income areas
Appalachian Regional Commission	ARC or subgrantees	ARC offers numerous grant opportunities aimed at improving quality of life in the region. Many of these allow applications for broadband-related projects.	Improved connectivity throughout the Appalachian region
USDA Community Connect	USDA	Targeted unserved rural, economically challenged communities to build fiber. Grant awards are ongoing.	Bring high-speed connectivity to 8,000 households
WVBIP: GigReady	US Treasury/WVDED	Encourages public-private partnerships among internet service providers, local governments, and WVDED to dedicate funds available through ARPA, or other local funding, to a broadband development initiative.	Encourage the collaborative partnerships needed for successful broadband development
WVBIP: Major Broadband Project Strategies	US Treasury/WVDED	Designed for projects that can transform broadband availability across a significant extent of coverage in West Virginia.	Fund larger scale projects designed to serve large numbers of Targeted locations
WVBIP: Line Extension Advancement and Development	US Treasury/WVDED	Targets internet service providers as primary applicants to expand existing networks to reach unserved locations at the end of line.	Intended to fund service extensions of last mile cable modem and FTTP broadband networks that can be constructed quickly

WVBIP Wireless
Internet
Networks

WVDED

Designed for wireless broadband networks that can quickly extend wireless broadband coverage in West Virginia.

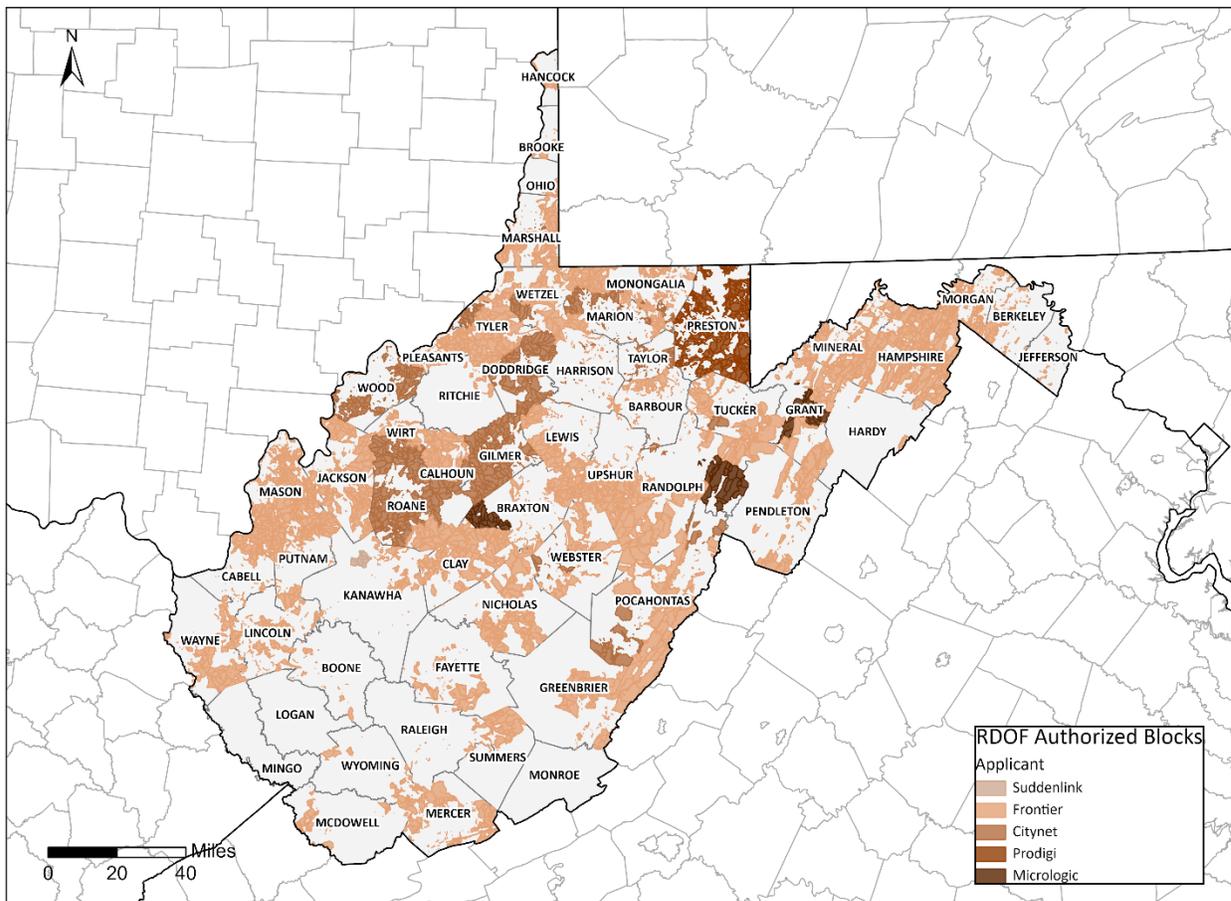
Fund extensions or upgrades of existing last mile wireless broadband networks that can be constructed quickly.

Federally Administered Programs

Across West Virginia, FCC RDOF and CAF II, USDA ReConnect and Community Connect, CDBG, and ARC funding programs have commitments to build or expand broadband service in unserved or underserved areas. To the greatest extent possible, and in keeping with West Virginia’s mission to provide broadband connectivity to all locations, WVDED will monitor broadband expansion projects under all funding programs to ensure that federal commitments are completed in compliance with applicable regulations.

At \$362 million in funding over 10 years, the Federal Communications Commission’s RDOF program is by far the largest in West Virginia, excluding the upcoming BEAD program. Figure 15 depicts the locations of all Census blocks with committed RDOF funding across the State; more details will be provided in the RDOF program section below.

Figure 15: Federally-Run Broadband Deployment Program Funded Areas Map — RDOF



Source: WVDED

Rural Digital Opportunity Fund. Launched by the FCC, RDOF offers internet service providers funding to extend service to designated underserved areas. The program centers on a reverse auction in which internet service providers compete for grants to connect underserved Census blocks; each block is awarded to the internet service provider that can connect it with the least amount of requested federal funding.

The FCC conducted Phase 1 of the RDOF multi-round, reverse auction in October and November 2020. Through the entire RDOF program, the FCC outlined plans to award up to \$20.4 billion to support fixed broadband development nationwide. Phase 1 of the RDOF auction program included \$16 billion in potential funding. Of the \$16 billion, \$9.2 billion, or 57.5%, was awarded through a competitive, reverse auction framework designed to reduce costs through repetitive rounds of bidding by location(s). Winning bidders were announced on December 7, 2020.

West Virginia’s initial auction eligibility profile, as determined by the FCC, included 120,506 locations. The maximum statewide award possible was slightly more than \$766 million, or \$76 million per year, for 10 years. This figure was the maximum potential subsidy to be awarded by the FCC to carriers that competed in the auction process. However, through the reverse auction process, the ultimate subsidy amount awarded in West Virginia was \$362 million, approximately 47.2% of the maximum amount. Additionally, of the 120,506 initially eligible locations, 119,267 (98.9%), were ‘won’ by auction participants.⁴⁵

Of these, six service providers serving 109,087 RDOF locations in West Virginia have been approved to provide broadband service under RDOF. All six will offer service that meets the fully served BEAD classification.⁴⁶ Of these, approximately 80,000 of those are assigned to Frontier.⁴⁷

All six service providers bid and won in the auction’s Gigabit Performance Tier, specifying the use of “Optical Carrier – Fiber to the End-User” as the technology to be utilized to satisfy deployment obligations. All auction winners must fulfill deployment obligations to serve 40% of the total locations won in a state by the end of year three (starting when the FCC announces final approval of auction winners to receive Universal Service Funds) and an additional 20% of auction subsidized locations per year until 100% completion by the end of year six.

The specification of “Optical Carrier – Fiber to the End User” as a technology necessitates the deployment of a Gigabit Passive Optical Network (GPON) as a fiber-to-the-home (FTTH) network that is able to provide service to each of the subsidized locations in West Virginia.

All auction winners must fulfill deployment obligations to serve 40% of total locations won across West Virginia by the end of the third year from RDOF Final Approval. An additional 20% must be

⁴⁵ WVOB, West Virginia Broadband Enhancement Council, 2022 Annual Report, https://www.wvlegislature.gov/legisdocs/reports/agency/B19_CY_2022_15837.pdf, p. 52

⁴⁶ “Auction 904: Rural Digital Opportunity Fund,” Federal Communications Commission, accessed May 19, 2023, <https://www.fcc.gov/auction/904>.

⁴⁷ WVOB, West Virginia Broadband Enhancement Council, 2022 Annual Report, https://www.wvlegislature.gov/legisdocs/reports/agency/B19_CY_2022_15837.pdf, p. 52

served each following year until 100% completion is achieved by the end of year six.⁴⁸ See Table 14 for each.

These deployment milestones apply to all auction participants and represents a significant investment in broadband infrastructure in West Virginia.

Table 14: RDOF Milestones

Internet Service Provider	Date of RDOF Final Approval	40% Milestone Date
Citynet	11/12/2021	12/31/2024
Micrologic	02/14/2022	12/31/2025
PRODIGI	03/15/2022	12/31/2025
Frontier	05/12/2022	12/31/2025
GigaBeam Networks	12/15/2022	12/31/2025
Suddenlink	08/05/2022	12/31/2025

Source: WVDED

Table 15 indicates the number of BSL units covered under RDOF by BEAD service type, as well the share of BSL units under any funded program that this represents. Note: BSL units both covered by RDOF and considered fully served may be a result of one of several activities, including but not limited to deployment activities by an RDOF-funded service provider, deployment activities by another service provider, or prior misclassification by the Federal Communications Commission.

Table 15: BSL Units Covered by RDOF Program

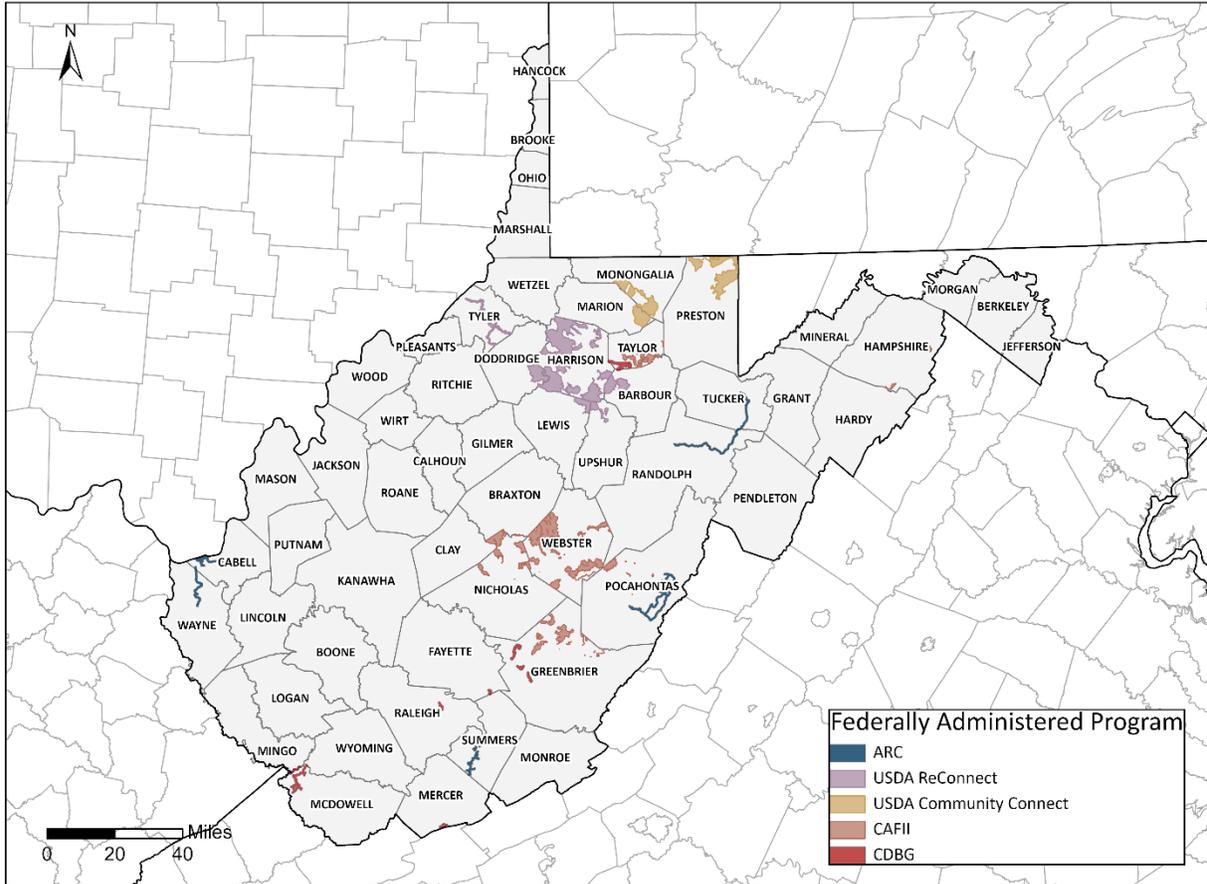
BEAD Service Type	BSL Units Count
Unserved – No Service	26,249
Unserved – Slow Service	64,718
Underserved	8,809

Source: WVDED

In addition, the geographic extent of the four other federally administered programs is displayed in Figure 16 below, with the largest non-RDOF federal programs—ReConnect and CAF II—focused in the north and center of the State. Each of these four other programs is described in detail below.

⁴⁸ “Rural Digital Opportunity Fund,” Universal Service Administrative Company, accessed May 19, 2023, <https://www.usac.org/high-cost/funds/rural-digital-opportunity-fund/>.

Figure 16: Federally-Run Broadband Deployment Program Funded Areas Map — All Other



Source: WVDED

Connect America Fund II Auction. A precursor to RDOF, the Connect America Fund II auction offered non- “price cap” internet service providers the opportunity to expand voice and broadband coverage into geographic areas with poor or no internet service. Through a competitive auction, the Federal Communications Commission awarded \$1.5 billion to 103 providers across the country to serve over 700,000 locations. In West Virginia, three service providers—Hardy Telecommunications, Citynet, and Viasat—were awarded \$12 million to serve 7,962 locations.⁴⁹ Of these, the 905 locations served by Citynet and Hardy have commitments to receive broadband service that meets the fully served BEAD classification.⁵⁰

Table 16 indicates the number of BSL units covered under the CAF II Auction program by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note: BSL units both covered by CAF II and considered fully served may be a result of one of several activities, including but not limited to deployment activities by a CAF II-funded service

⁴⁹ “FCC Connect America Fund Phase II Auction State Results Summary” (Federal Communications Commission, August 28, 2018), <https://docs.fcc.gov/public/attachments/DA-18-887A3.pdf>.

⁵⁰ “Connect America Fund Phase II: Assigned Bids,” Federal Communications Commission Public Reporting System, August 21, 2018, https://auctiondata.fcc.gov/public/projects/auction903/reports/prs_all_assigned_bids.

provider, deployment activities by another service provider, or prior misclassification by the Federal Communications Commission.

Table 16: BSL Units Covered by CAF II Auction Program

BEAD Service Type	BSL Units Count
Unserved – No Service	270
Unserved – Slow Service	599
Underserved	77

Source: WVDED

U.S. Department of Agriculture (USDA) ReConnect. In 2018, Congress provided \$600 million to USDA to expand broadband infrastructure deployment in rural America. Funds are awarded to projects with financially sustainable business models that bring high-speed broadband to rural homes, businesses, farms, ranches, and community facilities such as first responders, healthcare sites, and schools. Since then, Congress has appropriated an additional approximately \$4 billion for the program. Eligible applicants include both for- and nonprofit entities, such as cooperatives, corporations, state and local governments, territories, and tribes. For a geographic area to be eligible, it must be rural and at least 50% of households in the area must lack sufficient access to broadband service. Funding opportunities are available each fiscal year.

Four USDA ReConnect projects are underway in West Virginia, representing approximately \$40 million in USDA loans and grants.⁵¹ Table 17 indicates the number of BSL units covered under the ReConnect program by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note: BSL units both covered by ReConnect and considered fully served may be a result of one of several activities, including but not limited to deployment activities by an ReConnect-funded service provider, deployment activities by another service provider, or prior misclassification by the Department of Agriculture.

Table 17: BSL Units Covered by ReConnect Program

BEAD Service Type	BSL Units Count
Unserved – No Service	3113
Unserved – Slow Service	3980
Underserved	755

Source: WVDED

U.S. Department of Agriculture (USDA) Community Connect. Community Connect provides financial assistance to state and local governments, nonprofits, and other for-profit organizations which intend to provide broadband service in rural, economically challenged communities where service does not currently exist. Funds may be used in rural areas considered unserved under

⁵¹ WVOB, West Virginia Broadband Enhancement Council, 2022 Annual Report, https://www.wvlegislature.gov/legisdocs/reports/agency/B19_CY_2022_15837.pdf, p. 86

BEAD (less than 25/3 Mbps internet availability). Additional funding opportunities are available from USDA in FY 2023.

West Virginia received four Community Connect grants intended to cover 8,000 households from 2017 to 2020. Of these, three grant projects were expected to provide broadband service meeting or exceeding the requirements for full service as defined under the BEAD program. Table 18 indicates the number of BSL units covered under these Community Connect grants by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note that BSL units both covered by Community Connect and considered fully served may be a result of one of several activities, including but not limited to deployment activities by a Community Connect-funded service provider, deployment activities by another service provider, or prior misclassification by USDA.

Table 18: BSL Units Covered by Community Connect Program

BEAD Service Type	BSL Units Count
Unserved – No Service	3064
Unserved – Slow Service	3774
Underserved	278

Source: WVDED

Community Development Block Grant. Congress established CDBG through the Housing and Community Development Act of 1974.⁵² The West Virginia CDBG provides grants to local governments that do not receive CDBG direct funding from the U.S. Department of Housing and Urban Development (HUD). The grants focus on providing decent housing, a suitable living environment, and expanded economic opportunities principally for persons of low to moderate income. In response to COVID-19, HUD also granted West Virginia approximately \$20 million for a supplementary program called CDBG-CV. CDBG-CV funding can be used for broadband projects focused on closing the digital divide. Funding opportunities are available each fiscal year.

Through 2020, approximately \$6.3 million in CDBG funding has been dedicated to broadband planning and infrastructure projects. Twenty CDBG projects, covering 41 counties, involved broadband planning and community outreach. Eleven projects specifically focus on broadband infrastructure deployment, of which 7 are commitments to provide broadband service matching or exceeding the requirements to be fully served under the BEAD program.

Table 19 shows the number of BSL units covered under the 7 CDBG programs by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note that BSL units both covered by CDBG and considered fully served may be a result of one of several activities, including but not limited to deployment activities by a CDBG-funded service provider, deployment activities by another service provider, or prior misclassification by the Department of Housing and Urban Development.

⁵² Congress.gov. "S.3066 - 93rd Congress (1973-1974): Housing and Community Development Act of 1974." August 22, 1974. <https://www.congress.gov/bill/93rd-congress/senate-bill/3066>.

Table 19: BSL Units Covered by CDBG Program

BEAD Service Type	BSL Units Count
Unserved – No Service	332
Unserved – Slow Service	688
Underserved	35

Source: WVDED

Appalachian Regional Commission. ARC is a partnership between states and the Federal Government. Covering 423 counties across 13 states, ARC works with local Appalachian communities to improve overall quality of life. ARC has a variety of grant programs that local governments can use for efforts that align with its Strategic Plan, including building and improving Appalachian businesses, workforce ecosystem, infrastructure, culture and tourism, and community leaders and capacity.⁵³ In many cases, funds can be used for broadband-related projects. For instance, in January 2023, ARC awarded \$6.3 million to bolster broadband access across 50 communities through its Appalachian Regional Initiative for Strong Communities (ARISE).⁵⁴ ARC can either directly fund projects itself or it can provide the funds to states, such as West Virginia, for state-level grant programs. Funding opportunities are ongoing and are available each fiscal year.

ARC funds broadband through three programs in West Virginia: Partnerships for Workforce and Economic Revitalization (POWER), Central Appalachian Broadband, and North Central Appalachian Broadband. WVDED administers most ARC-funded broadband infrastructure projects in West Virginia.

Seven ARC grants are commitments to provide broadband service meeting or exceeding the requirements for full service as defined under the BEAD program. Table 20 indicates the number of BSL units covered under these ARC grants by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note that BSL units both covered by ARC and considered fully served may be a result of one of several activities, including but not limited to deployment activities by an ARC-funded service provider, deployment activities by another service provider, or prior misclassification by ARC.

Table 20: BSL Units Covered by ARC Program

BEAD Service Type	BSL Units Count
Unserved – No Service	341
Unserved – Slow Service	2628
Underserved	411

Source: WVDED

⁵³ Appalachian Regional Commission (ARC), Appalachia Envisioned: ARC’s 2022-2026 Strategic Plan, Accessed April 10, 2023, <https://www.arc.gov/strategicplan/>.

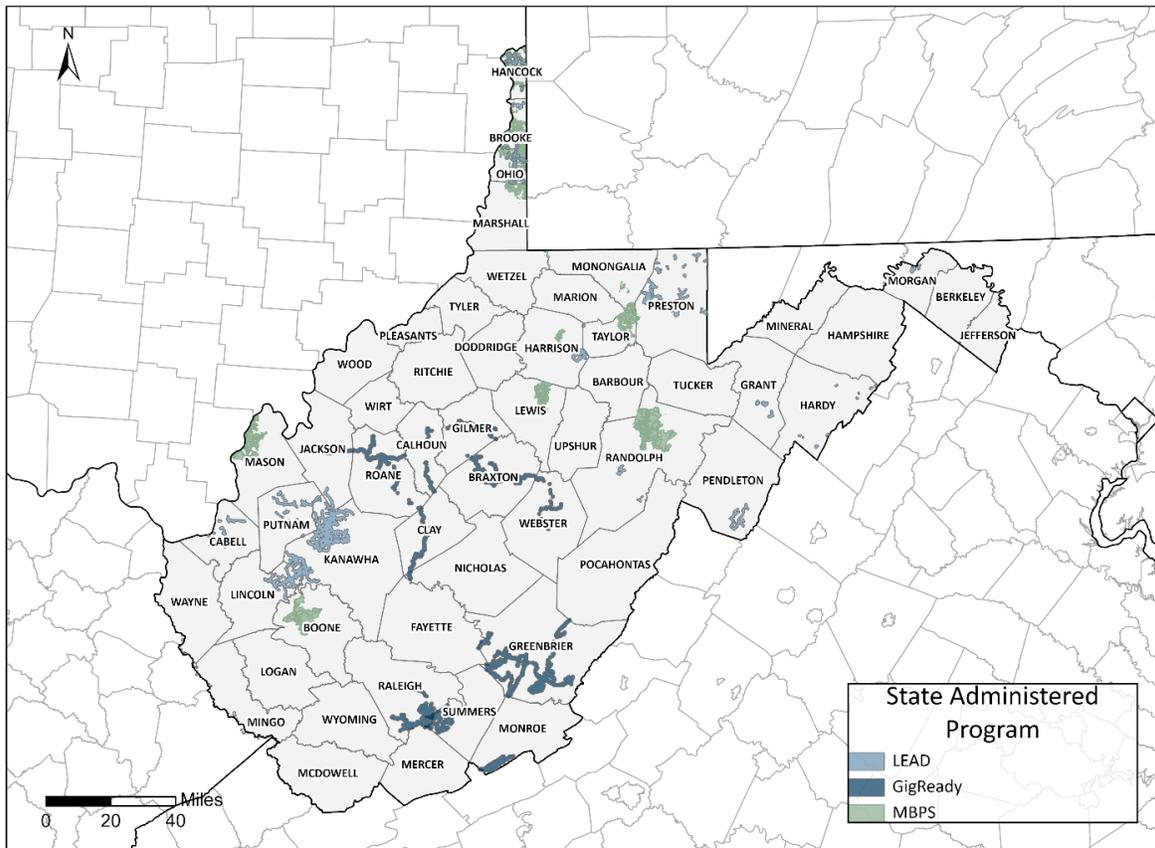
⁵⁴ ARC, Appalachian Regional Initiative for Stronger Economies (ARISE), Accessed April 10, 2023, <https://www.arc.gov/ARISE/>.

State-Administered Programs

The West Virginia Broadband Investment Plan (WVBIP) includes federally funded, but West Virginia administered, programs to expand broadband into unserved and underserved areas. These include GigReady, Major Broadband Project Strategies, and the LEAD programs. In addition, state funding is available for the Wireless Internet Networks (WIN) program. These existing programs complement the forthcoming infrastructure program developed for BEAD.

The geographic areas of the GigReady, Major Broadband Project Strategies, and LEAD programs are displayed in Figure 17 below. In line with the Governor’s Billion-Dollar Broadband Strategy effort, the WVBIP programs cover a larger geographic area than all but the federal RDOF program. LEAD, GigReady, and Major Broadband Project Strategies are described in detail below.

Figure 17: Funded Areas of State-Run Funding Programs



Source: WVDED

Line Extension Advancement and Development. The LEAD program awards competitive grants to internet service providers to expand their existing fiber and cable networks. During the first round of LEAD, applications were accepted in multiple batches from November 2021 through January 2022, with funding decisions made through early 2022. LEAD program projects must be completed within 12 months of being awarded, and projects in other categories must be

completed within 24 months of being awarded. All projects will be subject to continuous progress audits throughout their implementation to ensure early identification and correction of problems. For the second round of LEAD (i.e., LEAD2), WVDED accepted applications from February 2023 to March 2023.

To date, the State has provided \$53 million in funding to 20 projects across West Virginia. Table 21 indicates the number of BSL units covered under these LEAD grants by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note: BSL units both covered by LEAD and considered fully served may be a result of one of several activities, including but not limited to deployment activities by a LEAD-funded service provider, deployment activities by another service provider, or prior misclassification in the data.

Table 21: BSL Units Covered by LEAD Program

BEAD Service Type	BSL Units Count
Unserved – No Service	953
Unserved – Slow Service	11,009
Underserved	2,640

Source: WVDED

GigReady. West Virginia allocated more than \$500 million from the ARPA Local Fiscal Recovery Fund to local governments for both broadband and other projects. Many of these local governments chose to use these funds to invest in local broadband expansion. The GigReady program provides matching state funds for local governments that develop projects to pool their broadband investments. The state accepted applications on a rolling basis beginning in November 2021 and announced decisions throughout 2022. For the second round of GigReady (i.e., GigReady2), WVDED started accepting applications in May 2023 and will continue to do so through August 2023.

As of July 2023, the State provided \$41 million of funding to 5 projects. Table 22 indicates the number of BSL units covered under these GigReady grants by BEAD service type, as well as the share of BSL units under any funded program that this represents. Note: BSL units both covered by GigReady and considered fully served may be a result of one of several activities, including but not limited to deployment activities by a GigReady-funded service provider, deployment activities by another service provider, or prior misclassification in the data.

Table 22: BSL Units Covered by GigReady Program

BEAD Service Type	BSL Units Count
Unserved – No Service	1,004
Unserved – Slow Service	7,375
Underserved	1,868

Source: WVDED

Major Broadband Project Strategies. The Major Broadband Project Strategies program focuses on large-scale multicounty projects that require additional resources to achieve rapid implementation. On March 9, 2023, WVDED opened the second application window for Major Broadband Project Strategies, which is designed for projects that have received technical assistance through the GigReady program. WVDED supports the program through funds allocated to the State via the Capital Projects Fund and Local Fiscal Recovery Funds, both part of ARPA.⁵⁵ For the second round of Major Broadband Project Strategies, WVDED accepted applications from March 2023 to April 2023.

To date, the State has provided \$58 million in funding to 12 projects Table 23 indicates the number of BSL units covered under these Major Broadband Project Strategies grants by BEAD service type, as well the share of BSL units under any funded program that this represents. Note: BSL units both covered by Major Broadband Project Strategies and considered fully served may be a result of one of several activities, including but not limited to deployment activities by a Major Broadband Project Strategies-funded service provider, deployment activities by another service provider, or prior misclassification in the data.

Table 23: BSL Units Covered by Major Broadband Project Strategies Program

BEAD Service Type	BSL Units Count
Unserved – No Service	1,308
Unserved – Slow Service	5,888
Underserved	1,315

Source: WVDED

Wireless Internet Networks. The State allocated approximately \$10 million to the WIN Program to fund extensions or upgrades of existing last mile wireless broadband networks that can be constructed quickly. WVDED provided interested applicants with a set of targeted state parks and addresses, and it prioritized projects that benefited both at the same time. The application period ran from May to June 2022. As of July 2023, WVDED has provided nearly \$1 million in funding for two projects.

West Virginia Economic Development Authority (WVEDA) Broadband Loan Insurance Fund

Since 2018, West Virginia has provided incentives for investors to support the deployment of broadband infrastructure, through a non-lapsing fund administered by the WVEDA.

As outlined in W. Va. Code § 31-15-8, et seq, the **Broadband Loan Insurance Program** (BLINS) insures the repayment of debt on capital costs related to broadband service which is provided either:

⁵⁵ U.S. Department of the Treasury, Coronavirus State and Local Fiscal Recovery Funds, Accessed April 10, 2023, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-funds>.

U.S. Department of the Treasury, Capital Projects Fund, Accessed April 10, 2023, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/capital-projects-fund>.

- a) to unserved or underserved areas of the State
- b) by linking a segment of a network operator’s core network to a local network plant that serves an unserved area or an area with no more than two wireline providers

The BLINS program is essential to broadband expansion in West Virginia. One of the requirements of the RDOF process was for winning bidders to post a letter of credit with the FCC for up to 30% of the award amount to secure performance. To support this requirement, Governor Justice issued Executive Order (EO) 66-20 on September 3, 2020, pursuant to his authority to suspend statutory regulations during a state of emergency. EO 66-20 suspended the per-recipient and per-program dollar limits in the BLINS program and directed the WVEDA to make modifications to the BLINS program consistent with the EO.

The WVEDA, in consultation with the Council, completed modifications to its guidelines for the BLINS program, providing insurance to banks for letters of credit to winning RDOF bidders.

Statutory changes were implemented in the 2021 Legislative Session enabling the BLINS program to support applicants proposing broadband expansion in West Virginia using funds from RDOF and other federal programs.

Under the BLINS program prior to the Governor’s Executive Order, the WVEDA could insure up to 80% of a bank loan for a broadband infrastructure or development project. The insured portion could not exceed \$10 million and had a maximum term of 20 years. The WVEDA’s revised guidelines issued in November 2020, permit the BLINS program to insure up to 100% of a letter of credit, and the cap of \$10 million per recipient has been eliminated. This change will further encourage and support broadband projects.

Prior to the Governor’s Executive Order, the program required the certification of eligibility by the Council. Since the FCC and other federal programs have extensive vetting processes, the Council recognized this certification under a federal broadband expansion program.

Public notice is required for all projects, except those that plan to provide a downstream data rate of at least 1Gbps per second throughout the proposed project service area. The process for funding has detailed requirements for as-built plans, mapping, modifications, project completion, and closeout.

3.3.3 Existing Program Funding and Sources

Table 24 expands on the above and lists the existing broadband infrastructure programs and digital equity programs along with their allocation totals and sources of funding.

Table 24: Existing Broadband and Digital Equity Programs: Funding and Sources

Program	Total funding⁵⁶	Source
Rural Digital Opportunity Fund (RDOF)	\$362 million	FCC
Connect America Fund II Auction	\$12 million	FCC
USDA ReConnect	\$34 million	USDA
USDA Community Connect	\$10.9 million	USDA

⁵⁶ Total amount of funds awarded by the listed source.

Community Development Block Grant	\$6.3 million	HUD
Appalachian Regional Commission-POWER	\$11 million	ARC
Appalachian Regional Commission-North Central Appalachian Broadband	\$21 million	ARC
Appalachian Regional Commission-Central Appalachian Broadband	\$5.3 million	ARC
WVBIP: GigReady	\$65.25 million	U.S. Department of the Treasury
WVBIP: Major Broadband Project Strategies	\$70.25 million	U.S. Department of the Treasury
WVBIP: Line Extension Advancement and Development	\$60 million	U.S. Department of the Treasury
WVBIP Wireless Internet Networks	\$20 million	State of West Virginia
WVBIP: Unassigned	\$20.2 million	U.S. Department of the Treasury
Digital Equity Act: State Planning Grant	\$728 thousand	NTIA
Connecting Minority Communities Pilot Program	\$2.76 million	NTIA, U.S. Department of Commerce
Emergency Connectivity Program	\$33 million	FCC
NTIA Middle Mile Initiative AEP-APCO	\$25 million	NTIA
NTIA BIP Logan-Mingo Infrastructure Expansion	\$19.6 million	NTIA

3.3.4 Establishment of Broadband Cooperatives

The State of West Virginia also provides a statutory mechanism for residents, businesses, and political subdivisions in West Virginia who have no good options for internet service providers to create a cooperative association to address their community’s connectivity problems. These co-ops are authorized to establish a service provider focused on their communities, bond or finance the building of infrastructure, and engage in other related activities (W. Va. Code § 31G-2-1 *et seq.*).

To assist communities considering this option, the West Virginia University Entrepreneurship & Innovation Law Clinic has developed a Broadband Toolkit.⁵⁷ The Toolkit contains a diagram detailing options for broadband network development in West Virginia.⁵⁸ The Broadband Enhancement Council will continue its partnership with the Law Clinic to assist communities in the formation of cooperatives. Communities pursuing this option are encouraged to contact the Broadband Enhancement Council for additional information.

3.3.5 Partners

Throughout the development of the Five-Year Action Plan and Digital Equity Plan, WVDED engaged with and solicited feedback from a wide range of partners. These partners included organizations already

⁵⁷ Broadband in West Virginia Toolkit, West Virginia University, <https://landuse.law.wvu.edu/resources/broadband-in-west-virginia-toolkit>

⁵⁸ *Ibid.*

engaged in issues related to broadband deployment and digital inclusion, such as local governments, institutions of higher education, school systems, faith-based organizations, foundations, and more. Table 25 offers a non-exhaustive list of these partners and their roles in broadband deployment or adoption.

Table 25: List of Partners and Their Current or Planned Role in Broadband Deployment and Adoption

Partner	Current or planned role in broadband deployment and adoption
AARP West Virginia	Steering Committee member and offer feedback on Digital Equity Plan
Appalachian Prison Book Project	Offer insights related to the digital skills levels of incarcerated individuals
Appalachian Regional Commission	Act as a key partner, and potential source of funding, for a variety of broadband deployment projects; member of the Workforce Development Council
Bel-O-Mar Regional Council	Subgrantee for the purpose of community engagement and gathering feedback
Black by God	Provide feedback and information relevant to the deployment of broadband and digital equity activities for persons of color
Blue Ridge Community and Technical College	Member of the Workforce Development Council
Brooke-Hancock Regional Council	Subgrantee for the purpose of community engagement and gathering feedback
Chancellor of the Community and Technical College System	Member of the Workforce Development Council
Citynet	Exchange information on challenge and considerations for broadband deployment in West Virginia; member of the Workforce Development Council
Comcast	Exchange information on challenge and considerations for broadband deployment in West Virginia
Communications Workers of America	Member of the Workforce Development Council
Community and Technical College Systems of West Virginia	Members of the Workforce Development Council
CyberGenerations	Provide information on existing digital equity programs related to aging individuals
Eastern Panhandle Regional Planning and Development Council	Subgrantee for the purpose of community engagement and gathering feedback
Eastern West Virginia Community & Technical College	Member of the Workforce Development Council
Frontier	Exchange information on challenge and considerations for broadband deployment in West Virginia
Gassaway Public Library	Offer insights related to broadband deployment at CAIs
Generation West Virginia	Steering Committee member and offer feedback on Digital Equity Plan

GigaBeam Networks	Exchange information on challenge and considerations for broadband deployment in West Virginia
Innovative Community Solutions (ICS)	Covered populations outreach
Marshall University, Center for Business and Economic Research	Member of the core planning team
Mary H. Weir Public Library	Offer insights related to broadband deployment at CAIs
Micrologic, Inc.	Exchange information on challenge and considerations for broadband deployment in West Virginia; member of the Workforce Development Council
Mid-Ohio Valley Regional Council	Subgrantee for the purpose of community engagement and gathering feedback
Morgantown Public Library System	Offer insights related to broadband deployment at CAIs
Mountain State Educational Services Cooperative	Community outreach
Multiple Senior Centers	Provide information on existing digital equity programs related to aging individuals
National Digital Inclusion Alliance	Provide feedback and information relevant to the deployment of broadband and digital equity activities
National Electric Contractors Association (West Virginia/Ohio Valley Chapter)	Member of the Workforce Development Council
New River Community and Technical College	Member of the Workforce Development Council
Other Public Libraries	Offer insights related to broadband deployment at CAIs
Pierpont Community & Technical College Center for Workforce Education	Member of the Workforce Development Council
Prodigi dba Digital Connections	Exchange information on challenge and considerations for broadband deployment in West Virginia
Putnam County Library System	Offer insights related to broadband deployment at CAIs
Randolph County Development Authority	Member of the Workforce Development Council
Region 10 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 11 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 2 Planning & Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 3 Planning & Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 4 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 5 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED

Region 6 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 7 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 8 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region 9 Planning and Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Region I Planning & Development Council	Conduct listening sessions with constituents and provide details and feedback to WVDED
Regional Intergovernmental Council	Subgrantee for the purpose of community engagement and gathering feedback
Regional Optical Communications, Inc.	19 county consortium focused on the planning and collaboration to improve broadband within the region
Rural Business Users	Member of the Broadband Enhancement Council
Rural Residential Users	Member of the Broadband Enhancement Council
Southern West Virginia Community and Technical College	Member of the Workforce Development Council
StartUp West Virginia	Member of the core planning team
State of West Virginia Governor's Office	Member of the Workforce Development Council
Suddenlink/Optimum	Exchange information on challenge and considerations for broadband deployment in West Virginia
The Thrasher Group	Member of the core planning team
Three Sixty Strategies, LLC	Member of the Workforce Development Council
Tilson Technology	Member of the core planning team
U.S. Department of Labor	Member of the Workforce Development Council
Urban Business Users	Member of the Broadband Enhancement Council
Urban Residential Users	Member of the Broadband Enhancement Council
Users of a Large Amount of Broadband Service	Member of the Broadband Enhancement Council
West Virginia Broadband Enhancement Council	Steering Committee member; the West Virginia Office of Broadband exists as an extension of the WVBEC and its mandate, yet the Office of Broadband is a separate entity
West Virginia Department of Commerce	Member of the Workforce Development Council
West Virginia Department of Education	Provide feedback and information relevant to the deployment of broadband and digital equity activities
West Virginia Library Association	Steering Committee member and offer feedback on Digital Equity Plan
West Virginia University at Parkersburg	Member of the Workforce Development Council
West Virginia University, Data Driven WV	Member of the core planning team

West Virginia Broadband Enhancement Council	Member of the Workforce Development Council
West Virginia Department of Economic Development	Member of the Broadband Enhancement Council
West Virginia Department of Education	Member of the Broadband Enhancement Council
West Virginia Department of Education - Career Technical Education	Member of the Workforce Development Council
West Virginia Department of Veterans Assistance	Member of the Workforce Development Council
West Virginia Herbert Henderson Office of Minority Affairs	Member of the Workforce Development Council
West Virginia Higher Education Policy Commission	Member of the Workforce Development Council
West Virginia House of Delegates, Republican and Democratic Parties	Member of the Broadband Enhancement Council
West Virginia NAACP Chapters	Provide feedback and information relevant to the deployment of broadband and digital equity activities for persons of color
West Virginia Northern Community College	Member of the Workforce Development Council
West Virginia Office of Technology	Member of the Broadband Enhancement Council
West Virginia Senate, Republican and Democratic Parties	Member of the Broadband Enhancement Council
West Virginia University	Member of the Workforce Development Council
Workforce Development Board of Kanawha County	Member of the Workforce Development Council
Workforce WV	Member of the Workforce Development Council
WVCTA - The Internet and Television Association	Member of the Workforce Development Council

4. Obstacles or Barriers

Throughout the information collection phase of both the BEAD and Digital Equity programs, WVDED uncovered an abundance of barriers to both closing the digital divide and deploying broadband infrastructure across the State. WVDED categorized these obstacles and barriers into distinct 9 subject areas:

1. Legislative and regulatory barriers
2. Labor shortages
3. Supply chain issues
4. Materials availability
5. Industry participation
6. Lack of local digital inclusion programs/expertise
7. Topography
8. Digital literacy
9. Procurement or contracting issues

Of these nine subject areas, the “legislative and regulatory barriers” and “labor shortages” categories stood out as policy areas where the State could have some of the greatest direct impact and use momentum gained from this process to implement long-term statewide change. To that end, these two sets of barriers constitute the most extensively covered subject areas in this section.

The barriers discussed in this section were identified through formal meetings with internet service providers and research conducted by WVDED. For example, Section 4.1 discusses the legislative and regulatory barriers faced by service providers, combining concerns raised by service providers with research conducted by experts in the field. Each subsection provides an overview of the issues at hand as well as options that WVDED and the State could pursue. WVDED provides a full list of proposed solutions in Section 5.

To allow internet service providers to speak freely, WVDED agreed to the equivalent of Chatham House Rules during its meetings with providers: both parties could use information provided by one another freely provided no attribution was given.

4.1 Legislative and Regulatory Barriers

The regulatory requirements under which a company operates greatly shape its ability to deploy broadband infrastructure. Congress, via the Communications Act of 1934—as amended by the Telecommunications Act of 1996—established the FCC to broadly oversee wired and wireless communications services, including broadband. While the FCC provides certain regulations, states have the ability to implement far more regulations that impact broadband infrastructure deployment, and these often can supersede FCC regulation. West Virginia is, of course, no exception in this matter.

This section assesses the five most pertinent areas in which West Virginia affects the fixed broadband environment through regulation and then discusses ways to comply with such requirements. This section provides an overview of each regulation in the State, an overview of best practices, and recommendations. The areas of focus include the following:

1. Broadband Enhancement and Expansion Policies, Pole Attachment Regulations & Utility Agreements
2. Railroad Crossings
3. Local Rights-of-Way & Franchise Agreements
4. Division of Highways-Access to Right of Way
5. Private Property Land Use

Summary of the findings. West Virginia’s current regulatory environment is conducive to amendments that speed deployment of broadband.

4.1.1 Broadband Enhancement and Expansion Policies

West Virginia’s current broadband policy outlined in W. Va. Code §31G proactively addresses the types of roadblocks that are often faced throughout the broadband deployment process. This is accomplished in three primary ways:

1. **State Code establishes that broadband operators have the authority to construct broadband systems both over public rights of way and through easements** that are dedicated for compatible uses. The specific inclusion of easements for similar uses, such as gas, phones, or utility transmission further defines the rights of operators.⁵⁹ There is thus little room for argument over areas where broadband deployment can or cannot take place.
2. **State Code addresses preemption head-on.** By addressing the preemption of both local ordinances *and* the rules and regulations of corporations and entities such as HOAs, West Virginia makes the authority to deploy infrastructure and other associated equipment for broadband development explicit.
3. **West Virginia has empowered local jurisdictions to enable microtrenching.** Microtrenching is a useful construction process when a new attacher cannot get access to either existing poles or conduit.⁶⁰

West Virginia’s Broadband Enhancement and Expansion Policies also establish the West Virginia Public Service Commission as the entity with authority to administer and adjudicate disputes that arise under the policies. This therefore allows broadband developers to access the processes and procedures outlined in WV CSR Title 150.⁶¹

Best Practices and Gaps

West Virginia’s current policy encourages broadband investment. It explicitly and effectively establishes the State’s position that broadband deployment is of critical importance. By addressing typical roadblocks to deployment, such as the types of entities which should have access to the Rights-of-Way and easements, as well as explicitly preempting local ordinances and private regulations that hinder infrastructure, there is little room for obstructions to broadband deployment.

⁵⁹ W. Va. Code §31G-3-4 (1)-(2).

⁶⁰ W. Va. Code §31G-3-2.

⁶¹ WV CSR Title 150: <https://regulations.justia.com/states/west-virginia/agency-150/title-150/series-150-01/> (last visited 5.17.2023).

4.1.2 Pole Attachment Regulations & Utility Agreements

Integral to broadband network expansion, pole attachment regulations can provide a defined process to attach poles owned by electric or telecommunications utilities. As noted by NTIA, pole attachment regulations “...are a potential barrier to entry if they make a proposed project economically nonviable, particularly in unserved rural areas.”⁶²

Over the years, attachers have sought to improve this process. At the federal level, the FCC issued the One Touch Make Ready (OTMR) order in 2018, which set out rules to streamline the make-ready and attachment processes.⁶³ However, FCC regulations only apply to so-called “FCC states.”⁶⁴ States are permitted to reverse-preempt federal regulations and adopt comparable regulations. West Virginia’s Public Service Commission has adopted rules addressing the pole attachment application process, including detailed deadlines for distinct steps, and a complaint process modeled on the FCC’s pole attachment complaint process. Under the West Virginia Public Service Commission’s pole attachment complaint process, an attacher can have the Public Service Commission adjudicate the reasonableness of a pole owner’s decision to approve, reject, or approve subject to conditions a pole attachment application, and the reasonableness of the charge proposed by the pole owner. The Public Service Commission made revised Rules for the Government of Pole Attachments effective as of January 13, 2023.

The Public Service Commission of West Virginia opened a “show cause” proceeding on its own initiative in 2022 to eliminate the practice of the State’s largest electric utility and its largest incumbent local exchange carrier which had been requiring pole attachers to make applications to both entities separately for poles that were jointly used by the ILEC and the electric utility. In June, 2023, the Public Service Commission approved a Joint Stipulation by the electric utility, the ILEC, and several intervening broadband providers which eliminated the dual application process, replacing it with a single application to be made to the electric utility, and establishing distinct deadlines for steps to be taken by the electric utility in responding to an application to attach.

W. Va. Code §31G also addresses pole access., W.Va. Code §31G-6-2 preempts local government pole attachment ordinances in favor of broadband service for pole attachments. Furthermore, §31G-6-2(b) states explicitly that the pole attachment policies of Investor-Owned Utilities, Incumbent Local Exchange Carriers, and Competitive Exchange Carriers will be “strictly construed in favor of encouraging and assisting broadband installation and deployment.”⁶⁵

West Virginia’s pole attachment regulations are comparable to those at the FCC and have similar OTMR timeframes.⁶⁶ Regarding make-ready charges, pole owners must provide detailed estimates on a pole-by-pole basis and:

⁶² NTIA, *Broadband Policies & Mechanisms, A Guide for States and Localities*, <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-04/Broadband%20Policies%20Mechanisms%20PDF.pdf>.

⁶³ FCC, <https://docs.fcc.gov/public/attachments/FCC-18-111A1.pdf>.

⁶⁴ FCC, Public Notice, DA 22-630 (06.13.2022), <https://www.fcc.gov/document/states-have-certified-they-regulate-pole-attachments-3> (last visited 2.10.2023).

⁶⁵ W. Va. Code §31G-6-2.

⁶⁶ W.VA Code R. §150-38-10.

“...may not charge a new attacher to bring poles, attachments, or third-party equipment into compliance with current published safety, reliability, and pole owner construction standards guidelines if such poles, attachments, or third-party equipment were out of compliance because of work performed by a party other than the new attacher prior to the new attachment.”⁶⁷

While pole attachment regulations set a framework for attaching, companies must negotiate pole attachment agreements directly with pole owners. These agreements must comply with state regulations, and if a pole owner refuses to negotiate in good faith and/or follow the regulations, a company may file a complaint with the Public Service Commission, even before it has an agreement with the pole owner.⁶⁸

Best Practices and Gaps

While West Virginia’s current statutes and rules addressing pole attachments are conducive to the deployment of broadband infrastructure, in practice there is still some room for potential roadblocks. One of these areas relates to make-ready cost recovery: West Virginia’s Pole Attachment Rule is explicit that new attachers should not be responsible for the costs to replace an already failing pole. There is a mechanism to address disputes like these via the Public Service Commission’s FCC-modeled dispute resolution process under the Public Service Commission’s Pole Attachment Rules.⁶⁹ The Public Service Commission’s Pole Attachment Rules require that pole owners provide a “detailed, itemized estimate” of make ready charges to attachers.⁷⁰

4.1.3 Railroad Crossings

In some cases, internet service providers must build across railroad crossings or run lines parallel to them. Railroad crossings are a common source of delay for broadband deployments—so much so that multiple internet service providers raised it as a concern during meetings with WVDED. While W. Va. Code §31G-3-4 (d)(4) states that broadband railroad crossings should be treated the same as any other utility, however, providers suggested that the delays from building through railroad crossings were atypical. These include approval timelines and potentially exorbitant fees. For example, the initial application fee for a parallel encroachment for OmniTrax, which manages the Winchester and Western Railroad company, is \$5,000.00⁷¹. If an entity wants to place a “rush” on their application and have it reviewed within thirty days, an additional fee of \$1,500.00 is required.⁷² The actual crossing licenses can be exponentially higher. Depending on the number of crossings or encroachments associated with the broadband deployment, these fees can add up quickly.

Some railroad companies have sought to improve the process and provide increased transparency. In a meeting with WVDED, CSX noted that it had created an online portal for entities seeking railroad crossing permits, including internet service providers.⁷³ In cases where entities are flagged as seeking many

⁶⁷ 150 CSR 38 §10.4.4.

⁶⁸ 150 CSR 38 §4.4, see also, 150 CSR 1 §6.

⁶⁹ <https://regulations.justia.com/states/west-virginia/agency-150/title-150/series-150-01/section-150-1-10/> (last visited 2.6.2023)

⁷⁰ W.VA Code R. §150-38-10(4)

⁷¹ <https://omnitrax.com/track-access/> (last visited 5.18.2023, reference Underground Wire Line Crossing or Parallelism Application)

⁷² *Id.*

⁷³ Meeting between WVDED and CSX on July 12, 2023.

permits, CSX pursues a master agreement to expedite the process in the future. It has also sought to educate internet service providers about the time requirements to approve a permit and schedule inspectors and flaggers. Regarding costs, CSX noted that it typically charges two fees: an application fee and a lump sum. The lump sum fees in part incentivize applicants to bundle their requests, and they cover costs for engineers to review the applications, application portal development and maintenance costs, and more.

Best Practices and Gaps

West Virginia could establish a “reasonable compensation” standard with respect to the fees a railroad can charge for encroachments.⁷⁴ While this standard may be difficult to enforce in practice, inclusion within the statute would provide a clear benchmark to be utilized if disputes arise.

Because railroads are federally regulated, West Virginia is somewhat limited in its ability to address the roadblocks in this arena. However, the House Energy and Commerce Committee is actively working to reduce barriers to broadband deployment, including in the area of railroad policies, and there are likely more developments to come in future sessions.

4.1.4 Local Rights-of-Way & Franchise Agreements

West Virginia does not prohibit local jurisdictions from requiring a franchise agreement for the placement of poles, wires, cables, guy lines, stays, or related paraphernalia in the jurisdiction’s public places.⁷⁵ A franchise agreement can be a useful tool to outline the scope of a developer’s work, but the time required to negotiate and obtain final approval from the local governing body can also induce serious delays on a project.

Best Practices and Gaps

Establishing a state-recommended franchise template for municipalities could streamline the agreement approval process. By creating a standardized form that addresses typical deployment scenarios, including construction methods, application fees, and documentation, all parties will know what to expect when approaching a municipality with a new development project.

4.1.5 Division of Highways-Access to Right of Way

The West Virginia Department of Transportation, Division of Highways (WVDOH), is the governing authority for all work completed within State rights-of-ways. WVDOH’s Right of Way Manual was recently updated in 2021 but does not specifically address broadband deployments. WVDOH’s Accommodation of Utilities Manual was last updated in 2007 and does not specifically address broadband.

Best Practices and Gaps

Internet service providers have noted that streamlined permitting is essential to meeting the magnitude of construction anticipated under BEAD. Because most rural broadband expansion relies on access to the right of way, communication and planning between the industry and the WVDOH can improve efficiency

⁷⁴ For example, the state of Vermont has language in their statute that similarly addresses the equal treatment of broadband facilities and wireless telecommunications, but also implements this standard. See 30 V.S.A. § 2513.

⁷⁵ State Law reference— Granting of franchises, W. Va. Code § 8-31-1; compelling compliance with franchise obligations, W. Va. Code § 8-31-2. <https://code.wvlegislature.gov/8-31-1/> & <https://code.wvlegislature.gov/8-31-2/> (last visited 2.6.2023)

and maximize shared benefits. Having thorough, clearly defined rules and regulations not only manages expectations for broadband deployers, but also streamlines the approval process within WVDOH.

Additionally, some internet service providers expressed interest in WVDOH providing greater access to the roadway median for broadband deployment. WVDOH may facilitate this through resource sharing. For instance, if WVDOH or other entities plan on performing maintenance of any kind in the median, providers could use this as an opportunity to deploy fiber at the same time.

The ability to coordinate conduit installation with planned highway projects is considered a best practice. While WVDOH issues its Statewide Transportation Investment Plan (STIP) for public comment, intentional collaboration with internet service providers would provide opportunities for collaborative development initiatives, particularly in areas that lack broadband or in areas of economic interest. The State of Utah is a model for collaboration between the state and industry that has created significant opportunities to expand broadband infrastructure.

The Office of Broadband has allocated BEAD Planning funds to the creation of a “Guide to Broadband Development in West Virginia.” This guide will incorporate the current permitting process while providing a roadmap to recommendations for improvement.

In addition, the Office of Broadband has allocated BEAD Planning funds to the evaluation of middle mile expansion policies within West Virginia. This study is more fully described in Section 4.4.

To maximize cooperation among state agencies, West Virginia has established an IJA Inter-Agency Working Group, led by the Governor’s Office and WVDOH. The purpose of this working group is to facilitate communication among state agencies as they implement IJA funded programs across state government.

4.1.6 Private Property Land Use

Broadband infrastructure is typically placed in public rights-of-way but may also be placed on private property, fiber huts, and towers. West Virginia does not control private property at the state level, for the most part, but rather empowers local jurisdictions—cities and counties—to regulate the use of private property within their jurisdictions.^{76, 77} As such, land use planning and permitting duties fall largely on local governments.

Only a small percentage of local governments currently have land use and zoning laws in place. For example, out of the 55 counties in the State, approximately eight have zoning regulations.⁷⁸ Likewise, relatively few municipalities enforce zoning. Zoning that regulates telecommunications typically involves aesthetic controls. Examples of aesthetic controls include regulation of the placement of macrocell towers and small wireless facilities, collocation, and concealment of such facilities. The discussion below detailing regulation is excerpted from “[The Broadband in West Virginia Toolkit](#)”:

⁷⁶ See, e.g., West Virginia Code §31H-1-1 (the regulation of small cells); West Virginia Code §31G-6-1 (the regulation of satellites).

⁷⁷ West Virginia Legislature, West Virginia Code (W. Va. Code) §8A-7-1., 2020

⁷⁸ See collection of known local ordinances at <https://landuse.law.wvu.edu/projects/local-ordinances>

Local governments retain the ability to regulate the installation, location, and placement of **macrocell telecommunications towers, antennas, and related facilities** through zoning. More specifically, a local government may include restrictions on height, fencing, setback, screening, painting, type of tower, concealment, and landscaping in their zoning ordinance.

Local governments may require **collocation** of macrocell facilities to ensure new antennas locate on existing towers where feasible and that new towers are designed to accommodate multiple providers. Additionally, local governments may require proof that a proposed antenna cannot be accommodated on an existing tower before permitting a new tower to be constructed.

Another example of regulation is the use of design guidelines for **small wireless facilities**. Also known as “small cells” or “5G,” these facilities have higher data speeds while utilizing smaller facilities. Small cells are also typically situated more closely together than macrocell telecommunication facilities. Local design guidelines may require the coordination and matching of the aesthetics and character of a proposed small wireless facility to the immediate area. Design guidelines can include location, appearance, and concealment requirements. These requirements must be reasonable, published in advance, and no more burdensome than what is placed on similar infrastructure. Specifically, design guidelines for small wireless facilities may require:

- a. camouflaging to mimic surrounding structures and poles
- b. painting to match poles
- c. locational requirements that enable safe operation of traffic control equipment or streetlights
- d. not displaying commercial signs⁷⁹

For all regulations, local government must be careful not to impose different requirements on different providers, actually or effectively ban wireless services, regulate based on the effects of radio frequency emission inconsistent with FCC regulations, unreasonably delay review of applications, or fail to provide written and reasoned denials when applicable.⁸⁰

Worth noting, some private and public property may not be subject to current zoning regulations. Generally, land, buildings, and structures existing at the time of zoning adoption or amendment are not impacted and are considered “grandfathered”. This is appealing to businesses. However, there are circumstances when grandfathered or nonconforming structures or uses may be subject to zoning, such as when expanding or enlarging.⁸¹

For more information on local regulation, a separate toolkit, "[The Broadband in West Virginia Toolkit](#)," introduces legal issues relevant to local governments and local government partners seeking to expand broadband access. This resource provides examples of a [Macrocell Ordinance](#) and a [Small Cell Ordinance](#) for local governments in West Virginia. The toolkit also provides a [Guide to West Virginia Broadband Cooperatives](#).

⁷⁹ See <https://landuse.law.wvu.edu/resources/broadband-in-west-virginia-toolkit>

⁸⁰ 47 U.S.C. § 332(c)(7)(B)

⁸¹ W. Va. Code §8A-7-10. Effect of enacted zoning ordinance. Nonconformities

<https://landuse.law.wvu.edu/files/d/24058fbb-870e-425f-ae2a-8d598c4c9bf5/2019-07-11-nonconformities.pdf>

West Virginia historically has had a laissez-faire approach to zoning, consistent with other concerns against regulation, especially regulation of business. However, there is great variation in local land use regulation by jurisdiction. While some municipalities seek to regulate the impact of broadband on aesthetic or historical aspects of their community, the prevailing sentiment across the State is that local governments and individuals alike are interested in broadband expansion and less inclined to enact regulations that inhibit broadband infrastructure.⁸²

Best Practices and Gaps

West Virginia may not have the zoning barriers seen in other states, but careful evaluation of local code is necessary regardless. Where the installation or expansion of a broadband network is desired, developers should first evaluate if any private or public property is required. If so, the next steps are to find (a) a willing landowner and (b) land where the desired use is permitted under the local zoning ordinance.

Second, developers can begin negotiating a lease but should not commit until all necessary permits are obtained from the local jurisdiction. Third, once a company has approval to use the land as intended from the local jurisdiction, it can sign a lease with the landowner and take possession as specified in the lease. A qualified attorney should be obtained for assistance with a particular set of facts or legal issues regarding questions around zoning and local permitting.

4.1.7 Local Permitting Delays

During WVDED’s meetings with internet service providers, some concern about delays induced by the local permitting processes was expressed.⁸³ These local permits can include encroachment, building in the ROW, and general building permits. This is especially an issue for larger—typically national—providers that rapidly deploy large amounts of infrastructure. With so many permitting requests coming in at once, local municipalities become quickly overwhelmed—this creates a backlog. Both of the large service providers that voiced this concern had even offered to provide some jurisdictions with additional funding to hire additional staff to process the permit requests faster. Understandably, due to potential conflicts of interest and other unspecified reasons, these governments turned down such requests.

Best Practices and Gaps

When WVDED launches its grant program to distribute BEAD funding, local municipalities will undoubtedly be inundated with even more permitting requests, further exacerbating the situation. While these local governments have the authority to choose their response to this, WVDED can offer assistance. For instance, WVDED has some funds available via ARC that it is considering distributing through grants for smart city upgrades. As a part of this, WVDED may offer municipalities the opportunity to apply for funds related to expanding capacity, including permitting capacity. Additionally, governments may choose to dedicate additional funding for expanding capacity on their own with the understanding that they will expedite delivery of services in their jurisdictions if they approve permits faster.

⁸² Interview with Jared Anderson; West Virginia Code §31G-6-1 (The state codified this sentiment towards broadband in 2021).

⁸³ WVDED, “Interviews with ISPs for BEAD and Digital Equity,” Between April 17 and May 15, 2023.

4.1.8 Other

Dig Once

Based on WVDED's experience and findings, the State's Dig Once policy appears to provide little material benefit. Due to the complexity associated with shared infrastructure deployment, there are few significant instances of trenches being shared that can be attributed to the Dig Once program. The program may require modifications to be more effective in achieving this goal.

As part of its BEAD planning process, WVDED has initiated a Broadband Middle Mile Infrastructure Study (Middle Mile Study) for the State of West Virginia, more fully described in Section 4.4. As a component of broader goals, the study will incorporate a review of existing Dig Once policies.

National Environmental Regulations

An internet service provider recently shared its experience attempting to erect aerial cables on existing poles that cross through a national forest. Despite using existing poles with cables already running over them, the internet service provider had to go through the entire environmental review as prescribed by the National Environmental Policy Act. The internet service provider started its environmental review process in 2019 and it only cleared around early 2023. The Federal Government should consider expediting this process by fast-tracking construction in cases where there are no new major deployments.

4.2 Workforce Obstacles & Barriers

For West Virginia to achieve internet for all, it will need a well-trained, highly skilled workforce of broadband industry professionals spanning many disciplines. The Fiber Broadband Association predicts that the fiber industry will need to fill more than 205,000 new jobs to maintain and operate the networks being built over the next five years.⁸⁴ More immediately, the nation faces a serious shortage of trained fiber-optic installers and front-line electrical workers, as well as network and cybersecurity professionals.⁸⁵

This shortage stems from a combination of a tight labor market nationally, a skills gap, and a shortage of standardized training and credentialing for fiber optic technicians.⁸⁶ Policymakers and employers nationwide continue to grapple with these challenges. According to an FCC broadband workforce working group, employers report that absorbing the costs of both in-house and external training while bearing the risk of losing newly trained employees to competition presents one of their biggest challenges.⁸⁷

⁸⁴ Fiber Broadband Association (FBA)

⁸⁵ Telecommunications Interagency Working Group Report January 2023

⁸⁶ *ibid* FBA

⁸⁷ FCC's Broadband Infrastructure Deployment Job Skills and Training Opportunities Working Group report, 2020. Accessed at: <https://bit.ly/FCCWorkingGroup>

West Virginia’s workforce is generally older, but is also known for its loyalty. Like many states, West Virginia is addressing challenges related to mental health,⁸⁸ substance abuse,⁸⁹ a lack of public transportation options⁹⁰, and incarceration⁹¹. These challenges require an innovative approach and continuous emphasis on the ability to train, attract, and retain a sufficient workforce pool in West Virginia. Projected increases in demand for skilled labor are intensified by the BEAD program and other large-scale federal and state infrastructure investments. However, these requirements represent significant employment advantages throughout West Virginia.

The remainder of this section examines the direction and impact of West Virginia’s workforce trends across the following metrics: population growth, workforce participation, unemployment rate, labor turnover and job openings, comparative wages in selected occupations, degree attainment, physical and mental health challenges, and incarceration rates.

4.2.1 Workforce Demographics

A growing population is often a proxy for a booming state economy—as an economy grows, people from across the country choose to move there to create or fill new jobs. Conversely, a declining population serves as both an indicator of and catalyst for economic decline. As the pool of available workers shrinks, people do not see as much economic opportunity in the State, causing them to leave and further the trend. For West Virginia, the decline of certain economic sectors in specific regions of the State is more acute, and more heavily influences the overall percentages. This overall trend indicates that the population has been declining since 2013, as shown below in Figure 18.

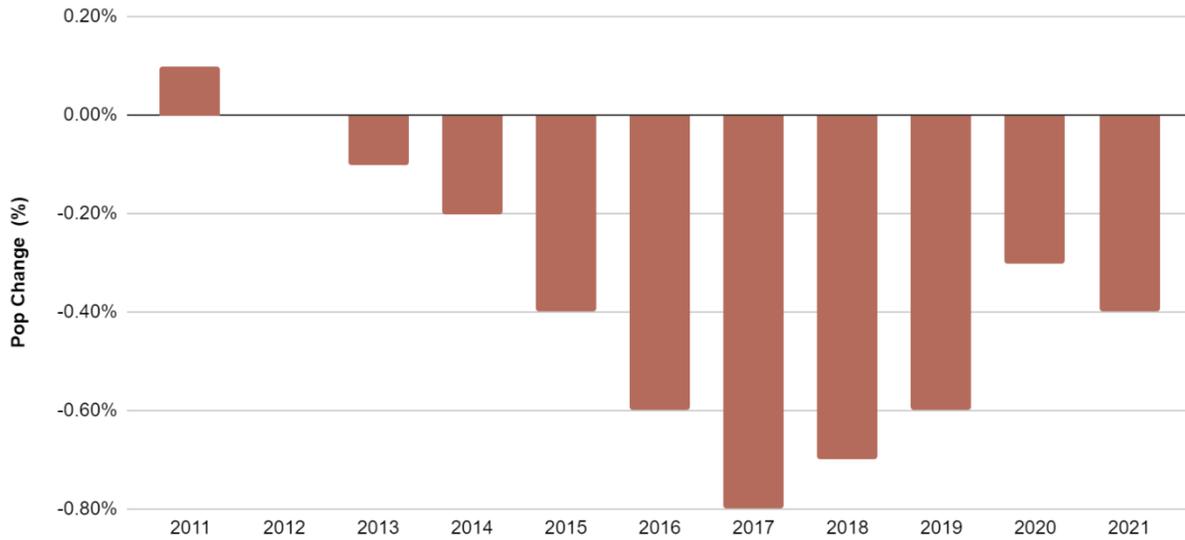
⁸⁸ As an example, the share of adults reporting symptoms of anxiety and/or depressive disorder estimated from February 1 to 13, 2023, was 38% in West Virginia and 32.3% in the United States, according to a KFF analysis of U.S. Census Bureau, Household Pulse Survey, 2023. KFF, “Mental Health in West Virginia” <https://www.kff.org/statedata/mental-health-and-substance-use-state-fact-sheets/west-virginia/>, accessed July 19, 2023.

⁸⁹ Between February 202 and February 2023, West Virginia experienced a predicted 1,409 drug overdose deaths. Centers for Disease Control and Prevention, “Provisional Drug Overdose Death Counts” <https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm>, accessed on July 19, 2023

⁹⁰ Using data from 2019 to focus on pre-COVID-19 pandemic data, according to the United States Bureau of Transportation, 4.96% of all individuals in the United States relied on public transportation to commute to work whereas only 0.79% of West Virginians did. While this is not fully indicative of a lack of public transportation options, it demonstrates a lack of utilizations.

⁹¹ West Virginia’s incarceration rate per 100,00 people in 2020 was 340, 27th in the nation. National Institute of Corrections, “State Statistics Information” <https://nicic.gov/resources/nic-library/state-statistics>, accessed July 19, 2023.

Figure 18: West Virginia Population Change per Year



Source: United States Census, American Community Survey, B01003

As the average age of West Virginians increases, the pool of available workers in the labor force may contract in the coming years. In 2021, West Virginia’s median age was approximately 42.6, more than four years older than that of the average American (at 38.4 years old).⁹² This is illustrated in Table 26. A population skewed older and closer to retirement creates looming workforce challenges as a large portion of the population will exit the labor force without an immediate replacement.

Table 26: Age and Working Age Characteristics for West Virginia and the United States, 2019 and 2021

		2019	2021
West Virginia	Median Age	42.5	42.6
	Population Age 15-64	1,160,355	1,140,496
	Pct Population Age 15-64	63.9%	63.3%
	Pct Working Population 55-64	22.6%	22.6%
United States	Median Age	38.1	38.4
	Population Age 15-64	213,061,574	215,492,484
	Pct Population Age 15-64	65.6%	65.4%
	Pct Working Population 55-64	19.6%	19.9%

Source: American Community Survey. ACS 2021 Five-Year Estimates Subject Tables. S0101

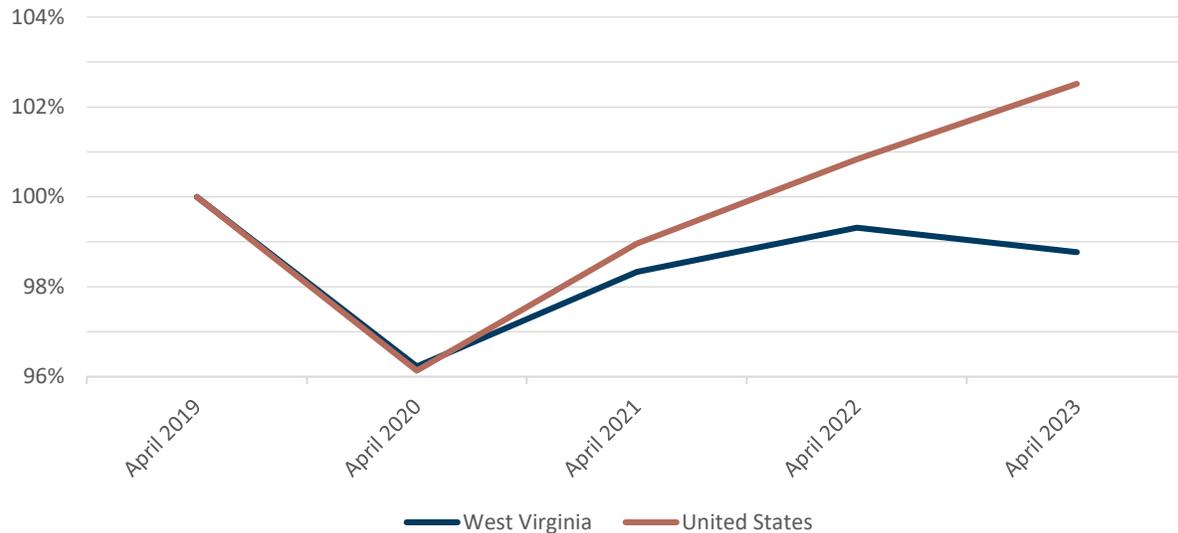
Digging deeper, the “civilian labor force” provides additional information only on the pool of potential workers and employees.⁹³ Figure 19 (below) displays the size of the civilian labor force as a percentage of the size in April 2019. As can be seen, both West Virginia and the United States’ civilian labor force

⁹² American Community Survey. ACS 2021 Five-Year Estimates Subject Tables. S0101

⁹³ For the purposes of this report, the civilian workforce is defined as all working-age persons in the civilian noninstitutional population classified as either employed or unemployed seeking employment.

declined by roughly 4% from April 2019 to April 2020, coinciding with the beginning of the COVID-19 pandemic. As the nation began to recover from the COVID-19 pandemic, West Virginia began to fall farther and farther behind. As of April 2023, overall civilian labor force participation in the United States exceeds pre-pandemic levels by approximately 3%, while West Virginia has begun to decline relative to April 2019.

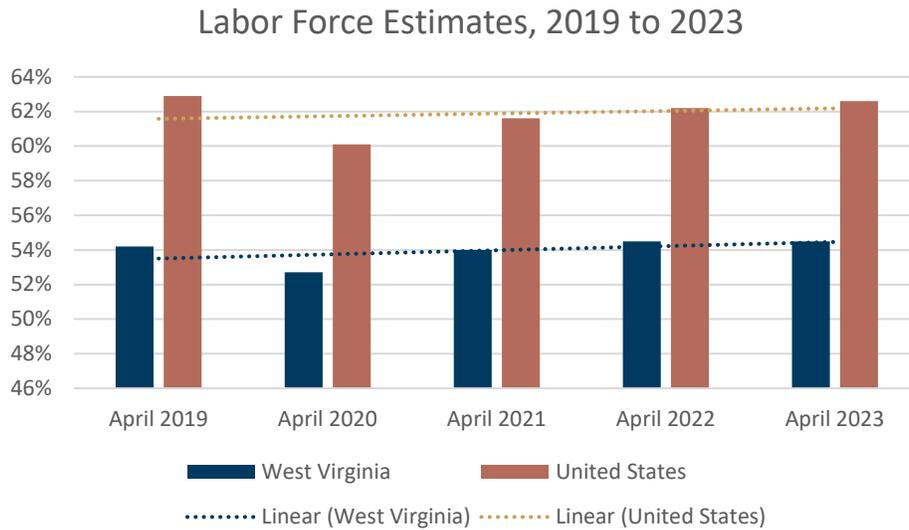
Figure 19: Civilian Labor Force as a Percentage of 2019 Size for West Virginia and the United States



Looking at the civilian labor force participation rate as a proportion of overall population offers an even more precise look at this same concept. Whereas the raw number of individuals participating in the workforce may be distorted by other trends and factors, such as individuals moving or a generally smaller population size, the rate provides a better indicator to answer the question, “what percentage of the population that can work is either working or seeking employment?” Labor force participation rates for West Virginia lag those of the United States. Excluding the time period at the height of the COVID-19 pandemic in 2020 and much of 2021, West Virginia’s rates of labor force participation have consistently remained around 8% lower than that of the United States as a whole—55% and 63% in April 2023, respectively.⁹⁴

⁹⁴ U.S. Bureau of Labor Statistics, Labor Force Participation Rate [CIVPART], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/CIVPART>. Labor Force Participation Rate for West Virginia [LBSSA54], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/LBSSA54>.

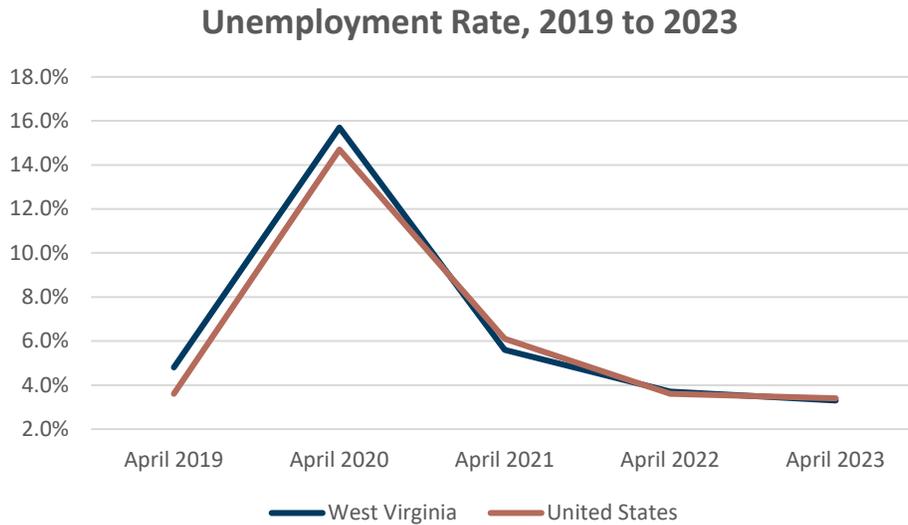
Figure 20: Labor Force Participation Rates for West Virginia and the United States, 2019 to 2023



The unemployment rate is often the most used statistic related to workforce, but to fully benefit from it, it must be examined within the context of the labor force discussed above. Unemployment rate changes for West Virginia have largely mirrored those of the United States since April 2019. Both April 2022 and preliminary April 2023 estimates indicate unemployment rates at or below pre-pandemic levels for both West Virginia and the United States (3.3% and 3.4%, respectively in 2023).⁹⁵ This may indicate a tightening labor market but may also be affected by lower labor force participation in the State—as highlighted above. Regardless of the root cause, lower unemployment rates may make it more difficult for employers to find individuals to fill roles, especially in fields that require training. Figure 21 illustrates the unemployment rates for West Virginia and the United States for 2019 to 2023.

⁹⁵ U.S. Bureau of Labor Statistics. Labor Force Statistics from the Current Population Survey and Local Area Unemployment Statistics Series. [CLF16OV] Unemployment Rates for States.

Figure 21: Unemployment Rates for West Virginia and the United States, 2019 to 2023



Source: U.S Bureau of Labor Statistics. Labor Force Statistics from the Current Population Survey and Local Area Unemployment Statistics Series. Unemployment Rates for States.

Data from the U.S. Bureau of Labor Statistics suggest continued difficulty in filling job openings at both the state and national level.⁹⁶ Prior to the COVID-19 pandemic, and as highlighted in Table 27 and Figure 22, in April 2019 the ratio of “hires” to “job openings” was 78% for West Virginia and 83.6% for the U.S. Job openings and hires plummeted in April 2020 for both geographies, but West Virginia’s ratio of “hires” to “job openings” plummeted by more than 30%, while the ratio for the U.S. increased. Intervening observations indicate job openings at or above pre-pandemic levels for both West Virginia and the United States, but with job filling ratios still at levels well below pre-pandemic levels.

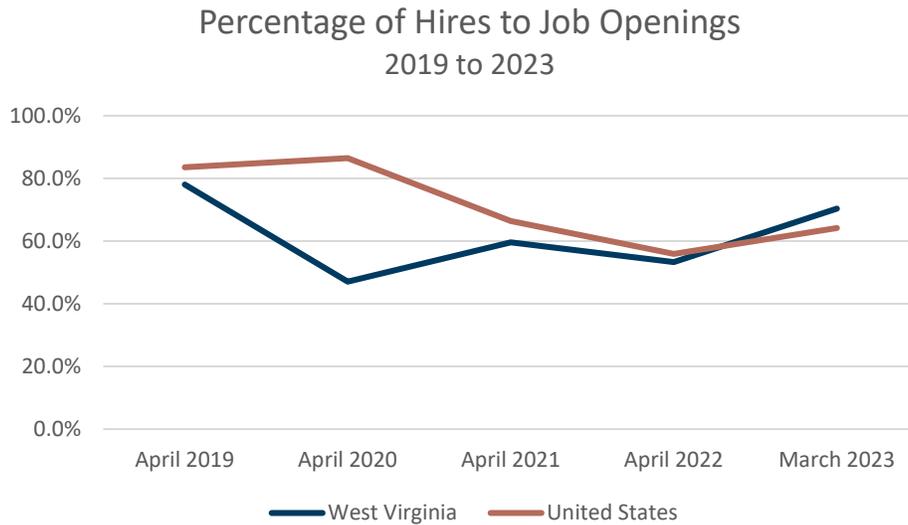
Table 27: Job Openings and Labor Turnover Survey Data for West Virginia and the United States, 2019 to 2023 (in thousands)

		April 2019	April 2020	April 2021	April 2022	March 2023(p)
West Virginia	Job Openings	41	34	52	60	54
	Hires	32	16	31	32	38
	Percent Filled	78.0%	47.1%	59.6%	53.3%	70.4%
United States	Job Openings	7,191	4,686	9,288	11,755	9,590
	Hires	6,011	4,052	6,170	6,572	6,149
	Percent Filled	83.6%	86.5%	66.4%	55.9%	64.1%

Source: U.S Bureau of Labor Statistics. Labor Force Statistics from the Current Population Survey and Local Area Unemployment Statistics Series. Unemployment Rates for States.

⁹⁶ U.S Bureau of Labor Statistics. Job Openings and Labor Turnover Survey.

Figure 22: Percentage of Hires to Job Openings, 2019 to 2023



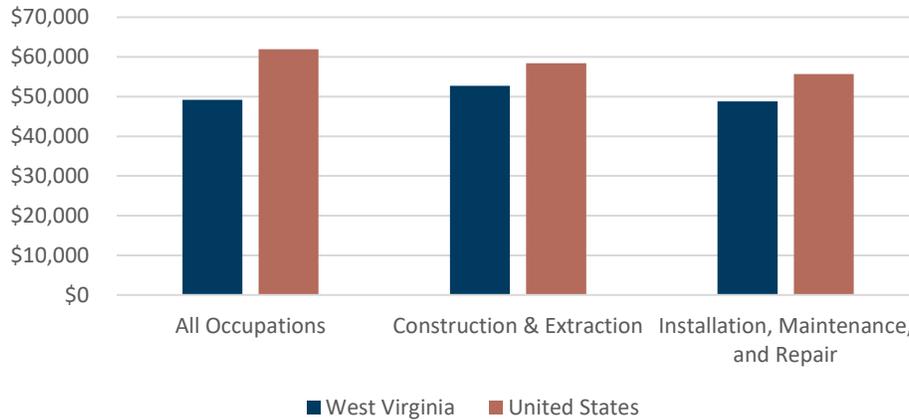
Source: U.S Bureau of Labor Statistics. Job Openings and Labor Turnover Survey.

Wages in West Virginia lag those of the United States.⁹⁷ Wage data from May 2022 suggest that West Virginia wages across all occupations are roughly 80% of those for the nation (\$49,170 to \$61,900 respectively). Gaps between West Virginia and national wage estimates for “Construction and Extraction” and “Installation, Maintenance, and Repair” occupations are smaller at 90.3% and 87.6% respectively. The two broad occupation groups also make up a higher percentage of the total reemployment in West Virginia (11% of all occupations) than in the U.S. (8%). Figure 23 highlights this data and the gap described.

⁹⁷ U.S Bureau of Labor Statistics. Occupational Employment and Wage Estimates. <https://www.bls.gov/oes/current/oesrcst.htm>. https://www.bls.gov/oes/current/oes_nat.htm.

Figure 23: Annual Mean Wage, Selected Occupations, May 2022

Annual Mean Wage, Selected Occupations in West Virginia and the United States, May 2022



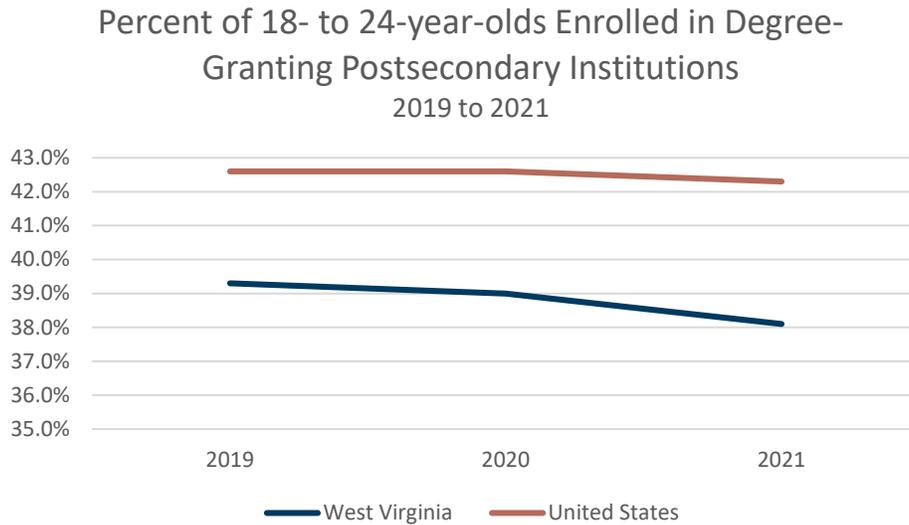
Source: U.S Bureau of Labor Statistics. Occupational Employment and Wage Estimates.

Location Quotients (LQs) in West Virginia for “Construction & Extraction Occupations” and “Installation, Maintenance, and Repair Occupations” provide a workforce-oriented perspective of the State’s economic base. The May 2022 LQ for “Construction & Extraction Occupations” was 1.47 and “Installation, Maintenance, and Repair Occupations” was 1.28 indicating that the occupations are concentrated more heavily here relative to the U.S. and are significant contributors to state economy.

Declines in the civilian labor force, labor force participation, and filled job openings are occurring concurrently with decreasing percentages of 18- to 24-year-olds enrolled in degree-granting postsecondary institutions—highlighted in Figure 24.⁹⁸ Here too, West Virginia trails the national average. 2021 American Community Survey five-year estimates indicate that 42.3% of 18 to 24-year-olds were enrolled post-secondarily, compared to just 38.1% of West Virginia’s 18 to 24-year-olds.

⁹⁸ U.S Department of Commerce, Census Bureau, American Community Survey (ACS), S1401 - SCHOOL ENROLLMENT.

Figure 24: Percent of 18- to 24-year-olds Enrolled in Degree-Granting Postsecondary Institutions, 2019 to 2021

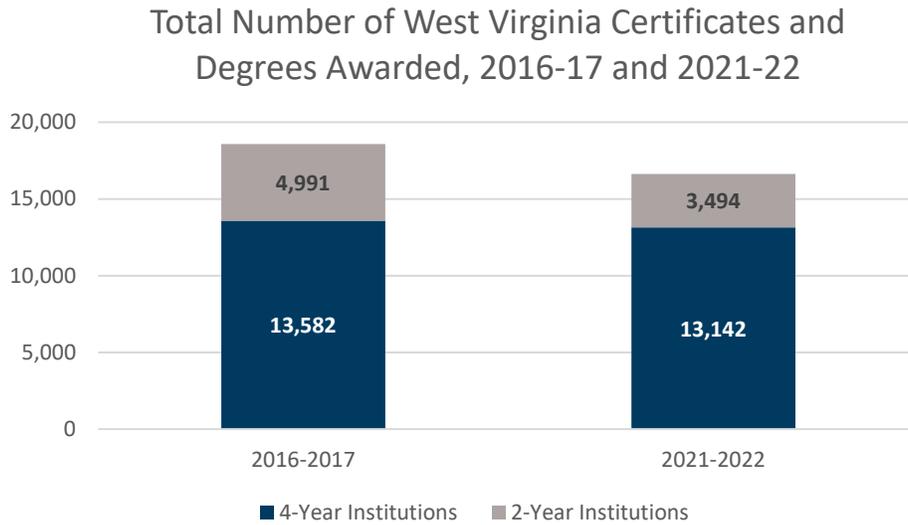


Source: U.S. Department of Commerce, Census Bureau, American Community Survey (ACS), S1401 - SCHOOL ENROLLMENT.

As enrollments decline, so do the number of awarded degrees and certifications.⁹⁹ In the 2016-2017 school year, West Virginia institutions of higher education awarded 18,573 degrees and certificates. For the 2021-2022 school year, that total fell to 16,636—a decline of approximately 10%. The number of certificates and degrees awarded by West Virginia two-year institutions has declined by nearly 30% over the same time period (4,991 awards in from 2016-2017) to (3,494 in 2021-2022). Figure 25 illustrates these statistics.

⁹⁹ West Virginia Higher Education Policy Commission. Explorer Data Portal. Degrees Awarded by Selected Characteristics. <https://www.wvhepc.edu/resources/data-and-publication-center/data-center-graduation/>

Figure 25: Number of West Virginia Certificates and Degrees Awarded, 2016-17 and 2021-22



Source: West Virginia Higher Education Policy Commission. Explorer Data Portal.

4.2.2 Medical Care and Mental Health

2021 American Community Survey estimates suggest that 6.1% of the West Virginia civilian noninstitutionalized population has no health insurance coverage, lower than the U.S. figure of 8.6%. Employed West Virginians aged 19 to 64 years report higher rates (8.6%), suggesting potential net-negative interactions between employment and program eligibility.¹⁰⁰

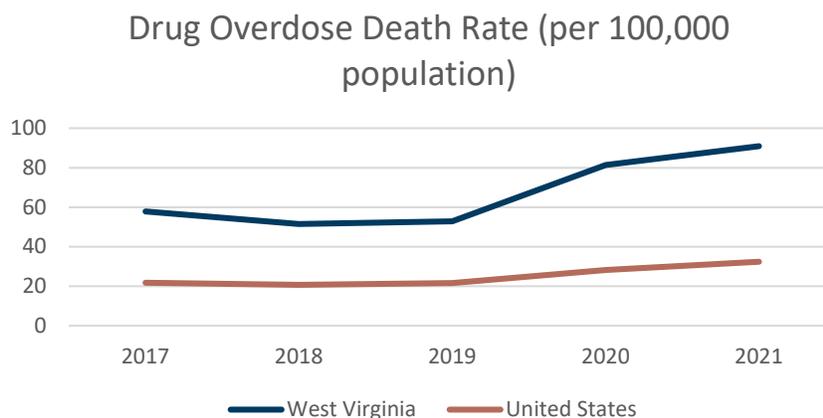
In 2021, roughly 22% of West Virginians aged 18-25 “received mental health services.” Further, Substance Abuse and Mental Health Services Administration estimates that for 2021, nearly one in four in the 18-25 age group met the criteria for having a substance use disorder, and more than 21% of that age group needed, but did not receive, treatment at a specialty facility for substance use.¹⁰¹

As seen in Figure 26, drug overdose death rates have increased in West Virginia from 36.3 per 100,000 in 2011 to 90.9 per 100,000 in 2021. Over the same period, drug overdose death rates increased from 13.2 to 32.4 per 100,000 in the U.S.

¹⁰⁰ U.S Department of Commerce, Census Bureau, American Community Survey (ACS) 2021 – CP03 COMPARATIVE ECONOMIC CHARACTERISTICS.

¹⁰¹ Substance Abuse and Mental Health Services Administration (SAMHSA). 2021 National Survey on Drug Use and Health (NSDUH). <https://www.samhsa.gov/data/report/2021-nsduh-state-specific-tables>

Figure 26: Drug Overdose Death Rate (per 100,000 population)



Source: U.S. Department of Health & Human Services. Centers for Disease Control and Prevention (CDC). Wides-ranging Online Data for Epidemiologic Research (WONDER).

4.2.3 Incarceration

The incarcerated and recently paroled populations often lack opportunities to learn the skills they need to successfully transition back into the labor market. For calendar year 2021, the ‘average sentenced population’ in West Virginia Division of Corrections institutions was 6,021 individuals, with roughly two-thirds of those in West Virginia Prison Facilities. Another 1,977 parolees were under supervision by West Virginia Parole Services at the end of fiscal year 2022.¹⁰²

4.2.4 Workforce Training

Although there are successful programs for workforce development in the telecommunications industry, there are not enough to meet workforce demands. The FCC Working Group on Broadband Workforce describes an “identity crisis” in the broadband industry, meaning that many potential workers and students do not know what broadband career paths are, nor how to enter the industry. More consistency in job titles and their associated skills, as well as clearer goals for workers to achieve, are needed. Much of the broadband industry agrees—a lack of standardized nationwide training programs negatively impacts potential workers’ awareness of industry career paths.¹⁰³ More information about WVDED’s plans to expand training opportunities can be found in Section 5.

4.2.5 Summary

The shortage of trained, highly skilled workers in West Virginia presents challenges and opportunities in maintaining a sufficient broadband workforce needed to meet projected infrastructure development and maintenance demands from the IJJA. Population stagnation and aging, further impacted by decisions to participate in the workforce, have reduced the overall pool from which West Virginia can draw workers. Wage gaps suggest a limit to the State’s ability to attract workers from other states, although these gaps

¹⁰² West Virginia Division of Corrections and Rehabilitation. Annual Report 2022.

https://dcr.wv.gov/resources/Documents/annual_reports/FY22%20ANNUAL%20REPORT%20WVDCR.pdf

¹⁰³ Ibid FCC working group.

are less prevalent for the fields of ‘Construction and Extraction’ and ‘Installation, Maintenance and Repair’.

West Virginia will require concerted preparation to address infrastructure project demands despite workforce struggles. For successful implementation, industry best practices, education, and training systems already in place across West Virginia must be leveraged to their utmost potential.

4.3 Supply Chain and Materials Availability

Lead times throughout the broadband supply chain—meaning the time between placing an order and receiving goods—are still prolonged, impacting internet service provider decisions on project timelines and project viability. Originally sparked by the impacts of the COVID-19 pandemic, these long lead times still reverberate throughout the industry. As of Q2 2023, internet service providers are contending with materials availability challenges on several fronts:

1. In addition to the ongoing effects of the pandemic, current global geopolitical affairs threaten to further strain the industry. As a result, internet service providers across the country must compete for the same broadband infrastructure materials.
2. Internet service providers must comply with the Build America, Buy America Act regarding domestic materials and products.

4.3.1 Continued Impact of COVID-19 and Future Demand Competition

Supply chain delays have impacted internet service providers across the country. The Fiber Broadband Association found that in the summer of 2022, minimum lead times for fiber-optic cables ranged from 52-60 weeks across the United States.¹⁰⁴ Providers that operate in West Virginia corroborated this finding in interviews with WVDED.¹⁰⁵ Internet service providers took two types of efforts to minimize the impacts of these delays:

1. Providers sought to proactively build an inventory of materials before they were needed, requiring additional capital in advance.
2. Providers needed to monitor material availability with suppliers and expand project timelines to account for material delays. Even still, projects took longer than anticipated.

These efforts provided only temporary and minor relief.

Lead times have improved in West Virginia and across the country. The Fiber Broadband Association found that minimum lead times for fiber optic cables decreased to 4-10 weeks as of March 2023. See Table 28 for details.¹⁰⁶ Some West Virginia internet service providers noted to WVDED that lead times have decreased by half and are continuing to decline. Some providers report that lead times are no longer a

¹⁰⁴ Fiber Broadband Association, “Fiber Broadband Association Reports Dramatic Improvements to Supply Chain,” May 2, 2023, <https://fiberbroadband.org/2023/05/02/fiber-broadband-association-reports-dramatic-improvements-to-supply-chain/>.

¹⁰⁵ WVDED, “Interviews with ISPs for BEAD and Digital Equity,” Between April 17 and May 15, 2023.

¹⁰⁶ Fiber Broadband Association, “Fiber Broadband Association Reports Dramatic Improvements to Supply Chain,” May 2, 2023, <https://fiberbroadband.org/2023/05/02/fiber-broadband-association-reports-dramatic-improvements-to-supply-chain/>.

concern. Despite improvements, lead times remain higher than before the pandemic and proper planning is essential to the efficient execution of BEAD funded projects.

Table 28: Change in Fiber Component Lead Times Between Summer 2022 and March 2023

Component category	Lead time (weeks)		Percent decrease
	Summer 2022	March 2023	
Fiber optic cables	52-60	4-10	92%
Cabinets and splitters	10-20	4-8	60%
Fiber multipoint terminals	20-35	4-8	80%
Conduit	15-20	3-7	80%
Hand holes	22-26	8-14	64%
Home equipment	12-24	4-10	67%

Source: Fiber Broadband Association, “Fiber Broadband Association Reports Dramatic Improvements to Supply Chain,” May 2, 2023

Looking ahead, WVDED foresees a surge in demand for fiber-optic components over the next five years as BEAD subgrantees across the country begin sourcing their required materials. Entities that have stockpiled materials may be affected if they underestimated their supply needs. Those that did not preorder will compete to procure materials. WVDED anticipates that larger entities with larger purchase orders will have a significant advantage over smaller and regional entities.

4.3.2 Buying American

As noted in the BEAD Notice of Funding (NOFO) Opportunity,

The Build America, Buy America Act requires that all of the iron, steel, manufactured products (including but not limited to fiber-optic communications facilities), and construction materials used in the project or other eligible activities are produced in the United States unless a waiver is granted.¹⁰⁷

Under the Build America, Buy America Act and the Buy America Guidance issued by the Office of Management and Budget, the Secretary of Commerce may waive the domestic content procurement preference if it is not in the public interest, if the materials are not available in the US, or if the cost will increase by more than 25%.¹⁰⁸ Additionally, and among other requirements, IJA prohibits subgrantees from using BEAD funds to purchase or support fiber-optic cable and equipment manufactured in China. This restriction is also subject to potential exemptions.

None of WV’s internet service providers interviewed expressed concerns about these requirements. However, if manufacturers in the United States cannot keep up with demand, then providers may be forced to pursue other sources and will need to seek exemptions as appropriate.

¹⁰⁷ NTIA, Broadband Equity, Access, and Deployment Program, Notice of Funding Opportunity, May 2022. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>.

¹⁰⁸ Shalanda D. Young, Director, OMB, Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, M-22-11 (Apr. 18, 2022), available at <https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf>.

4.3.3 Options for Addressing Supply Chain Barriers

As mentioned above, lead times will likely remain a barrier for many internet service providers because of the surge in demand, regardless of whether providers pursue exemptions for the requirements in the Build America, Buy America Act. At least one internet service provider expressed interest in having the State act as an intermediary to aggregate demand for any internet service providers that wish to purchase goods. This would allow the State to use large orders as leverage when negotiating its priority position. However, this presents its own challenges, including:

1. **Storage:** Where will the materials be stored?
2. **Cost:** Where will the up-front cost for the purchase come from?
3. **Liability:** Who will be liable for any inconsistencies with the materials or damage?
4. **Coordination:** Who will absorb the cost of coordinating such a process?

Many internet service providers stated that the most helpful change would be to extend the time allowed for purchasing materials. Specifically, it would be beneficial to be able to purchase materials before the State issues a notice to proceed. This would allow service providers to either purchase materials specifically for the project ahead of time or to use materials that they already have on hand. One internet service provider cited the U.S. Department of Agriculture’s Community Connect and ReConnect programs as examples of programs that allow this strategy.¹⁰⁹ In this scenario, WVDED would allow providers to use materials purchased ahead of time. Service providers would bear the risk in this case, as they would have to absorb any costs associated with purchasing these materials ahead of time, such as storage and any additional transportation.

Internet service providers may use requisite components for the project that have been purchased before WVDED issues a Notice to Proceed. Should an internet service provider choose to do so, it will be responsible for any additional cost associated with purchasing, managing, transporting, or otherwise handling these materials that have were not accounted for in its application.

4.4 Middle Mile Infrastructure

Middle mile infrastructure, or simply middle mile, carries data between the core of a telecommunications network and the last mile, where it is delivered to end users. It serves a critical part of the broadband network, as it provides the high-speed connections that are necessary for delivering high-quality internet service, as required by the BEAD Program. Lack of sufficient access to middle mile creates numerous issues for internet service providers. For instance, it can limit the amount of bandwidth available to end users when providers must rely more heavily on a web of last mile infrastructure with lower capacity. This can lead to slow internet speeds and congestion.

That said, internet service providers should not construct middle mile infrastructure as an isolated activity. Middle mile should be built as a means of assisting the process of deploying last mile infrastructure,

¹⁰⁹ Materials and/or equipment purchased, or construction performed, prior to an award offer accepted by the applicant will not be eligible for financing. Only new materials and equipment may be financed with award funds, unless otherwise approved in writing by RUS. ReConnect Program Construction Procedures Version 2.0 – February 2020.

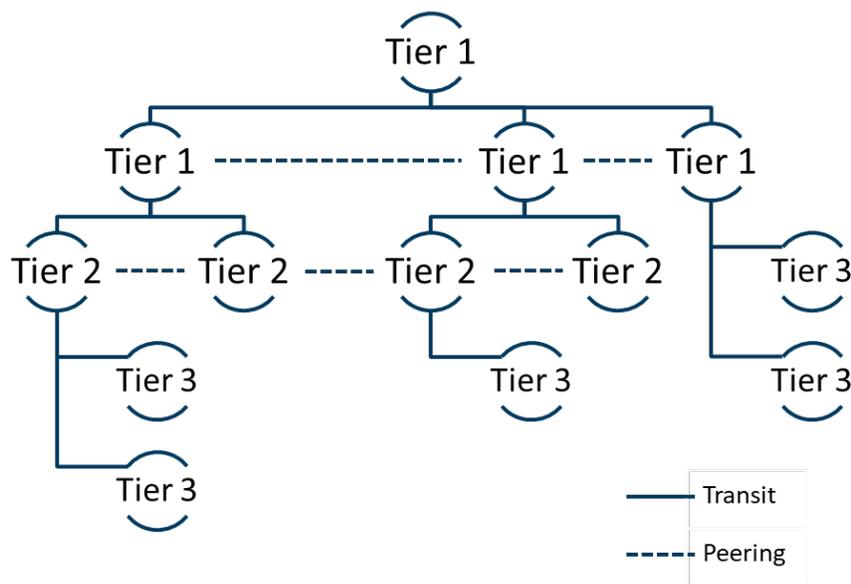
otherwise it can result in a so-called “bridge to nowhere.” Even before the outset of this project, WVDED sought to identify pain points related to this infrastructure and set aside funds for a middle mile study. Additionally, addressing the middle mile barrier would align with West Virginia State Broadband Plan 2020-2025, which listed “West Virginia will have robust middle mile services in West Virginia to support projects that support last mile broadband service” as a key goal.¹¹⁰

For context, the level to which an internet service provider relies on the networks of other providers breaks down into a three-tiered system.

- **Tier 1 providers** do not purchase transit services from other networks and maintain global reach independently. They only need to peer with other Tier 1 providers.
- **Tier 2 providers** own some level of network transport but must still purchase/lease transit from Tier 1 providers and also perform some peering of their own.
- **Tier 3 providers** must purchase/lease transit from Tier 1 or 2 providers, usually the latter, and generally do not participate in peering.

Which category entities fall into forms as a function of their scale and business pursuits. For instance, national and international providers are typically large enough that they fall into Tier 1, while regional providers fall into Tier 2. Small and usually local-only internet service providers inherently fall into Tier 3 as their business plans only deal with last mile connectivity. Often providers fall somewhere in between, such as a regional Tier 1 provider that does not have complete global internet access but does so for an entire country or region. Figure 27 offers a diagram illustrating the relationship between all three tiers.

Figure 27: Relationship Between Tier 1, 2, and 3 Service Providers



Source: WVDED

¹¹⁰ West Virginia Broadband Enhancement Council, “West Virginia State Broadband Plan,” <https://broadband.wv.gov/wp-content/uploads/2021/05/West-Virginia-State-Broadband-Plan-2020-2025.pdf>

4.4.1 State of Middle Mile Infrastructure

West Virginia is served by all three tiers of internet service providers, including a mix of providers that fall between Tier 1 and 2 and some which do not provide service to end users, only transit. The providers that do offer end-user service typically prefer owning their own infrastructure and generally do not lease any middle mile because it allows them to have greater control of their network.¹¹¹ As such, these larger providers expressed no concerns to WVDED about access to middle mile infrastructure. Table 29 lists the major Tier 1-2 providers that have dedicated middle mile infrastructure in West Virginia. As noted in the table, Zayo and Meta Middle Mile Infrastructure (MMI) are the only two middle mile providers that do not have end-user interests in the State. As Comcast does not offer leased middle mile to other providers, that leaves Frontier and Segra as the main players with middle mile availability running through mid-West Virginia.

Table 29: Tier 1-2 Providers with Dedicated Middle Mile in West Virginia

Tier	Provider	Offers end-user service?
1	Comcast	Yes
1-2	Frontier	Yes
1-2	Segra	Yes
1	Zayo	No
1-2	Meta Middle Mile Infrastructure	No

Source: WVDED

In addition, Appalachian Power is in the process of constructing a middle mile infrastructure project in Mingo and Logan counties in collaboration with Wheeling Power, as well as a similar project in Raleigh, Mercer, Wyoming, McDowell, and Summers counties. Details about the approval process for electric utilities to construct middle mile infrastructure, as well as the size, impact, and funding mechanisms for these two projects, can be found in Section 3.2.2 under the Electric Utility Middle Mile Initiative subheading.

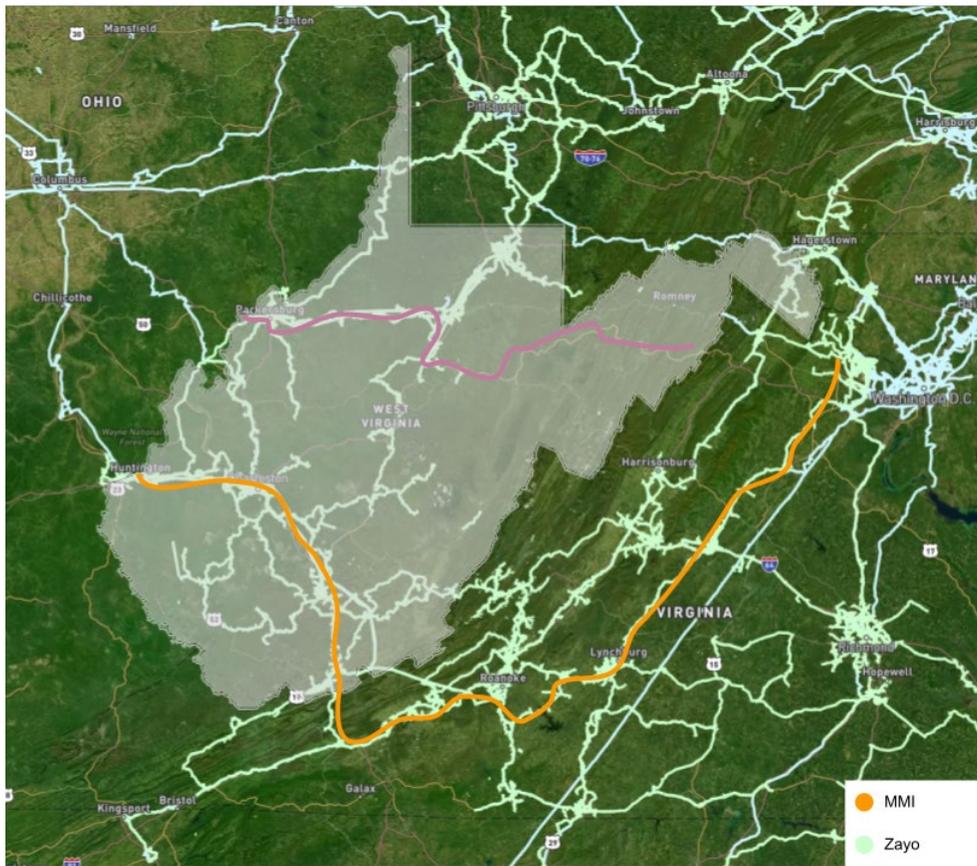
Many of the smaller sub-Tier 2 service providers also have middle mile infrastructure in the form of a hybrid network, meaning it serves as both middle mile network and last mile in some cases. For instance, they may deploy their last mile connections with additional fiber strands for increased capacity and rely on higher capacity XGS-PON technology, which offers 10 Gigabit symmetrical data transfers. Outside of using this hybrid infrastructure, these internet service providers must lease strands from the Tier 1-2 providers or trade capacity on their own network with other providers where their networks do not reach. Some of these providers expressed concerns about their current or required access to middle mile infrastructure. Concerns fell into three categories:

1. Cost to lease or reliability of middle mile infrastructure from existing providers
2. No access to middle mile of any kind to lease or trade
3. A combination of both 1 and 2, where providers were looking for alternatives to one middle mile infrastructure provider because of their unsatisfactory experience

¹¹¹ WVDED, "Interviews with ISPs for BEAD and Digital Equity," Between April 17 and May 15, 2023.

Zayo's network previously entered West Virginia from the west, splitting into two paths traveling southward and northeast. The network's layout created a gap in central and eastern regions of the State, as illustrated by the green lines in Figure 28. However, Zayo's latest middle mile deployment, illustrated in purple in Figure 28, connects more of the previously unconnected area. In March 2019, MMI announced that it would build a high-capacity fiber optic cable network across part of West Virginia as part of its ongoing larger network infrastructure build from Virginia to Ohio. All of the construction mileage within West Virginia is complete, and the rough route is demonstrated in Figure 28 with the orange path. The company has promised to improve connectivity in West Virginia by providing access to fiber along the route and creating opportunities for network expansion.

Figure 28: Zayo's Network and the MMI Network in West Virginia



Source: WVDED

MMI's more southern route complements Zayo's northern path through the State, providing another option for access. However, neither route connects in the center of the State. The limited availability of open-access, middle mile providers in mid-West Virginia leads low-Tier 2 and Tier 3 providers to primarily lease from Frontier or Segra, with the former having a much wider range of access. Many carriers and local service providers have already inquired about capacity availability and Meta remains committed to ensuring that excess capacity is available. This project is part of West Virginia's overall approach to broadband development. No single investment will address all connectivity issues and each community approaches broadband from a different vantage point. With a long-term view, West Virginia seeks to

empower local communities to pursue the benefits of connectivity by implementing policies that encourage investment.

Smaller internet service providers have sought ways around relying on the availability or quality of these middle mile networks. For instance, two providers expressed interest in forming a non-profit consortium of providers that would “donate” strands to a pool of infrastructure that anyone in the consortium could use. This would reduce barriers to entry for smaller internet service providers while capitalizing on their existing infrastructure. If such a consortium were formed, it is unlikely that the State would be involved, as it wishes to remain neutral and allow market forces to guide the process and is not interested in bearing the cost.

Other providers expressed interest in hybrid builds, in which portions of new network builds would be designed to have enough capacity to serve as middle mile infrastructure. It is important to note that BEAD funding cannot be used directly for middle mile projects, but hybrid networks in which the cost to increase capacity is nominal in relation to the rest of the network could offer an alternative. Even in areas where middle mile networks exist, these hybrid portions of the network would create alternative routes for access to strictly middle mile segments, potentially reducing costs through increased competition.

Next Steps: Broadband Middle Mile Infrastructure Study (Middle Mile Study)

Despite the analysis performed thus far by WVDED, questions still remain regarding the best course of action for promoting the deployment of additional middle mile infrastructure. WVDED has set aside up to \$250,000 for a specific study on the state of middle mile in West Virginia. The RFP is scheduled for release in late summer 2023 to procure a firm that will undertake the middle mile study.

The Middle Mile Study will assess the availability, development, and utilization of middle mile broadband infrastructure in support of last mile connectivity with particular interest in unserved and underserved areas. The Middle Mile Study will focus on existing fiber and network assets, future needs, and strategic planning to ensure that all West Virginians have access to broadband connectivity.

Among other deliverables, this study will produce a complete assessment of current aerial and buried middle mile broadband assets in the State, to include but not be limited to, a detailed gap analysis, opportunities for interconnection, a comprehensive strategy for future fiber investments, and policy recommendations for new fiber construction standards. The study will be used by WVDED and other state agencies to inform policy, guide investment decisions, maximize resources, and facilitate the expansion of broadband connectivity throughout West Virginia.

4.5 Financing Requirements for Service Providers

The BEAD NOFO states that subgrantees must, in addition to other requirements, submit a letter of credit from a bank that meets the eligibility requirements consistent with 47 C.F.R. §54.804(c)(2), as well as meet a minimum of a 25% match requirement for any funds received from BEAD.¹¹² Funds from other federal programs, including the Universal Service Fund, generally may not be used as matching funds. Compounding this, the NOFO notes that “in no event . . . shall the letter of credit have a value of less than

¹¹² NTIA, Broadband Equity, Access, and Deployment Program, Notice of Funding Opportunity, May 2022. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>. Pages 20 and 72

25 percent of the subaward amount.”¹¹³ Internet service provider interviews conducted by WVDED revealed concerns from four small-to-regional-sized internet service providers about these dual requirements.¹¹⁴ Additionally, given the potential complexity of the eventual RFP process for BEAD funds, one internet service provider requested that WVDED establish a clearly defined point-person for all matters related to applications.

If internet service providers were to solely participate in the resulting BEAD-related grant program, they may not have an issue with these requirements. However, many service providers are participating in multiple grant programs in West Virginia, as well as in other states in some cases. This quickly loads their debt-to-equity ratio. This is typically not an issue for larger regional or national providers, which have access to their own private capital or have larger equity amounts that offset any debt taken on. This would disproportionately impact small, local providers. Faced with these challenges, some well-positioned internet service providers may not be able to compete in the BEAD process.

The internet service providers that expressed their concerns proposed a mix of two solutions:

1. Lifting either of the letter of credit or 25% match requirement
2. Reducing the required match percentage

Both of these solutions would require exceptions from the Federal Government. For instance, if WVDED sought to reduce the match percentage, it would need approval from NTIA. Reduction of the match percentage could perhaps be accomplished by allowing other federal funds to be used as matching capital, but this too would require an exemption from NTIA.¹¹⁵ WVDED will seek other mechanisms to alleviate the burden on smaller internet service providers, which will be explored further in Section 5.

WVDED strongly believes that such a waiver should be pursued to facilitate broadband infrastructure development in the most rural areas of West Virginia.

4.5.1 Stakeholder Interviews

In some cases, WVDED held meetings with stakeholders to gather information to supplement the asset inventory survey. Preparing for BEAD, WVDED met with the following internet service providers to discuss current and planned broadband deployment, capabilities, barriers to providing service, suggestions, and concerns: Micrologic, Armstrong, Gigabeam Networks, Frontier, Prodigy, Citynet, Optimum, Comcast, and ArxWeb. Consultations with internet service providers will be ongoing, and other companies may ask to meet with WVDED. The barriers uncovered during these sessions are discussed in Section 4 and workforce-related issues are discussed in Section 4.2.

¹¹³ Ibid. Page 73

¹¹⁴ WVDED, “Interviews with ISPs for BEAD and Digital Equity,” Between April 17 and May 15, 2023.

¹¹⁵ “The Assistant Secretary retains the discretion to waive any amount of the match, including up to the full 25 percent requirement.” (NTIA, Broadband Equity, Access, and Deployment Program, Notice of Funding Opportunity, May 2022. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>.)

4.6 Other Barriers and Considerations

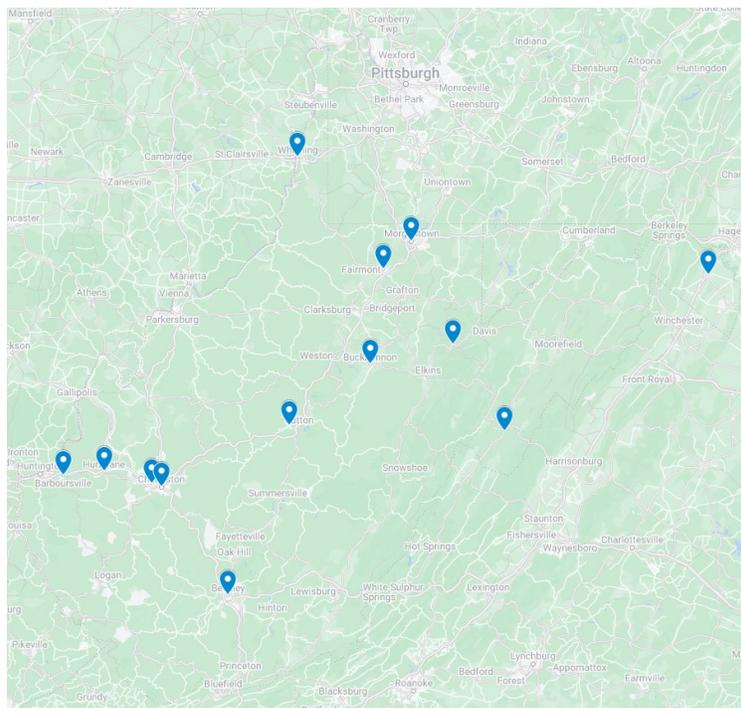
4.6.1 Digital Equity and Data Collection Challenges

As discussed in Section 3, WVDED developed an asset inventory survey that it distributed to stakeholders across the State. The survey included up to 60 questions about topics such as existing programs for digital literacy, plans that overlap with the goals and needs of BEAD/DE, and broadband service subsidies. WVDED tailored questions to each category of respondent to reduce length and complexity. Recipients included entities such as state and local governments, higher and K-12 education, libraries, nonprofits, and the private sector. The distribution process included multiple rounds of emails and reminders, posting the survey on WVDED's website, discussing it during stakeholder meetings, asking partners to distribute it on behalf of WVDED, and more.

Across the State, 19 entities completing the survey in full. The WVDED does not consider this survey to represent a complete sample of the State. Some of this information has been supplemented through listening sessions with residents and the resident-targeted statewide broadband survey, but not all. This survey was uniquely designed to capture and allow WVDED to create an inventory of existing programs affecting digital equity. Through this initial research, it is not clear whether the State lacks digital inclusion programs—or if instead the dataset is not complete enough. WVDED will continue to seek partners to carry out digital inclusion activities. Numerous nonprofit organizations have expressed interest in partnership. Looking ahead, WVDED will pursue additional methods of collecting survey responses to help supplement the existing information.

As highlighted in Figure 29, most of the respondents were in or around city centers, suggesting greater efforts should be made to reach and get responses from entities in more rural areas.

Figure 29: Map of Questionnaire Respondent Locations



Source: WVDED

Additional information regarding West Virginia’s digital inclusion and Digital Equity data collection efforts can be found in the State’s Digital Equity Plan, available September 2023.

4.6.2 Geography

West Virginia’s geography presents a unique challenge. It is the only state that lies completely within the Appalachian Mountain region and features an overall high elevation compared to its neighbors. Additionally, forests cover 78.5% of its land area.¹¹⁶ Although beautiful, this topography leads to winding roads, vast areas with low or very low population density, and terrain that complicates fixed or wireless broadband deployment. Accordingly, deploying buried infrastructure is far more costly in West Virginia than in many other states. Internet service providers therefore rely on aerial cables far more often, even in cases where buried provides a more direct route. Although aerial cable is cheaper to deploy, it is more exposed to the elements, leading to more frequent and therefore more costly maintenance. Large swaths of forest also present difficulties for wireless services by blocking line of sight and creating significant interference points.

¹¹⁶ USDA Forest Service. 2020. Forests of West Virginia, 2019. Resource Update FS-245. Madison, WI: U.S. Department of Agriculture, Forest Service. 2p. <https://doi.org/10.2737/FS-RU-245>.

4.6.3 National Radio Quiet Zone

The National Radio Quiet Zone (NRQZ) is an approximate 13,000-square-mile area located in the Allegheny Mountains of east-central West Virginia. Centered between the Green Bank Observatory in Green Bank, West Virginia, and Sugar Grove Station in Sugar Grove, West Virginia, the NRQZ was established in 1958 to facilitate scientific research and military intelligence.

Due to restrictions on the use of cellular devices and WiFi routers within the NRQZ, wired broadband connectivity is essential but challenging to deploy even with the support of the Green Bank Observatory.

4.6.4 Participation in the Affordable Connectivity Program

Affordable Connectivity Program (ACP) enrollment in the State falls well below the national average, particularly in more rural counties. ACP is a program of the Federal Communications Commission to assist lower income households with the cost of broadband service. Discussed further in the West Virginia Digital Equity Plan, the State and internet service providers continue to employ a variety of strategies to increase ACP enrollment. WVDED anticipates multiple barriers that may slow progress. These barriers mirror those of many other federally funded programs and include:

- a. distrust or disbelief in a program offering cheaper or free service
- b. difficulty reaching individuals in more rural locations, of which there are many in the State
- c. the eventual expiration of the program or depletion of funds

WVDED has dedicated a portion of its Digital Equity Planning Grant to ACP outreach activities. In addition, WVDED has applied for additional grant funds through the FCC's National Competitive Outreach Program (NCOP) to continue ACP promotion in West Virginia.

As of August 2023, there are no easy answers for West Virginians worried about the eventual expiration of funds. According to its latest updates from March 2023, the Affordable Connectivity Program has a total of approximately \$9.2 billion in funds remaining out of the approximately \$17 billion total.¹¹⁷ As states push to enroll their citizens, the ACP will likely deplete funds at an accelerating rate. In March 2023 alone, the total ACP support claimed totaled approximately \$390 million. Even if claims held at this same rate per month going forward, the fund would be depleted within approximately 24 months. As of May 2023, the Federal Government does not have a stopgap in place to prevent running out of funds.

WVDED is currently exploring backup options to increase broadband affordability in the event ACP funding is not renewed by the Federal government.

¹¹⁷ Universal Service Administrative Co., ACP Enrollment and Claims Tracker, <https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/>. accessed May 19, 2023

5. Implementation Plan

WVDED’s vision for universal broadband access, digital equity and inclusion, and leveraging broadband to benefit the entire State requires a focused and well-crafted implementation plan. With forthcoming BEAD allocations, the State’s federally funded broadband deployments will allow West Virginians more opportunities to participate in the digital economy, receive healthcare, engage in their communities, access educational programs, and more.

This section describes past and future local coordination, priorities for West Virginia, and the path forward for addressing current barriers to deployment, adoption, affordability, and access.

Throughout the development of this Five-Year Action Plan, WVDED has worked to develop an estimate for the cost of universal broadband in West Virginia. Section 5.3 details this estimate and provides a timeline for the next steps in completing the BEAD program. The remaining sections demonstrate alignment between the Five-Year Action Plan, other state priorities, and existing plans and efforts.

The technical assistance that West Virginia has received to date has been invaluable to this process. Together with NTIA, WVDED will use this Five-Year Action Plan to develop its Initial and Final Proposals and fully meet the BEAD program statutory requirements.

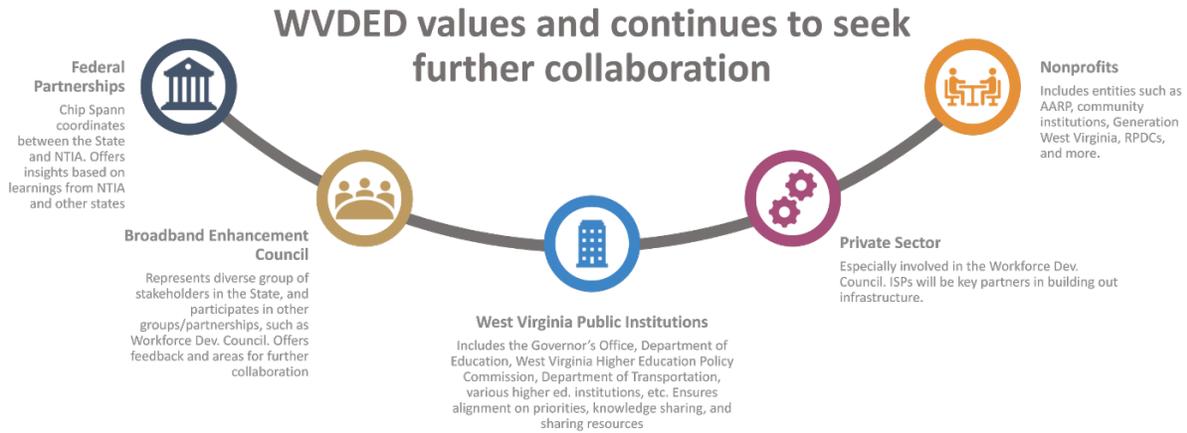
5.1 Stakeholder Engagement Process

Stakeholder engagement will continue to play a crucial role in West Virginia’s broadband deployment initiatives and digital equity efforts. In the summer of 2022, WVDED launched a coordinated outreach strategy that addressed both BEAD and Digital Equity requirements. This section will focus on outreach to entities, rather than individuals, across West Virginia; please refer to Section 3.1.3 for a detailed description of WVDED’s approach to collecting direct community input through listening sessions.

Dozens of entities across West Virginia engaged with WVDED throughout the development of both BEAD and Digital Equity plans. Through thoughtful collaboration with federal, state, and local entities, WVDED engaged community representatives, internet service providers, local leaders, and many others throughout every step of the BEAD planning process. Learnings shared from their experiences, local knowledge, and professional expertise were incorporated throughout the Five-Year Action Plan where possible.

Figure 30 below summarizes WVDED’s collaboration with these key groups of stakeholders. Whenever possible, WVDED has committed to continue working with each of these entities throughout the implementation processes of both the BEAD and Digital Equity plans.

Figure 30: Ongoing Collaboration with Entities



Especially critical to WVDED’s success are formalized working groups of dedicated West Virginians. These groups include the Broadband Enhancement Council and the West Virginia Workforce Development Council. For more information about the Digital Equity Steering Committee, please see WVDED’s Digital Equity Plan, available September 2023.

Broadband Enhancement Council

West Virginia’s Broadband Enhancement Council advises the Office of Broadband. The Council has 13 voting members and a Democratic and Republican appointee from both the Senate and House of Representatives. The four additional appointees serve as ex officio, nonvoting advisory members. The Council conducts regular meetings and provides invaluable insight into broadband expansion and digital equity.

West Virginia Broadband Workforce Development Council & Workforce Planning Team

The West Virginia Broadband Workforce Development Council and Workforce Planning Team, described in Section 3.1.2 were critical partners in the development of WVDED’s workforce development recommendations described in Section 5.

The figures below list the members of both the Broadband Enhancement Council and the Workforce Development Council.

Members of the Broadband Enhancement Council

- West Virginia Department of Economic Development
- West Virginia Higher Education Policy Commission
- West Virginia Senate, Republican and Democratic Parties
- West Virginia House of Delegates, Republican and Democratic Parties
- West Virginia Office of Technology
- West Virginia Department of Education
- Rural Business Users
- Rural Residential Users
- Urban Business Users
- Urban Residential Users
- Users of a Large Amount of Broadband Service

Members of the Workforce Development Council

- Appalachian Regional Commission
- Blue Ridge Community and Technical College
- Chancellor of the Community and Technical College System
- CityNet
- Communications Workers of America
- Community and Technical College Systems of West Virginia
- Eastern West Virginia Community & Technical College
- Micrologic, Inc.
- National Electric Contractors Association (West Virginia/Ohio Valley Chapter)
- New River Community and Technical College
- Pierpont Community & Technical College Center for Workforce Education
- Randolph County Development Authority
- Southern West Virginia Community and Technical College
- State of West Virginia Governor's Office
- Three Sixty Strategies, LLC
- U.S. Department of Labor
- West Virginia Department of Commerce
- West Virginia University at Parkersburg
- West Virginia Broadband Enhancement Council
- West Virginia Department of Economic Development
- West Virginia Department of Education - Career Technical Education
- West Virginia Department of Veterans Assistance
- West Virginia Herbert Henderson Office of Minority Affairs
- West Virginia Higher Education Policy Commission
- West Virginia Northern Community College
- West Virginia University
- Workforce Development Board of Kanawha County
- WorkForce West Virginia
- WVCTA - The Internet and Television Association

In addition to both Councils, groups that served covered populations with digital equity-related programs will provide a key subset of partners, both for Digital Equity and BEAD efforts. A preliminary list of state agencies and community organizations that WVDED has identified as potential collaborators for implementation of the West Virginia Digital Equity Plan is displayed in Table 30 below.

Table 30: West Virginia Organizations Involved in Digital Equity Work

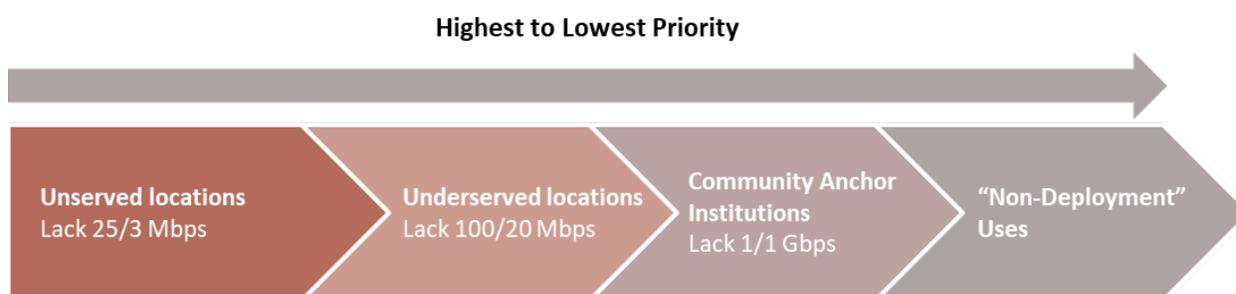
Covered Population	Organization	ACP Awareness & Promotion	Outreach	Access to free Wifi	Digital Literacy & Skills Training	Access to Computing Devices
Covered Households	WV Dept. Health and Human Resources					
	EducationSuperHighway					
Aging Individuals	WV Bureau of Senior Services					
	AARP West Virginia					
	Senior Centers					
	Public Libraries					
Incarcerated Individuals	WV Division of Corrections and Rehabilitation					
	Workforce WV					
	WVDE Schools of Diversion and Transition					
	REACH Initiative/WV Reentry Councils					
Veterans	WV Dept. of Veterans Assistance					
	CyberGenerations					
	WV Veterans Upward Bound					
	Tech for Troops					
	WV Veterans Home					
Individuals with Disabilities	WV Division of Rehabilitation Services					
	WVU Center for Excellence in Disabilities					
Individuals with Language Barriers	WV Dept. of Education – Adult Education and Literacy Programs					
	Literacy Volunteers of Monongalia and Preston Counties					
	Summers County Adult Education					
Rural Residents	Mountain State Digital Literacy Project					
	Morgantown Public Library System					
	Putnam County Public Library System					
	Gassaway Public Library					
	Mary H. Weir Public Library					
	Career Tech WV					
	Grow with Google Initiative WV Participants					
	Randolph County					
	Community Centers					
Racial and Ethnic Minorities	Herbert Henderson Office of Minority Affairs					
	Black by God					
	Innovative Community Solutions					
	West Virginia State University					
	WV NAACP Chapters					

5.2 Key Strategies, Planned Activities, and Priorities

With NTIA's \$1.2 billion BEAD allocation for West Virginia, the State will have substantial resources it needs to expand broadband access and adoption throughout the State.

BEAD funding will be part of a comprehensive strategy that complements previously funded efforts and is dedicated first to unserved or underserved locations that have not received a prior federal or state funding commitment.

As WVDED implements this Five-Year Action Plan, it will use a waterfall funding approach to determine how money will flow down from its highest priority projects. The image below depicts NTIA's priority order that WVDED will follow.



5.2.1 Unserved and Underserved Locations

Closing the broadband availability gap identified in this plan will be West Virginia's top priority. WVDED expects to have sufficient BEAD funding to address gaps for both unserved locations and underserved locations, but with the unserved locations as the first priority. In closing these gaps, the State will aim for a high level of service from this new infrastructure. **Wherever possible, the State's strategy will favor projects offering Gigabit service delivered over fiber-optic networks.** Where this is not possible due to cost or lack of fiber-based proposals, WVDED will give preference to projects with higher performance capability.

WVDED will fund projects through a competitive grant process like its existing West Virginia Broadband Investment Plan programs, with modifications that may be necessary to meet BEAD requirements. Unlike the broadband grant programs it has run to date, WVDED will seek to fund a project in every remaining unserved and underserved area instead of selecting which areas to fund. WVDED will adopt criteria that will help it select between competing proposals in the same area, though all funded projects must meet a minimum set of requirements including financial and operational capability, eligible project costs, matching funds, letters of credit, and compliance with other state and federal program requirements, as outlined by NTIA. Evaluation criteria are still being finalized, however WVDED expects that the following elements will be part of the selection criteria between competing projects:



1. Project cost, accounting for when extra cost will provide more scalability and/or improved resiliency
2. Applicant match above the minimum
3. Affordability of the service to customers, especially Gigabit service
4. Local coordination and support from the local government with oversight over the location or locations to be served

This strategy relies on the performance of projects already funded by WVDED, the FCC, USDA, and other programs. In compliance with statutory requirements, West Virginia will not use BEAD funding to duplicate these commitments. WVDED will continue to monitor the execution of projects under other funding sources are completed.

WVDED has implemented rigorous post-award monitoring of its West Virginia Broadband Investment Plan projects awarded using ARPA funding. As part of its responsibility for broadband mapping and data collection, WVDED will continue to monitor the execution of projects under both ARPA and BEAD funding sources to ensure that these investments are completed.

5.2.2 Community Anchor Institutions

WVDED will direct funding toward connecting Community Anchor Institutions that lack access to 1 Gbps/1 Gbps broadband service. To the extent possible, WVDED will do so by requiring projects that it funds to serve unserved or underserved locations to also serve nearby Community Anchor Institutions that lack Gigabit service.

For Community Anchor Institution locations that cannot be addressed in this way because they are not near unserved or underserved locations, WVDED will offer a Community Anchor Institution Competitive Grant process in parallel. These locations will be funded if it becomes clear that there will be BEAD money available after awarding projects for all unserved and infrastructure investment.

5.2.3 Supporting Infrastructure Investment

Creating a supportive regulatory and permitting environment for broadband infrastructure has been a West Virginia priority, and it will continue to be a high priority. This section describes several strategies for how WVDED can work with and assist state, local, and private partners so broadband projects can pass through the gates necessary prior to construction.



Dig Once Policy

To facilitate permits and licensing, WVDED will recommend improvements to the State's Dig Once policy, including establishing guidelines for laying conduit during major highway construction or reconstruction.



Clear Standards, Clear Communication

WVDED will advocate for:

- Clear, up-to-date, and publicly accessible standards,
- Certainty regarding common construction methods, and
- Swift permit approvals.

WVDED will also complete a Guide to Broadband Construction in West Virginia, which will detail applicable permits, clearances, and policies related to broadband construction.



Pole Attachment Application Process

WVDED has identified pole attachment delays as a significant barrier to broadband expansion in West Virginia. To address it, WVDED will encourage pole-owning utilities and the West Virginia Public Service Commission to expedite the pole attachment application process to decrease delays and eliminate unnecessary costs.¹¹⁸

WVDED has dedicated funding to completing a Middle Mile Broadband Study that will also assist in the development of these policy recommendations through a collaborative process under the State's existing IJA working group.

Addressing these barriers will require coordination with other state agencies, local governments, and where necessary, executive and legislative action. With the added capacity BEAD funding provides, WVDED will facilitate broadband deployment projects by coordinating between state and local agencies, utilities, and internet service providers. One tool for this could be a Permits and Licensing Coordination Committee chaired by WVDED that also includes the Division of Highways, the WVPSC and Department of Environmental Protection, county governments in targeted areas, pole owners, and internet service providers. To ensure the success of this committee and ensure that projects get the approvals they need in a timely fashion, West Virginia will consider proposing that NTIA allow a small portion of BEAD funding to be used for a temporary surge in staff or contracted capacity at the state agencies listed above. By investing in processes to eliminate bottlenecks for projects, West Virginia's broadband investments will be more efficiently made and transformational for the State and its residents.

5.2.4 Increasing Digital Equity

As acknowledged in the State's Digital Equity Plan (available September 2023), West Virginia's low rate of access to broadband, coupled with its demographic profile, creates many challenges for digital equity:

1. 97% of West Virginians are covered by the Digital Equity Act.
2. More than 35% of its citizens live in unserved or underserved areas as defined by the NTIA.¹¹⁹

¹¹⁸ While improvements are underway through WVPSC Show Cause Petition, Case No. 22-088-E-T-SC, continued coordination is essential to the expansion of broadband in West Virginia.

¹¹⁹ Calculated using National Broadband Availability Data provided by the Federal Communications Commission, available at <https://broadband477map.fcc.gov/#/data-download>.

3. West Virginia has the highest rate in the U.S. of individuals living in a rural area (90%).¹²⁰
4. West Virginia ranks 4th from the bottom in high-speed household internet service among all states, Washington, D.C., and Puerto Rico, and second-last among states for households with a computer device.¹²¹

Through braiding together BEAD and Digital Equity Act funds, WVDED will:



**Realize Affordable
Connectivity**



**Secure Device Access and
Affordability**



**Elevate Digital Skills and
Accessibility of Public Services**

WVDED will advance its three Digital Equity Goals by:

- a. further building trust with communities and aligning with their unique needs
- b. continuing to require internet service providers who receive broadband expansion grants to participate in the Affordable Connectivity Program
- c. identifying marketing, public relations, and event planning services to support comprehensive digital equity outreach and coordination strategies
- d. procuring local, state, and national non-profit organizations that refurbish, and distribute computers and devices to qualifying individuals and households
- e. expanding the State’s Digital Equity Pilot Program to support eligible activities described in the Digital Equity Plan

West Virginia’s Digital Equity Plan, available September 2023, offers more details about how the State will ensure that all West Virginians have the resources they need to participate in the digital world and achieve the economic benefits of digital equity.

5.2.5 Workforce Strategies

West Virginia dedicates resources to improving the State’s workforce through several programs detailed at: <https://westvirginia.gov/incentives-and-programs/workforce-programs/>. WorkForce West Virginia is the state government agency acting as the one-stop center for workforce resources, including assistance throughout the hiring process, support for employee training, tax incentives, and labor market information. Services are available at 13 comprehensive career centers throughout the state. In addition, WorkForce West Virginia has the largest online database of job seekers and job openings in the state.

Given the extent of actions required to develop a broadband talent pipeline and comprehensive workforce system, WVDED created a section specifically to house this topic even though NTIA’s guidance

¹²⁰ NTIA defines digital equity as a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy. Digital equity is necessary for access to essential services, civic and cultural participation, employment, and lifelong learning.

¹²¹ Per 5YAP Section 3.1 analysis and Digital Equity Plan Section 3.1.1 analysis respectively

does not mention it. The following figure (Figure 31) summarizes the specific workforce strategies that the State will undertake to accomplish its goal.

Figure 31: Summary of Specific Workforce Strategies

Coordinate and Convene all Broadband Industry Partners
WVDED will contract an organization with experience in coordinating and convening West Virginia entities statewide to launch and lead a new broadband industry workforce group.
The contracted partner will convene local workforce investment boards, employers, secondary and post-secondary educators, organized labor, and others.
The contracted partner will organize a series of workforce summits. Summits will facilitate transparency, clear communication, and continuous engagement as the industry grows and changes.
The contracted partner will support the workforce group as they: <ul style="list-style-type: none">• Determine and align on the goals of West Virginia’s broadband workforce• Collaborate on the development of relevant and timely training programs and pathways that lead to careers in the telecommunications field• Endorse and assist with the expansion of existing training programs• Monitor and evaluate programs and approaches
Develop Industry-Driven Training Programs with Work-Based Learning Opportunities
Together the workforce group, education, and industry partners will identify existing training opportunities and assets to build upon, expand and adapt to meet industry needs.
Partners will explore opportunities to coordinate with subject matter experts, national leaders, state agencies, and academic institutions to develop new academic curricula, programs, and work-based learning that follow national standards.
WVDED encourages partners to adhere to the following best practices: <ul style="list-style-type: none">• Plug-and-play curriculum models that training providers can stand up to begin scaling training efforts• Industry-centered registered apprenticeships, majors, and degree programs at the postsecondary level geared toward the broadband and 5G industry• Outreach to groups of NTIA’s designated covered populations
Workforce partners will Leverage existing Registered Apprenticeship programs and braid together federal, state, and ARC funds to expand programs in the broadband sector.
Partners engage with organizations that support covered populations and historically disadvantaged communities to welcome all West Virginians to the broadband sector.
Develop a Career Exploration Program for K-12 students
WVDED will build a pipeline of talent by encouraging the development of a K-12 Career Exploration for the broadband industry.
WVDED will engage the West Virginia Department of Education and identify local partners including local workforce boards, county-specific career exploration programs, school boards, and employers.
Partners will work to: <ul style="list-style-type: none">• Create middle and high school-level programs to expose students to the broadband industry

- Develop a coordinated state-wide campaign to inform late-middle school and early high school students about career and industry opportunities, including outreach to girls' and boys' clubs and other similar institutions
- Create a "single and consistent point" where interested students can learn more about the broadband industry
- Promote curricula and materials from partner organizations that identify broadband occupations "along the educational continuum," as well as place a particular emphasis on the identification of skills needed for each career path
- Include broadband careers as part of existing STEM programming
- Develop AP classes using a career pathway model in Spectrum, WiFi, Telecom, Wireless, and Fiber technologies
- Advocate for Legislative efforts to increase dual credit opportunities

WVDED will encourage greater industry involvement on CTE advisory councils and workforce boards

All the above workforce strategies will be guided by the U.S. Department of Labor's eight *Good Jobs Principles*, a framework to foster a thriving, equitable work environment. These principles center on the following:

1. Recruitment and Hiring
2. Benefits
3. Diversity, Equity, Inclusion, and Accessibility
4. Empowerment and Representation
5. Job Security and Working Conditions
6. Organizational Culture
7. Pay
8. Skills and Career Advancement¹²²

Guided by the above principles, WVDED will rely on research-based best practices to develop its skilled workforce, including the following recommendations from America Achieves' BEAD Program Playbook. These practices include partnerships with employers, career coaching and wrap-around services, and promoting a diverse workforce through recruiting traditionally underserved populations.¹²³

WVDED will define the skilled workforce requirements and guidance for its subgrantees that will shape the experiences of workers on-site.

Equitable Training and Workforce Development

By emphasizing workforce readiness and protections, WVDED and its partners will ensure that all individuals have an equal opportunity to develop necessary workplace skills, fostering a robust workforce capable of advancing broadband infrastructure.

¹²² NTIA Internet for All: Workforce Planning Guide, page 6:
https://broadbandusa.ntia.doc.gov/sites/default/files/2022-10/DOC_NTIA_Workforce%20Planning%20Guide_FINAL_100722.pdf

¹²³ Creating and Expanding a Diverse Broadband Workforce with Good Jobs and Career Pathways, America Achieves, <https://americaachieves.org/wp-content/uploads/2022/06/America-Achieves-Broadband-Workforce-Report-June-2022.pdf>

Recruiting women, people of color, and representatives of NTIA’s Covered Populations is an important first step in creating a diverse workforce.¹²⁴ In addition to encouraging recruitment, WVDED will ensure that BEAD subgrantees provide an inclusive work environment and offer equal opportunities for skill development.

Outreach and Engagement

The successful implementation of each of these workforce-specific strategies requires targeted and ongoing outreach and engagement with citizens, community organizations, and industry groups. Through annual broadband summits, convenings, and formal advisory groups, WVDED will gain valuable insights and support the development of a skilled, inclusive workforce that will advance the goal of expanded broadband access across West Virginia.

Worker Protections

Ensuring worker protections for the broadband workforce in West Virginia is vital in maintaining a safe, fair, and productive work environment. During the Workforce Planning Team interviews, West Virginia employers stated that they prioritize the safety and environment of their employees, especially for those working in an exposed right of way, climbing poles with electrical exposure, or entering homes. However, this risk can be mitigated by making sure the workforce is properly trained through national safety standards, on-the-job training, and bespoke safety instruction.

West Virginia has a strong workforce development system that can be leveraged to strengthen the broadband workforce. Its existing programs can be expanded, enhanced, and adapted to serve the State’s broadband employers’ needs. West Virginians are resilient and know how to adapt. Together, the State, employers, and residents will work to ensure that all West Virginians have an opportunity to participate in the broadband sector, earn family-sustaining wages, and contribute to the State’s economy. Estimated Timeline and Cost of Universal Service

Universal service represents the final goal of the BEAD Program. As a part of its planning efforts, WVDED has developed a timeline and projected cost to meet this goal. On June 26, 2023, NTIA announced that West Virginia would be awarded \$1,210,800,969.85 to carry out the BEAD program.¹²⁵ This significant award is a historic win for West Virginia.

To estimate whether these funds would be enough to cover the State’s broadband needs, and develop an estimate for its own planning, WVDED undertook a cost analysis. Section 5.3 details WVDED’s cost estimate to provide universal service, and Section 5.4 provides an estimated timeline for providing universal service in the State.

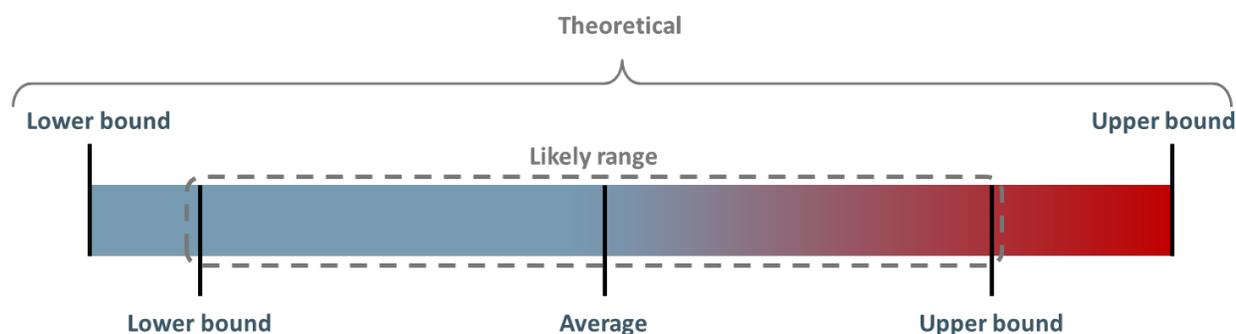
¹²⁴ As defined in Section I.C. of the Digital Equity NOFO, Covered Populations are: Individuals who live in covered households; Aging individuals (60 and above); Incarcerated individuals, other than individuals who are incarcerated in a Federal correctional facility; Veterans; Individuals with disabilities; Individuals with a language barrier, including individuals who are English learners; and have low levels of literacy; Individuals who are members of a racial or ethnic minority group; Individuals who primarily reside in a rural area.

¹²⁵ National Telecommunications and Information Administration, “Biden-Harris Administration Announces State Allocations for \$42.45 Billion High-Speed Internet Grant Program as Part of Investing in America Agenda,” June 26, 2023, <https://www.ntia.gov/press-release/2023/biden-harris-administration-announces-state-allocations-4245-billion-high-speed>.

5.3 Estimated Cost of Universal Service

WVDED and its partners sought to create a range of estimated costs to provide broadband to the targeted addresses under BEAD. As highlighted in Figure 32, WVDED created two sub-ranges to more accurately describe the estimated costs. First, the **theoretical costs** would represent the absolute maximum and minimum costs to accomplish the BEAD program. These are labeled as “theoretical” because—as described later in this section—they are very conservative on the upper end and overly optimistic on the lower end because of the nature of the data used. The **likely range** seeks to correct this by accounting for the either conservative or overfitted numbers that contribute to the theoretical estimates. This results in a likely range that moves closer to the middle from both ends. Note that the upper bound and lower bound simply mean the high or low cost in a range, respectively.

Figure 32: Illustration of the Theoretical and Likely Ranges for the Cost Estimate



5.3.1 Theoretical Cost Methodology

WVDED contractors Tilson—a national, multi-specialty telecommunications consulting, engineering, and construction firm—and The Thrasher Group—an architecture and engineering firm with a utilities practice and substantial presence in West Virginia—collaborated to develop a cost estimate for BEAD goal completion. Thrasher, as a part of its work for Regional Optical Communications, had already performed an analysis on the state of infrastructure in West Virginia as a part of a project funded by ARC.¹²⁶ As a follow-up to this work, and using funding from ARC, Thrasher began developing high-level designs to connect all the target addresses under BEAD for each county. Additionally, Thrasher also developed an estimated cost-per-mile specific to West Virginia to generalize the cost of deploying this network. Applying this cost-per-mile to the aggregate of the new network segments would theoretically result in a total estimated cost.

Tilson sought to validate this cost estimate, both at the cost-per-mile level and in aggregate. To accomplish this, Tilson used six of the high-level designs to create more granular designs that more closely matched how the potential projects might be designed if more tightly targeted at clusters of unserved and underserved addresses. One of the pared-back designs was removed from the analysis process because the unique layout and mix of targeted versus untargeted homes skewed the results. Tilson then created more precise cost estimates using industry-standard methods and compared these against the results that

¹²⁶ Regional Optical Communications is a consortium that focuses on the planning and improvement of broadband.

applying Thrasher’s cost-per-mile would generate. This led to the conclusion that Thrasher’s cost estimates were consistently conservative: 7-11% higher than the most precise estimates. Furthermore, Thrasher’s designs estimate the cost of serving targeted locations by constructing “greenfield” fiber optic network in all cases. While this may be necessary in some places, in practice, it is likely that at least some networks funded under BEAD will be extensions of existing networks and require many fewer miles of new fiber than those produced by Thrasher. Therefore, Thrasher’s estimates for the full high-level designs form the theoretical upper bound to provide service as required by BEAD.

To generate a theoretical lower bound, Tilson looked to the Major Broadband Project Strategies projects that WVDED had already awarded for real-world examples of highly targeted infrastructure buildouts. To calculate this lower bound, Tilson applied the average cost per targeted address from the approved Major Broadband Project Strategies projects to the total number of targeted addresses included in Thrasher’s designs. The Major Broadband Project Strategies projects more closely match the style of project design expected to be shared by BEAD projects. However, some Major Broadband Project Strategies projects may be “lower-hanging-fruit” than future BEAD program projects through selection bias; more-economical or more cost-effective projects are more likely to have become funded projects in the first place. As such, it is likely the cost-per-targeted-address is lower than might be expected for BEAD.

5.3.2 Likely Cost Methodology

As mentioned, the cost estimates from Thrasher are likely conservative. Many of the designs that WVDED will likely fund under BEAD for RFP will be far more targeted. It is reasonable to expect the likely upper bound to be at least 10% less than the theoretical.

Looking at the lower bound, the already funded Major Broadband Project Strategies projects more closely match the style of project design expected to be shared by BEAD. However, as stated in Section 5.3.1, some of these projects may represent lower-hanging fruit compared to many of those carried out as a part of the BEAD program. To adjust for this, a more conservative lower bound would exclude the projects whose costs per targeted address fell at or below the 10th percentile of cost per targeted address for the Major Broadband Project Strategies projects. This shifts the lower bound higher and closer to the upper bound.

5.3.3 Results

Before determining results, this analysis must distinguish between the **total project cost** and the **grant amount**. The BEAD funding rules from NTIA require a 25% match of the total project cost with few exceptions.¹²⁷ As such, WVDED will theoretically only grant up to approximately 75% of the total project cost in most cases. Levels of match already achieved by West Virginia Broadband Investment Plan programs significantly exceed 25% on average. Recognizing that some projects may be exempt from this matching requirement, a 20% level of match should be a conservative estimate. Therefore, the grant amount in the following estimates represents the true cost for the federal funds allocated by WVDED.

- **Total project cost:** Full cost of project, including both the BEAD funds and matching amounts from subgrantees.

¹²⁷ Broadband Equity, Access and Deployment Notice of Funding Opportunity, NTIA: <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>.

- **Grant amount:** The amount of funds that WVDED will provide to cover the total cost of projects, which is conservatively estimated at 20%.

Using the above methodology, Figure 33 and Table 31 provide the total project and grant cost estimates to provide universal broadband service in West Virginia. For context, the theoretical upper bound grant cost estimate to serve all unserved and underserved locations in West Virginia is 95% of the BEAD funding allocated to West Virginia. While an estimate is not a prediction, this estimate inspires optimism that West Virginia will have sufficient BEAD funding for projects that can close the broadband availability gap. Furthermore, if West Virginia can achieve a grant cost closer to the likely or lower range estimate, this could leave significant funding available for other activities allowed under BEAD.

Figure 33: Estimated Total Grant Cost of Universal Broadband in West Virginia

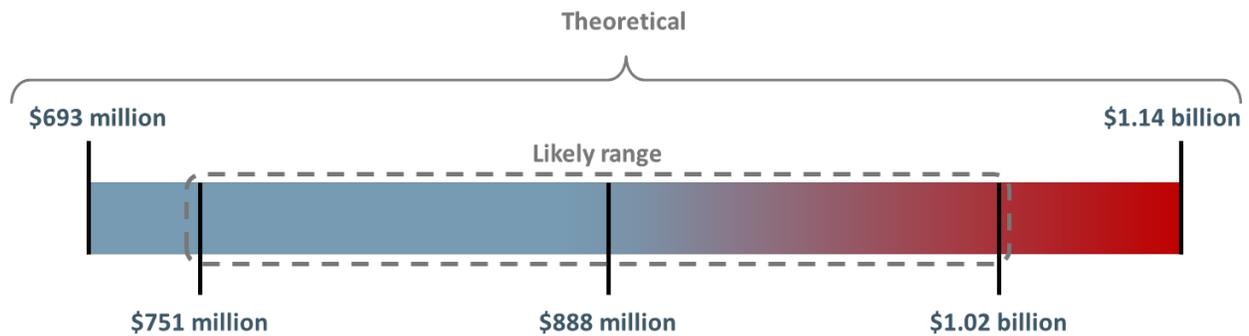


Table 31: Estimated Cost of Universal Broadband in West Virginia

	Theoretical	Likely			Theoretical
	Lower bound	Lower bound	Average	Upper bound	Upper bound
Total project cost	\$866 million	\$939 million	\$1.11 billion	\$1.28 billion	\$1.42 billion
Grant amount	\$693 million	\$751 million	\$888 million	\$1.02 billion	\$1.14 billion

Source: WVDED analysis

5.4 Estimated Timeline

WVDED must select projects it will fund through a competitive grant process and will use its methods established for programs developed under ARPA funding, with any necessary modifications required by NTIA. NTIA must approve the details of the State’s selection process and program procedures. WVDED intends to submit program details in Fall 2023 as part of the NTIA Initial Proposal. WVDED plans to administer the competitive grant process in 2024 and have a set of selected projects ready for required NTIA approval by the end of 2024. WVDED will favor projects that can be implemented quickly, as it does in its current broadband grant programs. However, because of the scale of the projects needed, it is likely that some project implementation may run the full four years of implementation allowed by BEAD, approximately through 2028. The timeline for fully carrying out the BEAD program will depend on the timing and substance of NTIA’s feedback to WVDED’s proposals.

5.5 Alignment

The forthcoming, sweeping investments in broadband infrastructure and digital equity will have a ripple effect across West Virginia, for its people and its government agencies. WVDED is focused on aligning BEAD initiatives with existing broadband programs and advancing other State Government initiatives (see Digital Equity Plan, available September 2023). This alignment is a strategy to achieve WVDED's third broadband pillar: to leverage improved broadband. West Virginia will look beyond just closing the digital divide: it will serve as a mechanism for growth and transformation, especially growing the economy and transforming public education and telehealth.



Growing West Virginia's Economy:

West Virginia's broadband investments are aligned squarely with WVDED's focus on economic development. WVDED can lead by example in its efforts to leverage broadband deployment to grow the State's economy. Given the demand for a well-trained broadband workforce and the need to develop talent, WVDED will:

- Grow and strengthen the broadband industry workforce to successfully implement deployment projects, and
- Positively impact the State's workforce writ-large and across sectors to ensure that West Virginia has the talent it needs to meet employer needs and ensure career opportunities for all.

Broadband deployment provides many kinds of employment opportunities (See Section 3.1.2). The broadband industry can pave the way for a growth-oriented approach to workforce development that capitalizes on collaborative efforts and efficient delivery of training opportunities. These opportunities will lead to good-paying jobs and strong career trajectories for West Virginians. The skills gained from the working in the broadband industry will be transferable to other sectors, creating a dynamic workforce that will grow West Virginia's economy.

Through increased broadband access, West Virginia's workforce development system will benefit from more opportunities to increase the use of on-line training and growing digital skill development that is needed in the 21st century economy. Expanded broadband will also help the State achieve its broader goals of recruiting and retaining remote workers.

WVDED will take the following actions to grow the state's workforce and economy:



Designate a lead organization to act as a clearinghouse of information on online training and continuing education best practices for local organizations who support education and workforce development efforts in their communities.



Identify opportunities to combine federal funding sources to **increase access to online education opportunities and workforce development opportunities**, such as the Department of Labor's Registered Apprenticeship program.



Leverage workforce partners to **convene educators, educational institutions, and employers** to help align broadband workforce goals and initiatives.



Partner with organizations to leverage universal broadband access to **attract remote workers and remote work opportunities**, particularly in rural areas.

Transforming Government Services, Education, and Healthcare

State and local government can also leverage this investment to better serve constituents. Government agencies face many demands for delivering services and information, and a mandate that they will deliver them in a fiscally prudent manner. Every branch of government at the State and local level recognizes the importance of advancing their technology resources for their internal needs and/or for the delivery of government services and information online. Citizens increasingly expect to be able to interact with organizations online, and their government is no exception.

These historic investments in broadband allow West Virginia to reimagine how public services—especially education and healthcare—are delivered and how government is run.

The West Virginia Office of Technology is the appropriate leader to support this transformation by offering deployment of online processes and platforms for internal and public-facing use. State agencies can expand delivery of high-quality online services. Extending similar support efforts to local governments, with a focus on developing best practices and shared services, will foster the development and use of broadband services for the purpose of better serving the public.

With universal access and initiatives to close the digital divide, the improved delivery of public services will empower West Virginians to better access education and healthcare, improving their ability to participate in the State's economy. This new paradigm requires strong leadership to ensure that WV's public educational institutions have the support they need to rise to the occasion, and that students can access online education opportunities. In both cases, this cross-continuum alignment is likely to increase awareness of broadband industry careers and opportunities. This leadership will also ensure healthcare institutions and patients have access to telehealth services, such as through rural community center partnerships with organizations like the West Virginia Department of Health and Human Resources.

West Virginia has within its sights: broadband for all West Virginia. Now is the time to plan in earnest—during this period when the goal can be seen but has not yet been reached—for the task of leveraging this investment in ways that will increase its benefits to the State and its residents. WVDED will play that leadership role and convene key stakeholders, but progress will depend on partners.

5.6 Technical Assistance

The technical assistance that West Virginia has already received from the Federal Government has been invaluable. During the development of the Digital Equity and Five-Year Broadband Action Plans, WVDED met regularly with its NTIA Federal Program Officer. The Federal Program Officer (FPO) provided a line of communication from the State to Washington, D.C. West Virginia's Program Officer was responsive and answered planning questions quickly and effectively.

Looking ahead, WVDED will seek technical assistance with:

1. **Updates to CostQuest data** (as described in Section 3.1.1): CostQuest data informs the cost to provide service to any of the addresses in the underlying Fabric. Upon release of this data in August 2023, WVDED looks forward to using this information to further validate its estimated cost to provide universal broadband.

2. **Continued support from NTIA staff:** WVDED benefits greatly from the support of its FPO and their colleagues and anticipates continued engagement and advisement throughout the development of both the Initial and Final Proposals.
3. **Additional resources and training opportunities:** NTIA provides WVDED staff and its colleagues around the nation with opportunities to attend training (in-person and virtual). These opportunities support the professional development of Broadband Office employees around the nation. As states progress through the phases of the BEAD Grant, staff will continue to benefit from training and convenings.
4. **Opportunities to connect with peer states:** WVDED has appreciated each opportunity to engage with its peers and share best practices. Additional opportunities to convene partners around the country will ensure WVDED is aligned with neighboring states and others.
5. **Connections to national leaders:** WVDED looks forward to building relationships and connections with national broadband and digital equity leaders at the industry and non-profit levels. Such relationships provide opportunities for WVDED to learn from the sector's pioneers.

Every state in the nation took on this BEAD program together and under the same timeframe. Navigating this new terrain has been a tremendous challenge but through partnership across states and with the NTIA, much has been accomplished. WVDED is proud of the work being done across the nation and looks forward to continued collaboration. We're all in it together.

6. Conclusion

Increasingly, access to the internet plays a critical role in the ways in which Americans work, learn, receive health care, and participate in democracy. Full participation in the twenty-first century economy requires it. Yet far too many West Virginians lack access to affordable, reliable, high speed internet access.

The COVID-19 pandemic made clear that broadband is a necessity for all Americans, regardless of their age, race, or income, irrespective of where they live, what languages they speak, what resources they have at their disposal, and what specific challenges they may face in their daily lives.¹²⁸ With historic and transformational broadband investments from the Federal Government, West Virginians will have the opportunity to realize the full potential of the internet.

WVDED is committed to achieving universal broadband coverage and digital equity throughout the State through aggressive broadband deployment goals and a commitment to closing the digital divide through robust equity and inclusion initiatives.

To do so, WVDED's three pillars will guide its work to achieve internet for all West Virginians:

1 Universal Broadband Access

2 Increase Digital Equity and Inclusion

3 Leverage Improved Broadband

Specific goals and objectives for each pillar will be monitored and tracked by WVDED and its partners. The work is significant but with historic broadband funding, the State finally has the resources it needs to connect all West Virginians. And WVDED is not doing it alone.

Throughout the development of this Five-Year Action Plan and the Digital Equity Plan, WVDED and its partners worked together to deepen understanding of broadband needs and elevate the voices of West Virginians on the wrong side of the digital divide. The pillars above, as well as the strategies included in the BEAD and Digital Equity plans, were informed by outreach, listening sessions, stakeholder engagement, surveys, interviews, and public input. Additionally, WVDED received invaluable advice from the Broadband Enhancement Council, the Digital Equity Steering Committee, and the Broadband Workforce Development Council.

¹²⁸ Broadband Equity, Access and Deployment Notice of Funding Opportunity, NTIA: <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>

WVDED is grateful for the time and energy that so many West Virginians offered to support and inform this effort so that this historic investment will maximize opportunities for all.

The following organizations contributed to the development of West Virginia’s Five-Year Action Plan:

AARP-West Virginia

Bowles Rice, LLP

Generation West Virginia

Marshall University, Center for Business and Economic Research

Regional Optical Communications

Regional Planning and Development Councils

The Thrasher Group

Tilson Technology Management

West Virginia University: StartUp West Virginia; Data Driven WV; Survey Research Center; Land Use and Sustainable Development Law Clinic

West Virginia Broadband Enhancement Council

West Virginia Community and Technical College System

West Virginia Economic Development Council

West Virginia Department of Education

West Virginia Library Commission

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A.1. Crosswalk with Guidance Document

NTIA Requirement Key	
NTIA Broadband Equity, Access, and Deployment Guidance Requirement	Addressed in West Virginia BEAD Plan Section/s
<p>3.1: Provide details of the existing broadband program or office within the Eligible Entity, including:</p> <ul style="list-style-type: none"> any activities that the program or office currently conducts, any previous entity-wide plans or goals for availability of broadband, and any prior experience awarding broadband deployment grants. ^{Req 1} 	3.3 Existing Programs and Partnerships
<p>3.1: Identify the funding that the Eligible Entity currently has available for broadband deployment and other broadband-related activities, including:</p> <ul style="list-style-type: none"> data collection and local planning, and the sources of that funding, including whether the funds are from the Eligible Entity or from the federal government. ^{Req 2} 	<p>3.3.2 Existing Infrastructure Programs</p> <p>3.3.3 Existing Program Funding and Sources</p>
<p>3.1: Identify existing efforts funded by the federal government, including the Universal Service Fund, or an Eligible Entity to deploy broadband and close the digital divide. ^{Req 3}</p>	<p>3.1.1 Current Broadband Deployment</p> <p>3.3.2 Existing Infrastructure Programs</p>
<p>3.1: Identify the current full-time and part-time employees of the Eligible Entity who will assist in implementing and administering the BEAD Program and the duties assigned to those employees, as well as any existing contracted support, and any planned expansion of employees or contractors. ^{Req 4}</p>	3.3.1 The Office of Broadband, Department of Economic Development
<p>3.2: ...[identify] and [provide] details regarding any relevant partners, such as community-based organizations and CAIs that may inform broadband deployment and adoption planning. ^{Req 6}</p>	<p>3.1.2 State of Broadband Workforce</p> <p>3.1.3 Digital Equity Needs and Gaps</p> <p>3.2.1 Soft Assets</p> <p>6 Conclusion</p>
<p>3.3: Include an asset inventory that catalogues broadband adoption, affordability, equity, access, and deployment activities occurring within the Eligible Entity... ^{Req 6}</p>	<p>3.1.1 Current Broadband Deployment</p> <p>3.1.2 State of Broadband Workforce</p> <p>3.3.2 Existing Infrastructure Programs</p> <p>3.2 Asset Inventory</p>
<p>3.4: Identify local and regional broadband service needs and gaps within the Eligible Entity's boundaries, including unserved or underserved locations and CAIs without</p>	3.1 Needs and Gaps Assessment

<p>gigabit service, and/or any plans to make these determinations where service availability is unclear. ^{Req 9}</p>	
<p>3.4: Identify digital equity and inclusion needs, goals, and implementation strategies, including ways in which the Eligible Entity plans to utilize BEAD funding, Digital Equity Act funding and/or other funding streams in concert to remedy inequities and barriers to inclusion. Accordingly, the Five-Year Action Plan should set forth a vision for digital equity, include the results of a needs assessment for underrepresented communities and an asset inventory of ongoing digital equity activities, and detail holistic strategies around affordability, devices, digital skills, technical support, and digital navigation. This requirement may be satisfied by the completion of a State Digital Equity Plan under the Digital Equity Act. ^{Req 11}</p>	<p>3.1.3 Digital Equity Needs and Gaps 3.2.1 Soft Assets See West Virginia’s State Digital Equity Plan, available September 2023</p>
<p>3.4: Incorporate available federal, Eligible Entity, or local broadband availability and adoption data, including but not limited to Affordable Connectivity Program enrollment data. Other federal broadband data sources include the NTIA Internet Use Survey, the NTIA Indicators of Broadband Need Map, and the American Community Survey. ^{Req 8}</p>	<p>Incorporated in many sections throughout the plan</p>
<p>4: Identify known or potential obstacles or barriers to the successful implementation of the BEAD Program and the Eligible Entity’s corresponding plans to address them. ^{Req 5}</p>	<p>4 Obstacles or Barriers</p>
<p>5.1: Include a description of the Eligible Entity’s external engagement process, demonstrating collaboration with local, regional, and Tribal (as applicable) entities (governmental and non-governmental) and reflective of the local coordination requirements outlined herein, including outreach to underrepresented communities and unions and worker organizations. The engagement required must be undertaken both during the development of the Five-Year Action Plan itself and following submission of the plan, reflecting ongoing collaboration throughout the BEAD Program. ^{Req 7}</p>	<p>5.1 Stakeholder Engagement Process 5.2.5 Workforce Strategies</p>

<p>5.2: Provide a comprehensive, high-level plan for providing reliable, affordable, high-speed internet service throughout the Eligible Entity, including:</p> <ul style="list-style-type: none"> • Prioritization of areas for federal support. <small>Req 10.c</small> 	<p>5.2.1 Unserved and Underserved Locations 5.2.2 Community Anchor Institutions 5.2.4 Increasing Digital Equity</p>
<p>5.3: Provide a comprehensive, high-level plan for providing reliable, affordable, high-speed internet service throughout the Eligible Entity, including:</p> <ul style="list-style-type: none"> • The planned utilization of federal, Eligible Entity, and local funding sources <small>Req 10.b</small> 	<p>5.3 Estimated Cost of Universal Service</p>
<p>5.4: Provide a comprehensive, high-level plan for providing reliable, affordable, high-speed internet service throughout the Eligible Entity, including:</p> <ul style="list-style-type: none"> • Any consideration afforded to the use of public-private partnerships or cooperatives in addressing the needs of the Eligible Entity’s residents. <small>Req 10.d</small> • Strategies to address affordability issues, including but not limited to strategies to increase enrollment in the Affordable Connectivity Program by eligible households. <small>Req 10.e</small> • Strategies to ensure an available and highly skilled workforce (including by subgrantees, contractors, and subcontractors) to minimize project disruptions, including any plans to ensure strong labor standards and protections, such as those listed in Section IV.C.1.e; and plans to attract, retain, or transition the skilled workforce needed to achieve the plan’s goals, including describing the involvement and partnerships of sub-grantees, contractors, and subcontractors with existing in-house skills training programs, unions and worker organizations; community colleges and public school districts; supportive services providers; Registered Apprenticeship programs and other labor management training programs, or other quality workforce training providers. <small>Req 10.f</small> 	<p>3.3.4 Establishment of Broadband Cooperatives 5.2 Key Strategies, Planned Activities, and Priorities 5.2.5 Workforce Strategies 5.3.1 Theoretical Cost Methodology 5.3.2 Likely Cost Methodology</p>
<p>5.5: Provide a comprehensive, high-level plan for providing reliable, affordable, high-speed internet service throughout the Eligible Entity, including:</p> <ul style="list-style-type: none"> • The estimated timeline... for universal service. <small>Req 10.a</small> 	<p>5.4 Estimated Timeline</p>

<p>5.6: Provide a comprehensive, high-level plan for providing reliable, affordable, high-speed internet service throughout the Eligible Entity, including:</p> <ul style="list-style-type: none"> • The estimated... cost for universal service.^{Req 10.a} 	<p>5.3 Estimated Cost of Universal Service</p>
<p>5.7: Detail alignment of the Five-Year Action Plan with other existing and planned economic development, telehealth, workforce development, and related connectivity efforts, and other Eligible Entity priorities.^{Req 12}</p>	<p>5.5 Alignment</p>
<p>5.8: Describe technical assistance and additional capacity needed for successful implementation of the BEAD Program.^{Req 13}</p>	<p>5.6 Technical Assistance</p>