Five-Year Action Plan

Broadband Equity, Access, and Deployment (BEAD) Program

Department of Housing and Community Development

Office of Statewide Broadband

State of Maryland

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Maryland
DEPARTMENT OF HOUSING
AND COMMUNITY DEVELOPMENT

CONNECT Maryland
High Speed Internet For A Better Future.

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1 Executive summary

The Maryland Department of Housing and Community Development Office of Statewide Broadband (OSB), the Eligible Entity for the State of Maryland, is pleased to present this Broadband Equity, Access, and Deployment (BEAD) Program Five-Year Action Plan, which comprises a comprehensive needs assessment (including the needs of covered populations and underrepresented communities) and establishes Maryland's goal to ensure all residents have access to broadband services and are empowered to pursue "the acquisition of skills and knowledge necessary for digitally inclusive communities."[1]

1.1 Vision and objectives

Governor Wes Moore's administration and the Maryland General Assembly share a common vision in which Maryland leads the nation in connecting all residents to affordable broadband.

> "Internet access is essential for Marylanders to have a pathway to receive critical information, be involved with their communities and participate in the local economy…."
>
> –Gov. Wes Moore

As established in the Digital Connectivity Act of 2021,[2] the State of Maryland's goal is to "ensure that every resident of the State has the ability to connect to universal, affordable, reliable broadband Internet that exceeds the Federal Communications Commission standard for upload and download speeds by a date not later than December 31, 2026."

Maryland's vision for broadband encompasses both access and equity:[3]

1. Affordable, accessible, and reliable high-speed home internet service is available for all individuals
2. Public online content is inclusive and accessible by all individuals

[1] "Senate Bill 66, Chapter 74, Digital Connectivity Act of 2021," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf, at Preamble.
[2] Senate Bill 66, at 6.5–104(c)(1)(I)(2).
[3] "Maryland Facilitated IIJA Workforce Development Session," DHCD, March 29, 2023, https://dhcd.maryland.gov/Broadband/Documents/MD-IIJA-Facilitated-Session-Workforce-Development.pdf, slide 5 (linked to from "Connect Maryland," DHCD, https://dhcd.maryland.gov/Broadband/Pages/default.aspx).

3. Individuals have digital skills to support their ability to meaningfully use the internet in their daily lives
4. Individuals can protect their data privacy and online security
5. Individuals have access to a computer or tablet and technical support

Execution of the State's broadband vision is being led by an experienced team at OSB who are well versed in forging the partnerships necessary to achieve both universal connectivity and digital inclusion. This vision builds on years of work by the State, often in partnership with local governments and through the State sub-grant-funded efforts of partners such as internet service providers (ISP), to build broadband infrastructure and foster broadband deployment.

1.2 Current state of broadband and digital inclusion

OSB and its predecessor, the Office of Rural Broadband,[4] have been administering broadband grant programs since 2018 to fund efforts including broadband expansion, network infrastructure, federal application assistance, and digital inclusion.

In 2021, the State launched its largest planned investment in broadband to date, the Connect Maryland initiative, which will invest $400 million to support broadband infrastructure deployment and digital inclusion initiatives.

As of April 2023, the State's broadband office had invested more than $270 million in broadband infrastructure and programs since its establishment, enabling the deployment of high-speed internet access to an estimated 52,000 previously unserved homes and businesses statewide.

Along with its efforts to expand broadband access, the State has also made strides to further digital inclusion. To reduce the number of Marylanders that are unable to afford broadband connectivity, the State used $45 million in American Rescue Plan Act (ARPA) funding to create the Maryland Emergency Broadband Benefit (MEBB) Program that provides a $15 State subsidy in addition to the Affordable Connectivity Program (ACP) subsidy. As of July 2023, an estimated 33 percent of households in the State who are eligible for the ACP are enrolled in the program.[5] On July 18, 2023, Governor Wes Moore announced a new program, "Maryland ActNow," in

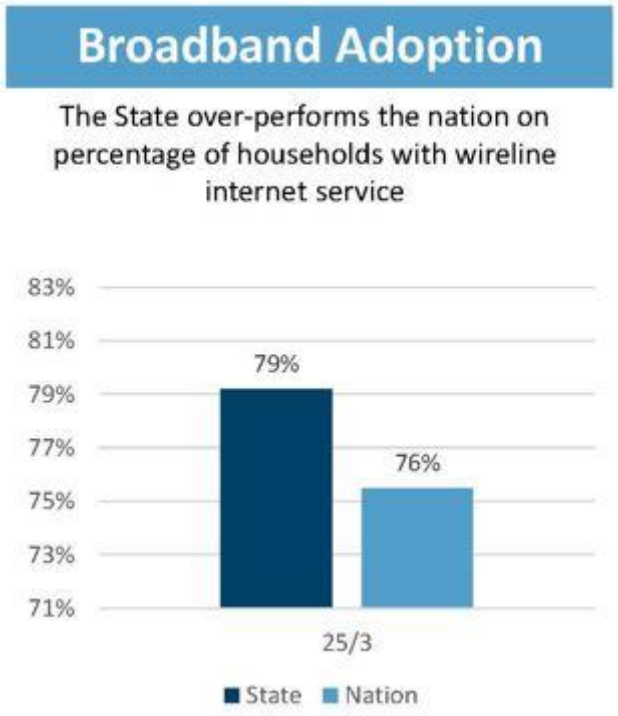
[4] OSB was established by the Digital Connectivity Act (SB 66) in 2021 to succeed the Office of Rural Broadband, which was created by executive order in 2017 (01.01.2017.14).

[5] See ACP Connectivity Tracker at ACP Enrollment and Claims Tracker - Universal Service Administrative Company (usac.org) (last accessed July 31, 2023). See also "Bipartisan Infrastructure Law State Fact Sheet: Maryland," the White House, March 2023, https://www.whitehouse.gov/wp-content/uploads/2023/03/Maryland-Fact-Sheet-March-Edition.pdf.

partnership with EducationSuperHighway to increase awareness of ACP and the MEBB program.[6] The State will also use $30 million in ARPA funding to provide approximately 145,000 devices to low-income families in fiscal year 2023, distributed through county and municipal governments.

According to analysis of the FCC's address fabric (June 2023), 98.3 percent of Maryland locations are served at 100/20 Mbps (see Section 5.5.2). As Figure 1 shows, Maryland performs well relative to national averages in broadband adoption, but the State continues to make efforts to close the remaining gap.

Figure 1: Summary of findings on broadband adoption[7]



1.3 Obstacles or barriers

OSB has identified a range of potential obstacles or barriers that it will seek to mitigate. As discussed in Section 4, these include:

[6] "Governor Moore Launches Maryland ActNow Campaign to Close the Digital Divide in Maryland," Office of Governor Wes Moore, News Release, July 18, 2023, https://governor.maryland.gov/news/press/pages/governor-moore-launches-maryland-actnow-campaign-to-close-the-digital-divide-in-maryland.aspx.

[7] U.S. Census Bureau, American Community Survey, Public Use Microdata Sample (2021), 1-year estimates,

- **Legislative and regulatory barriers –** The State recognizes the importance of efforts to streamline State and local permitting in such a way as to protect the State's interests while also ensuring effective and efficient broadband construction permitting.

- **Labor shortages –** The pool of skilled workers for broadband deployment is smaller than experts predict is necessary for the broadband projects that BEAD will fund nationwide. The State will work in concert with workforce development agencies and community colleges to develop training programs that meet the specific industry skills now and into the future.

- **Supply chain issues and materials availability –** The extensive federal funding allocated to broadband infrastructure deployment, as well as current and planned investments by State and local governments and ISPs nationwide, have caused a spike in demand for labor and materials. This compounds supply-chain related market disruptions from the COVID-19 pandemic that have yet to disappear.

- **Industry participation –** As OSB's past experience in broadband grant-making illustrates, commitments by ISPs to share the cost and risk of last-mile broadband deployment in exchange for partial public funding will be an important factor in closing the State's digital divide.

- **Topography –** Construction methods must consider survivability in terms of flooding and other natural disasters as well as instances of reaching isolated, yet populated islands in the Chesapeake Bay.

- **Affordability –** The cost of available service is a barrier to broadband adoption in Maryland for some households, and while discounted services and subsidy programs are available there is low awareness of and participation in these programs.

1.4 Implementation plan

This Plan presents the State's estimated costs, timeline, and strategies for achieving universal service along with strategies related to remedying inequities in digital inclusion.

1.4.1 Priorities

The State's primary objectives for broadband deployment are aligned with the principal focus of the BEAD Program:

1. Serving 100 percent of unserved locations (i.e., below 25/3 Mbps) within five years– including public and non-profit owned multiple dwelling unit (MDU) locations that are determined to be unserved through the challenge process to ensure the availability of

reliable and affordable high-speed broadband access in low-income and affordable public housing

2. Serving 100 percent of underserved locations (i.e., between 25/3 and 100/20) within five years

3. Assuming adequate funding, delivering gigabit connections to community anchor institutions that do not have that level of service within five years

Should BEAD funds remain after the first three objectives are fulfilled, Maryland will then focus on:

4. Supporting digital equity and inclusion programs to help drive higher adoption among BEAD-defined covered populations

1.4.2 Estimated timeline and cost for universal service

In summary, the State estimates (as of the submission of this Plan) that universal service can be achieved by deploying fiber within the mandatory BEAD period (i.e., by 2028). Planning, design, and permitting are estimated to generally require up to 12 months to fulfill, followed by another 12 to 18 months at minimum for construction. Constructing "extensions" from existing networks may require less time. These assumptions do not take into account uncontrollable barriers that may arise, such as supply chain issues that could alter planned timelines.

The State estimates the total five-year deployment cost to be approximately $484.3 million to reach the estimated 32,006 unserved and underserved addresses. This estimate assumes buildout of primary fiber-to-the-premises (FTTP) infrastructure passing each address, with deployment activities related to customer activations, including service drop construction and installation of customer premises equipment (CPE), continuing through the five-year period of performance. These estimates are based on an analytical model that incorporates local labor and material unit costs; the location of existing infrastructure that can be used as a starting point; and surveys of a statistically valid sample of unserved and underserved areas.

Due to Maryland's past and ongoing broadband expansion efforts, the remaining unserved and underserved addresses represent the last, hardest-to-build locations. These locations also often represent a lower population density with longer distances between locations and current providers, which increases the costs to extend high-speed, end-to-end fiber. In addition, this estimate accounts for all the funding that the State may need to incentivize providers to build fiber to those locations. Other factors such as defining extremely high-cost locations will impact the actual amount of BEAD funding (and match) that will be required to deliver universal service.

Maryland will adjust the proposed technology mix underpinning its cost modeling estimates as development of the Initial Proposal continues and in accordance with the BEAD allocation of $267,738,400.71 announced by NTIA on June 26, 2023. This could include extensions of existing hybrid fiber-coaxial (HFC) networks that are scalable to provide the required speeds. Though not preferable, these extensions could be part of the proposed technology mix in order to meet universal service goals in locations that make sense from a cost standpoint.

1.5 Confirmation that this BEAD Five-Year Action Plan meets minimum requirements

This Five-Year Action Plan meets minimum requirements as outlined in the NOFO and summarized in Section 7.1 of the NTIA's "Five-Year Action Plan: Guidance" document:

Requirement	Section in this Plan
1. Details of existing broadband program of office within the Eligible Entity	Section 3 Appendices
2. Funding the Eligible Entity has available	Section 3.1 Appendices
3. Existing efforts funded by the federal government	Section 3.1
4. Employees and contract support	Section 3.1
5. Obstacles or barriers	Section 4
6. Asset inventories	Section 3.3 Appendices
7. Description of external engagement process	Section 3 Section 5.1 Appendices
8. Broadband availability and adoption data	Section 3 Section 5
9. Broadband service needs and gaps	Section 3 Section 5
10. Comprehensive, high-level plan, including timeline and cost for universal service	Section 5
11. Digital equity and inclusion needs, goals, and implementation strategies	Section 3 Section 5
12. Alignment of the Plan with other efforts and priorities	Section 5
13. Technical assistance and capacity needed for successful implementation	Section 5.8

2 Overview of the Five-Year Action Plan

2.1 Vision

Governor Wes Moore's administration and the Maryland General Assembly share a common vision in which Maryland leads the nation in connecting all residents to affordable, high-speed broadband. To that end, the State of Maryland will "ensure that every Marylander has access to broadband services, regardless of their ZIP code"[8] and that all residents are empowered to pursue "the acquisition of skills and knowledge necessary for digitally inclusive communities."[9]

Maryland's vision for broadband encompasses both access and equity:[10]

- Affordable, accessible, and reliable high-speed home internet service is available for all individuals
- Public online content is inclusive and accessible by all individuals
- Individuals have digital skills to support their ability to meaningfully use the internet in their daily lives
- Individuals can protect their data privacy and online security
- Individuals have access to a computer or tablet and technical support

The State legislature created OSB to lead Maryland's extensive broadband deployment and digital inclusion efforts—which will include effectively and efficiently deploying future federal funding to address the needs identified in this Five-Year Action Plan (Plan). Execution of the State's vision is being led by an experienced team at OSB who are well versed in forging the partnerships necessary to achieve both universal connectivity and digital inclusion.

OSB has taken direction from the General Assembly, which "recognizes the importance of the Internet as the most transformative technology of modern life, a key stimulus for

[8] "Connect Maryland," OSB, https://dhcd.maryland.gov/Broadband/Pages/default.aspx.
[9] "Senate Bill 66, Chapter 74, Digital Connectivity Act of 2021," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf, at Preamble.
[10] "Maryland Facilitated IIJA Workforce Development Session," DHCD, March 29, 2023, https://dhcd.maryland.gov/Broadband/Documents/MD-IIJA-Facilitated-Session-Workforce-Development.pdf, slide 5 (linked to from "Connect Maryland," DHCD, https://dhcd.maryland.gov/Broadband/Pages/default.aspx).

socioeconomic opportunity and development, and a prerequisite for social and economic inclusion."[11]

To achieve this vision, OSB recognizes the legislature's commitment "to enabling the development of a statewide digital communications infrastructure by encouraging continued private investment and where necessary, through public investment, public-private partnerships, and cooperatives to meet the growing demand for reliable, high-speed, universal, and affordable broadband access in the key sectors of public safety, education, health care, and transportation for all Marylanders."[12]

This broadband vision builds on years of work by the State, often in partnership with local governments and through the State sub-grant-funded efforts of partners such as internet service providers, to build broadband infrastructure and foster broadband deployment. This history of cooperation between State agencies and among other key stakeholders will be a positive force for achieving the goals of this Plan.

The State of Maryland will build on its long history of successful broadband deployment with local partners, such as in creating the NTIA-funded One Maryland Broadband Network (OMBN), a 1,294-mile fiber optic middle-mile network that links 1,006 government facilities and anchor institutions while also traversing mountains, wetlands, and rural and urban communities to reach every county in the State.[13]

2.2 Goals and objectives

As established in the Digital Connectivity Act of 2021,[14] the State of Maryland's goal is to "ensure that every resident of the State has the ability to connect to universal, affordable, reliable broadband Internet that exceeds the Federal Communications Commission standard for upload and download speeds."[15]

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[11] "Senate Bill 66, Chapter 74: Digital Connectivity Act of 2021," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf, at Preamble.
[12] "Senate Bill 66, Chapter 74: Digital Connectivity Act of 2021," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf, at Preamble.
[13] OMBN linked and extended three independent fiber networks: the rural nonprofit Maryland Broadband Cooperative network, the State-run Maryland network, and the 10-county consortium Inter-County Broadband Network. The project was completed in 2013. *See:* "One Maryland Broadband Network (OMBN)," NTIA, https://www2.ntia.doc.gov/grantee/maryland-department-of-information-technology.
[14] "Senate Bill 66," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf.
[15] "Chapter 74, §6.5–104 (c)(1)(i)," Maryland General Assembly, https://mgaleg.maryland.gov/mgawebsite/Laws/StatuteText?article=ghs&section=6.5-104&enactments=False&archived=False.

The State of Maryland has the following primary objectives for broadband deployment, which are fully aligned with the requirements of the BEAD Program:

1. Serving 100 percent of unserved locations (i.e., below 25/3 Mbps) within five years– including public and non-profit owned multiple dwelling unit (MDU) locations that are determined to be unserved through the challenge process to ensure the availability of reliable and affordable high-speed broadband access in low-income and affordable public housing

2. Serving 100 percent of underserved locations (i.e., between 25/3 and 100/20) within five years

3. Delivering gigabit connections to community anchor institutions that do not have that level of service within five years

Should BEAD funds remain after the first three objectives are fulfilled, Maryland will then focus on:

4. Supporting digital equity and inclusion programs to help drive higher adoption among BEAD-defined covered populations

3 Current state of broadband and digital inclusion

This section describes the current state of broadband infrastructure and digital inclusion in Maryland, as documented through rigorous and comprehensive data collection and stakeholder outreach efforts. It begins with an overview of the State's past and current efforts to promote broadband deployment and digital equity; describes the resources and relationships available to OSB; presents detailed asset inventories related to broadband deployment, adoption, affordability, and access, and digital equity; and presents a needs and gaps assessment.

The State of Maryland is a national leader in broadband infrastructure deployment and is well-positioned to close the remaining digital divide among its residents. Governor Wes Moore's administration has set a standard of excellence that includes leaving no one behind—especially in terms of digital connectivity.

Maryland has creatively used a variety of funding programs to bridge the digital divide and will continue to do so. This includes support to local jurisdictions and their ISP partners for infrastructure construction; bringing high-capacity networks to anchor institutions; and piloting several digital inclusion initiatives, including purchasing and distributing laptops for qualifying households as well as digital skills training.

Through the Connect Maryland initiative, launched in 2021, the State has committed to invest $400 million to support broadband infrastructure deployment and digital inclusion initiatives, administered by OSB; $229 million of this investment was allocated from federal funding under the American Rescue Plan Act (ARPA) Coronavirus State and Local Fiscal Recovery Fund (SLFRF), and an additional $171 million from ARPA Capital Projects Fund (CPF).[16]

Although Connect Maryland represents the State's largest planned investment in broadband to date, OSB and its predecessor, the Office of Rural Broadband,[17] have been administering broadband grant programs since 2018 as described in Table 1. OSB has successfully administered programs funded with State resources and by federal funding from the

[16] "Governor Hogan Announces $400 Million Initiative to Ensure Universal Broadband For Maryland," Maryland Department of Housing and Community Development, August 20, 2021, https://news.maryland.gov/dhcd/2021/08/20/governor-hogan-announces-400-million-initiative-to-ensure-universal-broadband-for-maryland/.

[17] The Office of Statewide Broadband was established by SB 66 in 2021 to succeed the Office of Rural Broadband, which was created by executive order in 2017 (01.01.2017.14) with a focus on expanding broadband in underserved, rural areas; Executive Order Of June 27, 2017, "Office of Rural Broadband," https://mgaleg.maryland.gov/Pubs/LegisLegal/2017-executive-orders.pdf.

Coronavirus Aid, Relief, and Economic Security Act (CARES) Act (2020), as well as ARPA-funded grant programs in 2021.

As of April 2023, the State's broadband office had invested more than $270 million in broadband infrastructure and programs since its establishment, enabling the deployment of high-speed internet access to an estimated 52,000 previously unserved homes and businesses statewide. This total includes an investment of nearly $92 million announced in April 2023 through the Connect Maryland Network Infrastructure Grant Program, which made 35 awards to ISPs and local jurisdictions to construct new broadband networks to service an estimated 14,500 households and businesses.

Leveraging the State's funding, these projects invest more than $143 million to connect communities as remote as homes in the mountains of western Washington County to areas in more densely populated jurisdictions in the State, including Prince George's and Montgomery counties.[18]

3.1 Existing programs

The table below identifies OSB's current and recent activities and programs (including stakeholder engagement conducted for purposes of the BEAD Five-Year Plan); OSB's previous statewide plans comprising goals for the availability of broadband; and its prior experience awarding broadband deployment grants.

[18] "Governor Moore Announces Nearly $92 Million Awarded to Expand Broadband Access," State of Maryland news release, April 5, 2023, https://news.maryland.gov/dhcd/2023/04/05/governor-moore-announces-nearly-92-million-awarded-to-expand-broadband-access/.

Table 1: Current and past activities that OSB conducts

Activity name	Description	Intended outcome(s)
Maryland Emergency Broadband Benefit Program	Provides a subsidy up to $15 per month against a low-income household's internet service cost, in addition to the $30 per month provided by the federal ACP. This program was set up to seamlessly layer into the federal benefit, so that a household qualifying for ACP automatically also receives the State subsidy as well	Reduce the number of Marylanders that are unable to have access to affordable broadband connectivity
Maryland SpeedSurvey	Administer an online speed survey that residents can use to provide data about the speed of their internet service, or report that internet service is not available at their location	Gather data about the availability and speed of internet service, including identifying potentially unserved locations
Federal Funding Application Assistance	Offers 100 percent grants to local jurisdictions or their ISP partner for the costs associated with federal funding applications	Improve the delivery of broadband services to unserved residents and businesses by providing financial and technical assistance as needed to obtain project funding via federal funding sources
Connected Devices Program (MD-CDP)	Provides grants of internet-enabled devices to counties and municipal governments to distribute to eligible low-income households; the program was allocated $30	Assist in digital equity and inclusion efforts in Maryland by providing new devices to families who need them. OSP procured laptops for distribution to county and

Activity name	Description	Intended outcome(s)
	million in ARPA funding to provide approximately 145,000 devices in FY23[19] and contracted with HP to supply Chromebooks[20]	municipal governments, which engaged with local nonprofit organizations for distribution. Distribution in round 1 totaled 98,000 devices to local governments
Network Infrastructure Grant Program (MDNI Program)	Offers grants of between $800,000 and $4.5 million to local jurisdictions or their ISP partner to construct new broadband networks to serve unserved areas[21]	The State awarded almost $100 million through the program in 2022[22] and announced an additional $92 million in awards in April 2023 to connect 14,500 locations,[23] utilizing support from the Capital Projects Fund[24]
Neighborhood Connect Broadband Grant Program	Provided funding to local jurisdictions and their ISP partners to extend existing broadband service to unserved areas	Approximately $14.4 million awarded in FY22[25]
Statement of Existing Service Area – Grant Application PFSA Challenge Process	A companion effort to the MDNI and Neighborhood Connect programs that	Ensure that the maximum amount of grant funding is directed to unserved areas

[19] "Connect Maryland: FY23 Connected Devices program," OSB presentation, November 29, 2022, https://dhcd.maryland.gov/Broadband/Documents/CDP-Presentation.pdf.
[20] "Provider Resources: Connected Devices Program (MD-CDP)," OSB, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.
[21] Defined by the program as areas that do not have access to service that provides 100 Mbps download, 20 Mbps upload with maximum latency of 50 ms.
[22] "FY22 Broadband Awards List," OSB, https://dhcd.maryland.gov/Documents/PressReleases/FY22BroadbandAwardsList.pdf.
[23] "Governor Moore Announces Nearly $92 Million Awarded to Expand Broadband Access," press release from the Office of the Governor, April 5, 2023, https://governor.maryland.gov/press/pages/Governor-Moore-Announces-Nearly-$92-Million-Awarded-to-Expand-Broadband-Access.aspx.
[24] https://home.treasury.gov/news/press-releases/jy0866.
[25] "FY22 Broadband Awards List," OSB, https://dhcd.maryland.gov/Documents/PressReleases/FY22BroadbandAwardsList.pdf.

Activity name	Description	Intended outcome(s)
	allows incumbent ISPs to submit challenges to the proposed funded service areas under the MDNI program by demonstrating they offer existing service in the area	
Maryland Emergency Education Relief (MEER) Grant	Eligible applicants were schools, libraries, and anchor institutions; the program covered 100 percent of the cost of eligible purchases of equipment or broadband services for on- or off-campus use by students, school staff, and community members[26]	Help communities close the gap for K-12 students who lack necessary internet access or the devices they need to connect to classrooms and lay the groundwork for improved broadband access, adoption, and utilization. Approximately $8.4 million was awarded through the program in FY22[27]
Digital Inclusion Grant (MD-DIG) Program	Provided funding to local jurisdictions, 501(c) entities, and community-based anchor institutions to fund projects around digital inclusion planning and implementation	Further the State's digital inclusion efforts
Connected Communities Grant Program (MD-GAPS)	Provided grants for up to 100 percent of the construction, deployment, expansion, or continuation of community-	Address the affordability challenge many low to moderate income households face in subscribing to the internet;

[26] "Request for Applications: Connect Maryland: FY22 Maryland Emergency Education Relief Grant Program," OSB, April 20, 2022, https://dhcd.maryland.gov/Broadband/Documents/MEER/FY22-Application-Guide-Form.pdf.
[27] "FY22 Broadband Awards List," OSB, https://dhcd.maryland.gov/Documents/PressReleases/FY22BroadbandAwardsList.pdf.

Activity name	Description	Intended outcome(s)
	based gap networks	approximately $5 million awarded in FY22[28]
Maryland Broadband Advisory Workgroup	Created a bipartisan workgroup including representatives from the counties and municipalities, as well as members of the General Assembly	Bring together key stakeholders from across the State to advise the State on the best ways to utilize new investment in broadband infrastructure
Broadband for Public Housing	Provide grants to local jurisdictions to retrofit public housing for broadband distribution	Digital equity initiative to help bring broadband access to low-income residents of public housing communities; program administration is underway in 2023
Digital Connectedness program	Provide grants to local jurisdictions to help offset costs associated with difficult to connect homes	Reduce the number of locations not able to connect to available broadband due to geographical limitations[29]

OSB has managed strategic studies, needs assessments, grant programs, public-private partnerships, and other efforts to identify and close the State's digital divide. The tables below identify the current and planned full- and part-time employees and contractors who will assist in implementing and administering BEAD-funded activities and programs to achieve OSB's goals and objectives.

[28] "FY22 Broadband Awards List," OSB, https://dhcd.maryland.gov/Documents/PressReleases/FY22BroadbandAwardsList.pdf.
[29] Pending review by Treasury as of the writing of this Plan.

Table 2: Current and planned full-time and part-time employees

Current/ planned	Full-time/ part-time	Position	Description of role
Current	FT	Program Manager III – Digital Equity Program Manager	Direct day-to-day project activities to manage the digital equity portion of the BEAD program
Current	FT	Program Manager Sr I – Infrastructure Program Manager	Direct day-to-day project activities to manage the deployment portion of the BEAD program
Current	FT	Administrator II – Grants Manager	Complete and submit grant reports on behalf of, or in coordination with, the BIPM, and perform associated duties
Current	FT	Assistant Attorney General VI – Legal	Ensure all reports, applications, and documents follow federal and State requirements
Current	FT	HCD Financial Manager I – Grants Accounting Manager	Support the OSB with financial analysis and financial flow of federal funding and the facilitation of said funds
Current	FT	HCD Financial Analyst II – Grant Accountant	Support the GAM and the OSB with financial analysis and financial flow of federal funding and the facilitation of said funds
Current	FT	Program Manager III – Public Relations Manager	Support the OSB with creative marketing services

Table 3: Current and planned contractor support

Current/ planned	Time	Position	Description of role
Current	FT	Program Manager Senior I – Broadband Infrastructure Program Manager	Direct day-to-day project activities to manage the access and deployment portions of the BEAD program
Current	FT	Administrator II – Project Administrator	Support the BIPM with data requests and managing community outreach and stakeholder activities and events
Current	FT	Administrator II – GIS Developer	Support the BIPM with mapping requests, data management and mapping needs
Current	PT	Digital Equity Coordinator	Supports DEPM with the digital equity portion of the BEAD program
Current	FT	Public Affairs Officer II – Outreach Coordinator	Support the DEPM with community engagement and outreach services
Current	PT	Eastern Shore Regional GIS Cooperative	Assist with the creation of Maryland's Broadband Map and Plan
Planned	PT	MD Broadband Cooperative	Support the GIS consultant in the creation of Maryland's Broadband Map through data acquisition
Planned	PT	CTC Technology & Energy	Support the drafting of Maryland's Broadband Plan

The table below identifies OSB's funding for broadband deployment and other broadband-related activities.

Table 4: Broadband funding[30]

Source	Purpose	Total
FCC, Rural Digital Opportunity Fund[31]	Rural broadband deployment	$43,963,097.80[32]
NTIA Connecting Minority Communities Pilot Program – University of Maryland Eastern Shore	Rebuilding Our Digital Road: Digital Infrastructure Re-imagining project	$2,999,999.89[33]
NTIA Connecting Minority Communities Pilot Program – Morgan State University	META (Miles of Education through Technology Access) Zones project	$4,115,616[34]
NTIA – Enabling Middle Mile Broadband Infrastructure Program award to Baltimore Gas & Electric for the BGE Underground Fiber Project	Build 69.9 route-miles of underground middle-mile fiber	$15,438,845.47[35]
Maryland Office of Rural Broadband (ORB)[36]	Build fiber and supporting infrastructure to unserved areas. 45,582 locations passed over the life of the program	$245,343,703 over the life of the program[37]

[30] Details on expended and available funds for these programs are not accessible to OSB.
[31] "Auction 904 winning bidders by state," FCC, https://docs.fcc.gov/public/attachments/DA-20-1422A3.pdf.
[32] After disqualification of Space Exploration Technologies' wins of $4,060,771.30 for 5,413 locations in nine counties.
[33] "Biden-Harris Administration Announces More Than $175 Million in Internet for All Grants to 61 Minority-Serving Colleges and Universities," NTIA, February 23, 2023, https://www.internetforall.gov/news-media/biden-harris-administration-announces-more-175-million-internet-all-grants-61-minority.
[34] "Biden-Harris Administration Announces More Than $175 Million in Internet for All Grants to 61 Minority-Serving Colleges and Universities," NTIA, February 23, 2023, https://www.internetforall.gov/news-media/biden-harris-administration-announces-more-175-million-internet-all-grants-61-minority.
[35] "Funding Recipients," NTIA, https://broadbandusa.ntia.gov/funding-programs/enabling-middle-mile-broadband-infrastructure-program/funding-recipients. Total project cost is $30,889,369.68.
[36] The Office of Rural Broadband (ORB) was renamed the Office of Statewide Broadband.
[37] Total awarded in fiscal year 2023 was $91,632,351 to 20 jurisdictions. In FY 22, $114,677,575 was awarded to 15 jurisdictions. In FY 21, $28,840,532 was awarded to 11 jurisdictions. In FY 20, $9,845,690 was awarded to 12 jurisdictions; and in FY 19, $1,647,578 was awarded to 3 jurisdictions.

Source	Purpose	Total
U.S. Treasury State and Local Fiscal Recovery Funds (SLFRF)	Program at the University of Maryland to improve digital skills[38]	$6,000,000

3.2 Partnerships

The table below identifies OSB's current and potential future partners in the development and implementation of this Plan. These partners include organizations already engaged in broadband deployment and digital inclusion efforts (e.g., local governments, K-12 schools, higher education, ISPs) and entities OSB has identified as potential future collaborators.

Table 5: Partners

Partners	Description of current or planned role in broadband deployment and adoption
Aarons Place Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Al Huda Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Allegany County Commissioners	Recipient of State funding or pass-through federal funding for broadband infrastructure
Allegany County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Anne Arundel County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Anne Arundel Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Antietam Cable	Recipient of State funding or pass-through federal funding for broadband infrastructure
Baltimore City	Recipient of State funding or pass-through federal funding for digital equity initiatives
Baltimore City Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives

[38] "State of Maryland: American Rescue Plan State and Local Recovery Funds: 2022 Annual Performance Report," U.S. Treasury, July 31, 2022, https://home.treasury.gov/system/files/136/Maryland_2022RecoveryPlan_SLT-0958.pdf.

Partners	Description of current or planned role in broadband deployment and adoption
Baltimore County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Baltimore Schools for the Arts	Recipient of State funding or pass-through federal funding for digital equity initiatives
Bay Country Communications	Recipient of State funding or pass-through federal funding for broadband infrastructure
Board of Education of Allegany County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Baltimore County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Charles County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Harford County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Montgomery County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Prince George's County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Queen Anne’s County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of St Mary's County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Board of Education of Worcester County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Bowie State University	Recipient of State funding or pass-through federal funding for digital equity initiatives
Breezeline (formerly Atlantic Broadband)	Recipient of State funding or pass-through federal funding for broadband infrastructure
Byte Back	Recipient of State funding or pass-through federal funding for digital equity initiatives
Calvert County Government	Recipient of State funding or pass-through federal funding for broadband infrastructure
Calvert County Public Library	Recipient of State funding or pass-through federal funding for broadband infrastructure and digital equity initiatives
Calvert County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Cambridge Waterfront Development Inc.	Recipient of State funding or pass-through federal funding for broadband infrastructure

Partners	Description of current or planned role in broadband deployment and adoption
Caroline County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Caroline County Department of Social Services	Recipient of State funding or pass-through federal funding for digital equity initiatives
Caroline County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Carroll County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Carroll County Public Library	Recipient of State funding or pass-through federal funding for digital equity initiatives
Carroll County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Carroll Technology Council Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Casa Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Cecil County	Recipient of State funding or pass-through federal funding for broadband infrastructure and digital equity initiatives
Cecil County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Cedar Ridge Children's Home & School Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Center for Educational Leadership	Recipient of State funding or pass-through federal funding for digital equity initiatives
Central Baltimore Partnership, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Centro Apoyo Familiar	Recipient of State funding or pass-through federal funding for digital equity initiatives
Charles County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives
Charles County Commissioners	Recipient of State funding or pass-through federal funding for digital equity initiatives
Charles County Public Library	Recipient of State funding or pass-through federal funding for digital equity initiatives
Charter Communications	Recipient of State funding or pass-through federal funding for broadband infrastructure
Chelsea School	Recipient of State funding or pass-through federal funding for digital equity initiatives

Partners	Description of current or planned role in broadband deployment and adoption
Chimes Foundation, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Choptank Electric	Recipient of State funding or pass-through federal funding for broadband infrastructure
Church of the Immaculate Conception	Recipient of State funding or pass-through federal funding for digital equity initiatives
City of Baltimore	Recipient of State funding or pass-through federal funding for digital equity initiatives
City of Cambridge	Recipient of State funding or pass-through federal funding for broadband infrastructure
City of Crisfield	Recipient of State funding or pass-through federal funding for broadband infrastructure and digital equity initiatives
City of Greenbelt	Recipient of State funding or pass-through federal funding for digital equity initiatives
City of Hagerstown	Recipient of State funding or pass-through federal funding for broadband infrastructure
City of Princess Anne	Recipient of State funding or pass-through federal funding for digital equity initiatives
City of Salisbury	Recipient of State funding or pass-through federal funding for digital equity initiatives
City of Takoma Park	Recipient of State funding or pass-through federal funding for digital equity initiatives
Comcast	Recipient of State funding or pass-through federal funding for broadband infrastructure
Commissioners of Garrett County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Community Services Foundation	Recipient of State funding or pass-through federal funding for digital equity initiatives
County Commissioners of Kent County	Recipient of State funding or pass-through federal funding for digital equity initiatives
County Commissioners of Queen Anne's County	Recipient of State funding or pass-through federal funding for digital equity initiatives
County Commissioners of Somerset County	Recipient of State funding or pass-through federal funding for digital equity initiatives
County Commissioners of Worcester County	Recipient of State funding or pass-through federal funding for digital equity initiatives
Cross Community, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives

Partners	Description of current or planned role in broadband deployment and adoption
Cumberland YMCA	Recipient of State funding or pass-through federal funding for digital equity initiatives
Digital Harbor Foundation	Recipient of State funding or pass-through federal funding for digital equity initiatives
Dorchester County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives
Dorchester County Government	Recipient of State funding or pass-through federal funding for broadband infrastructure
Easton Utilities	Recipient of State funding or pass-through federal funding for broadband infrastructure
Faith and Works Enterprises Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Frederick County	Recipient of State funding or pass-through federal funding for broadband infrastructure and digital equity initiatives
Frederick County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Friends Meeting Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Garrett County	Recipient of State funding or pass-through federal funding for broadband infrastructure and digital equity initiatives
Garrett County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives
Greater Baltimore AHC, Inc	Recipient of State funding or pass-through federal funding for digital equity initiatives
Harford County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Harford County Public Library	Recipient of State funding or pass-through federal funding for digital equity initiatives
Health Empowerment Network of Maryland Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Howard County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Howard County Public School System	Recipient of State funding or pass-through federal funding for digital equity initiatives
Islamic Society of Baltimore	Recipient of State funding or pass-through federal funding for digital equity initiatives
Kent County	Recipient of State funding or pass-through federal funding for broadband infrastructure

Partners	Description of current or planned role in broadband deployment and adoption
Kent County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
KindWorks, Inc	Recipient of State funding or pass-through federal funding for digital equity initiatives
LASOS Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Maryland Broadband Cooperative	Recipient of State funding or pass-through federal funding for broadband infrastructure
Mayor & City Council of Cumberland	Recipient of State funding or pass-through federal funding for broadband infrastructure
MOCO KIDSCO Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Montessori Society of Ashton	Recipient of State funding or pass-through federal funding for digital equity initiatives
Montgomery County Government	Recipient of State funding or pass-through federal funding for digital equity initiatives
Montgomery County, Montgomery Connects	Recipient of State funding or pass-through federal funding for digital equity initiatives
Montgomery Housing Partnership	Recipient of State funding or pass-through federal funding for digital equity initiatives
Mount Saint Joseph College Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Neighborhood Service Center, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
NHT Communities	Recipient of State funding or pass-through federal funding for digital equity initiatives
Notre Dame of Maryland	Recipient of State funding or pass-through federal funding for digital equity initiatives
Open Works, Inc	Recipient of State funding or pass-through federal funding for digital equity initiatives
Pratt Free Library	Recipient of State funding or pass-through federal funding for digital equity initiatives
Prince George's County Memorial Library	Recipient of State funding or pass-through federal funding for digital equity initiatives
QCOL	Recipient of State funding or pass-through federal funding for broadband infrastructure
Quantum Telecommunications	Recipient of State funding or pass-through federal funding for broadband infrastructure
Queen Anne's County	Recipient of State funding or pass-through federal funding for broadband infrastructure

Partners	Description of current or planned role in broadband deployment and adoption
Queen Anne's County Public Library	Recipient of State funding or pass-through federal funding for digital equity initiatives
Rebuild Johnston Square Neighborhood Organization, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Sandy Spring Slave Museum & African Art Gallery, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Shenandoah Cable Television – Shentel	Recipient of State funding or pass-through federal funding for broadband infrastructure
Society for the Preservation of Maryland Antiquities	Recipient of State funding or pass-through federal funding for broadband infrastructure
Somerset County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Southern MD Regional Library Association	Recipient of State funding or pass-through federal funding for digital equity initiatives
Spectrum Southeast	Recipient of State funding or pass-through federal funding for broadband infrastructure
Sport and Entertainment Corporation of Maryland	Recipient of State funding or pass-through federal funding for broadband infrastructure
St Mary's County	Recipient of State funding or pass-through federal funding for broadband infrastructure
St Mary's County Government	Recipient of State funding or pass-through federal funding for digital equity initiatives
St. Elizabeth School	Recipient of State funding or pass-through federal funding for digital equity initiatives
St. Mary's County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives
Talbot County Free Library Association, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Talbot County Public Schools	Recipient of State funding or pass-through federal funding for digital equity initiatives
Talkie Communications	Recipient of State funding or pass-through federal funding for broadband infrastructure
The Children's Guild, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
The Foundation Schools, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
The H.O.P.E. Academy Baltimore, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
The Interfaith Service Coalition of Hancock, MD, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives

Partners	Description of current or planned role in broadband deployment and adoption
The SEED School of Maryland, LLC	Recipient of State funding or pass-through federal funding for digital equity initiatives
ThinkBig Networks	Recipient of State funding or pass-through federal funding for broadband infrastructure
Town of Eagle Harbor	Recipient of State funding or pass-through federal funding for digital equity initiatives
Town of North Brentwood	Recipient of State funding or pass-through federal funding for digital equity initiatives
United Way of Central MD	Recipient of State funding or pass-through federal funding for digital equity initiatives
United Way of Frederick County, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
University of Maryland	Recipient of State funding or pass-through federal funding for digital equity initiatives
Verizon	Recipient of State funding or pass-through federal funding for broadband infrastructure
Village Learning Place, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Washington County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Washington County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives
Wells of Water, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
Wicomico County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives
Wide Angle Youth Media, Inc.	Recipient of State funding or pass-through federal funding for digital equity initiatives
William S. Baer School Partnership Board	Recipient of State funding or pass-through federal funding for digital equity initiatives
Worcester County	Recipient of State funding or pass-through federal funding for broadband infrastructure
Worcester County Board of Education	Recipient of State funding or pass-through federal funding for digital equity initiatives

3.3 Asset inventory

This section catalogs and describes a sample of broadband deployment (infrastructure), broadband adoption, broadband affordability, broadband access, and digital equity activities across the State of Maryland. These inventories comprise agencies that have hard assets, such

as utility poles and land, and soft assets such as programs and activities that aim to close the digital divide. These sections are not exhaustive in their scope; rather, they focus on key assets OSB believes can be readily leveraged to implement the Plan. Additional asset inventory data are included in Appendix A.

3.3.1 Broadband deployment

The table below lists examples of the types of State-owned structures, land, rights-of-way, utility poles, conduit, fiber, and other assets that might be leveraged to implement the Five-Year Action Plan. A discussion of available workforce assets to deploy broadband is in Section 3.4.1.

Table 6: Broadband deployment assets

Asset name	Description
Maryland Broadband Cooperative	The Maryland Broadband Cooperative operates an open access middle-mile fiber network across the State.[39]
State-owned fiber	Fiber strands may be available on portions of State-owned fiber routes
State-owned land	Land owned by the Maryland Department of Transportation or other State entities may be available for placement of huts or other broadband infrastructure through the State's Resource Share Program
State-owned buildings	Buildings owned by the State may be available for placement of network electronics or other broadband infrastructure through the State's Resource Share Program
State-owned towers	Towers owned by the State may be available for placement of antennas or other broadband infrastructure through the State's Resource Share Program
Rights-of-way	Rights-of-way controlled by the State may be available for placement of fiber, huts, or other broadband infrastructure through the State's Resource Share Program

[39] Maryland Broadband Cooperative, https://mdbc.us/services/.

For internet service providers, Maryland offers up to 100 percent grants to local jurisdictions or their ISP partner for the costs associated with the preparation of federal funding applications. The grant may pay for the cost of market studies, engineering, legal financial and other approved services provided by outside consultants necessary for preparing a federal funding application.

Maryland awarded grants in 2023 to the following ISPs through its Network Infrastructure Grant Program:[40]

- Bay Country Communications[41]
- Choptank Electric Cooperative[42]
- Comcast[43]
- Easton Utilities[44]
- Harford County, Maryland[45]
- Quantum Telecommunications d/b/a Quantum Internet and Telephone[46]
- Shentel[47]
- Talkie Communications[48]
- Verizon[49]

DHCD has assembled a list of broadband points of contact for residents for each county in Maryland and at two institutions: the University of Maryland Extension (which is the non-formal statewide education system of the University of Maryland) and at the Maryland State Arts Council (which is part of the Maryland Department of Commerce).[50]

[40] "Community & Provider Resources," DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.
[41] BCCTV, https://bcctv.com/.
[42] Choptank Electric Cooperative, https://choptankelectric.coop/.
[43] Comcast, https://www.xfinity.com/overview.
[44] Easton Utilities, https://eastonutilities.com/.
[45] Harford County, Maryland, https://www.harfordcountymd.gov/.
[46] Quantum Telecommunications d/b/a Quantum Internet and Telephone, https://www.qis.net/.
[47] Shentel, https://www.shentel.com/.
[48] Talkie Communications, https://talkiefiber.com/.
[49] Verizon, https://www.verizon.com/. The grant was awarded to Verizon Maryland.
[50] "Broadband POC by Jurisdiction," DHCD, https://dhcd.maryland.gov/Broadband/Documents/Broadband-POC-by-Jurisdiction.pdf.

The Office of Security Management of Maryland's Department of Information Technology (DoIT) publishes an annual cybersecurity report.[51] DoIT is constantly upgrading the security skills of team members. For example, it took part in cybersecurity workshops provided by the National Security Agency (NSA).[52]

The Maryland counties that have published broadband strategic plans include:[53]

- Charles County (2020)[54]
- Frederick County (2020)[55]
- Garrett County (2012);[56] updated study forthcoming as of the writing of this plan[57])
- Harford County (2020)[58]
- Howard County (2022)[59]
- Queen Anne's County (2020)[60]
- Somerset County (2020)[61]
- Worcester County (2019)[62]

[51] See, e.g., "Cybersecurity 2022 Year in Review," DoIT Office of Security Management, https://doit.maryland.gov/cybersecurity/Documents/OSM-press-release-Year-In-Review-2022.pdf/.
[52] "NSA Hosts the Maryland Department of IT in a Cybersecurity Workshop," DoIT, May 19, 2022, https://doit.maryland.gov/Documents/NSA_DoIT%20Workshops%20Press%20Release.pdf.
[53] Baltimore County states that it has developed a broadband strategic plan, but the plan is not available online (see, https://www.baltimorecountymd.gov/departments/information-technology/digital-equity/serviceability); the County is also developing a Digital Equity Plan as of the writing of this report (see, https://www.baltimorecountymd.gov/departments/information-technology/digital-equity/index.html).
[54] "Broadband Strategic Plan," Charles County, https://www.charlescountymd.gov/home/showpublisheddocument/3945/637202087537630000.
[55] "Rural Broadband Study," Frederick County, Maryland, https://www.frederickcountymd.gov/DocumentCenter/View/329057/Rural-Broadband-Study---Frederick-County---Sept-2020?bidId=.
[56] "Broadband in Garrett County: A Strategy for Expansion and Adoption," Garrett County, Maryland, https://www.garrettcounty.org/resources/broadband/pdf/Broadband-Feasibility-Study.pdf.
[57] "Rural Broadband Expansion," Garret County, Maryland, https://www.garrettcounty.org/broadband.
[58] "Broadband Strategic Plan," Harford County, Maryland, https://www.harfordcountymd.gov/DocumentCenter/View/15397/Broadband-Strategic-Plan.
[59] "Howard County Ensures Broadband to 85% of Unserved Households," Howard County press release, March 1, 2022, https://www.howardcountymd.gov/News030122b.
[60] "Broadband Strategic Plan," Queen Anne's County, Maryland, https://www.harfordcountymd.gov/DocumentCenter/View/15397/Broadband-Strategic-Plan.
[61] "Broadband Strategic Plan," Somerset County, Maryland, https://cms7files1.revize.com/somersetcountymd/Broadband%20Strategic%20Plan%20-%20Somerset%20County%20-%20Final%20-%2020200717.pdf.
[62] "Broadband Feasibility Study," Worcester County, Maryland, https://www.co.worcester.md.us/sites/default/files/2022-06/Completed%20Broadband%20Feasibility%20Study%20-%20Worcester%20County%20-%2020191231_0.pdf.

Maryland has 16 community college systems that could be partners in developing and delivering broadband workforce training.[63] Additionally, Maryland's Department of Human Services offers the Supplemental Nutrition Assistance Program Employment and Training (SNAP E&T)[64] that connects people who receive food stamps to industry-specific training programs. These programs are free and run for an average of 12 to 16 weeks. Many SNAP E&T employment programs also offer job placement, retention and support services that help program graduates find and keep employment.

3.3.2 Broadband adoption

This section describes the current state of broadband adoption (i.e., the percentage of residents who have adopted broadband) and identifies broadband adoption assets.

79 percent of households in the State subscribe to wireline internet service, according to 2021 data from the American Community Survey.[65]

The table below lists programs that promote broadband adoption—such as through digital literacy and digital skills training, public computing labs, device and hotspot loans, K-12 schools with one-to-one computer programs, computer refurbishing efforts, and other broadband awareness and outreach efforts. These assets are available to all covered populations.

Table 7: Broadband adoption assets

Asset name	Description
Emergency Connectivity Fund	Provided about 214,000 connected devices, including hotspots, to 101,000 Maryland students[66]
Your Home, Your Internet Pilot Program of the FCC	Awards to the Housing Authority of Baltimore City[67] and to the Maryland Department of Housing and Community Development[68] aimed at providing ACP outreach and application assistance to eligible households.[69]

[63] "Maryland at a Glance: Community Colleges," State of Maryland, https://msa.maryland.gov/msa/mdmanual/01glance/html/colcom.html.
[64] Maryland Department of Human Services, "Workforce Development," https://dhs.maryland.gov/workforce-development/.
[65] American Community Survey Public Use Microdata 2021 1-year estimates, U.S. Census Bureau.
[66] "American Rescue Plan State by State: Maryland," the White House, https://www.whitehouse.gov/wp-content/uploads/2023/03/ARP-State-by-State_Maryland.pdf.
[67] Housing Authority of Baltimore City, https://www.habc.org/.
[68] DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.

Asset name	Description
ACP Navigator Pilot Program of the FCC	Awards to the Baltimore County Public Library[70] and to Montgomery County[71] to provide access to the National Verifier to help low-income households complete and submit their ACP application.[72]
University of Maryland Extension: Tech Extension	A $6 million award from the State of Maryland utilizing ARPA SLFRF that will focus on broadband adoption. $4 million of the award will be utilized for training, competency, and education initiatives; the remaining $2 million will be utilized to help sign people up for internet access subsidies and acquire a device. Resources include a call center tech hotline and the hiring of 10 digital navigators who will work throughout Maryland with vulnerable populations.[73]
ACP outreach campaign with EducationSuperHighway	In July 2023, the State announced a partnership with the nonprofit EducationSuperHighway on a statewide initiative (Maryland ActNow) to raise awareness of the ACP and increase enrollment by working with trusted community organizations.[74] The City of Baltimore launched an initial campaign ("Bmore Connected") in May 2023.[75]
University of Maryland, Baltimore County (UMBC)	The AOK Library at UMBC provides short-term laptop loans for the UMBC community.[76]

[69] "Consumer and Governmental Affairs Bureau and Wireline Competition Bureau announce ACP Pilot Program Grants target funding," FCC, March 15, 2023, https://docs.fcc.gov/public/attachments/DA-23-219A1.pdf.
[70] Baltimore County Public Library, https://www.bcpl.info/.
[71] Montgomery County, Maryland, https://www.montgomerycountymd.gov/.
[72] "Wireline Competition Bureau Announces Final List of Entities Selected for the Affordable Connectivity Pilot Programs," FCC, April 6, 2023, https://www.fcc.gov/document/wcb-announces-final-list-entities-selected-acp-pilot-programs.
[73] "$6M Award From State to Help Extension Bridge Digital Divide," University of Maryland, June 1, 2022, https://today.umd.edu/6m-award-from-state-to-help-extension-bridge-digital-divide.
[74] "Governor Moore Launches Maryland ActNow Campaign to Close the Digital Divide in Maryland," Office of Governor Wes Moore, News Release, July 18, 2023, https://governor.maryland.gov/news/press/pages/governor-moore-launches-maryland-actnow-campaign-to-close-the-digital-divide-in-maryland.aspx.
[75] "Mayor Scott, BCIT to Bring Affordable Home Internet to Baltimore Households," press release from the Mayor's Office, May 18, 2023, https://mayor.baltimorecity.gov/news/press-releases/2023-05-18-mayor-scott-bcit-bring-affordable-home-internet-baltimore-households.
[76] "AOK Library Laptop Loans," University of Maryland, https://lib.guides.umbc.edu/c.php?g=961173&p=6941114.

Asset name	Description
Albin O. Kuhn (AOK) Library Laptop Lending Program	
Pass IT On	Pass IT On is a nonprofit organization that provides technology skills training programs for youth and adults in disadvantaged and under-represented communities. The organization offers STEM-related programming to engage younger students around technology as well as workforce development to help participants enter the IT field. [77]
Montgomery County Public Libraries – hotspot loans	Outdoor public Wi-Fi is available at the Aspen Hill, Davis (N. Bethesda), Gaithersburg, Germantown, Long Branch, Maggie Nightingale (Poolesville), Marilyn Praisner (Burtonsville), Rockville Memorial, Twinbrook, Wheaton, and White Oak MCPL locations. All branches except for the Noyes Library for Young Children have wireless hotspots that can be checked out for two weeks at a time.[78]
Senior Planet	Funded by the AARP, Senior Planet provides technology training for seniors in Montgomery County.[79]
Kind Works	Kind Works provides free refurbished computers to students and families in need.[80]
Mac Recycle Clinic	A nonprofit which refurbishes donated Macintosh computers and Chromebooks and donates to students, families, individuals, and veterans in need on a referral basis.[81]
Montgomery Connects – Maryland Connected Devices	The Maryland Connected Devices program provides new Chromebooks to qualified residents (limit of one per household/address). A household must be eligible for the ACP to receive a computer. The program prioritizes residents, age 7

[77] "About Us," Pass IT On, https://www.passitonmd.org/about-us.
[78] "Computers and Technology," Montgomery County Public Libraries, https://montgomerycountymd.gov/library/services/computers.html.
[79] "Welcome to Senior Planet in Montgomery County," Senior Planet, https://seniorplanet.org/locations/montgomery-county/.
[80] "How Kind Works, Works," Kind Works, https://dokindworks.org/about/.
[81] "About," Mac Recycle Clinic, https://www.macrecycleclinic.org/site/about-2/.

Asset name	Description
	or older, who have not previously received a computer from the County.[82]
Gilchrist Immigrant Resource Center	The Gilchrist Immigrant Resource Center offers free computer skills classes to immigrant residents in Montgomery County.[83]
PCs for People Maryland	PCs for People, a nonprofit with several locations across the country, recycles and refurbishes computers to provide them at a low cost to low-income families. The organization also offers low-cost internet service and digital skills training. Since opening in July 2020, the organization's Baltimore location has distributed over 4,000 computers and provided internet service to more than 3,000 people.[84]
Transform Howard – devices for students	In September 2020, Howard County partnered with the Howard County Public School System (HCPSS) and the Bright Minds Foundation to distribute mobile hotspots and devices to students.[85]
Enoch Pratt Library free computer training classes	The Enoch Pratt Library system in Baltimore offers free computer training classes at six branches across the city, including their SeniorTec series, geared towards seniors. Each computer center has a wheelchair-accessible computer workstation, and many computers have assistive software for individuals with a visual disability. Pratt Library also offers online training outside of classes for computer application trainings, technology courses, as well as online tutorials for new computer users, available in both English and Spanish.[86]
Phoenix Computers	Phoenix Computers is a nonprofit in North Bethesda that provides low-cost refurbished computers, equipment, and

[82] "Montgomery Connects – Maryland Connected Devices," Montgomery County, https://www.montgomerycountymd.gov/obp/computer-for-you.html.
[83] "Basic Computer Classes and Programs," Gilchrist Immigrant Resource Center. https://www.montgomerycountymd.gov/gilchrist/classes/computer-class.html.
[84] "Baltimore, MD, Electronics Recycling Center," PCs for People, https://www.pcsforpeople.org/locations/baltimore/.
[85] "Transform Howard," Howard County, https://www.howardcountymd.gov/transform.
[86] "Computer Training," Enoch Pratt Free Library, https://www.prattlibrary.org/services/computer-training.

Asset name	Description
	software to low-income residents and individuals with a disability, as well as nonprofit and charitable organizations.[87]
Lazarus Foundation	This community-based nonprofit provides refurbished computers and technology to educational institutions and other nonprofit organizations in the Baltimore area.[88]
Baltimore County Public Library	The Baltimore County Public Library allows eligible county residents to borrow a Wi-Fi-enabled Chromebook and/or a 5G LTE internet router for up to six months. Assistance with Affordable Connectivity Program (ACP) signup to establish permanent in-home internet access is also provided to eligible residents.[89]
Prince George's County Memorial Library System	All branches of the Prince George's County Memorial Library System lend Chromebooks with built-in LTE wireless internet service to county residents for free through the Online 2Go program.[90] The Library was also awarded $2.2 million in the FY23 federal budget to deploy a library vehicle ("Rover: Library2Go") which will provide internet access in areas without access to a library branch, as well as multilingual assistance, job search services, and immigrant and refugee support.[91]

The following entities received grants in 2023 from the Connected Devices grant program (MD-CDP):[92]

- Baltimore County[93]
- Baltimore City[94]

[87] "Homepage," Phoenix Computers, http://www.phoenixcomputers.info/index.htm.
[88] "Request Computers For Your Organization," Lazarus Foundation, http://www.lazarus.org/request.
[89] "Long Term Lending Program," Baltimore County Public Library, https://www.bcpl.info/services/longterm-lending.html.
[90] "Online 2Go," Prince George's County Memorial Library System. https://www.pgcmls.info/online2go
[91] "Prince George's Library Awarded $2.2 Million To Acquire A Mobile Library Vehicle: Library 2Go," Prince George's Suite Magazine, January 5, 2023, https://www.pgsuite.com/news/2023/1/5/mobile-library-coming-back.
[92] "Community & Provider Resources," DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.
[93] Baltimore County, https://www.baltimorecountymd.gov/.

- Charles County[95]
- Frederick County[96]
- Garrett County[97]
- Kent County Local Management Board (KCLMB)[98]
- Montgomery County[99]
- City of Greenbelt[100]
- Town of North Brentwood[101]
- Queen Anne's County Local Management Board Collective[102]
- City of Crisfield[103]
- Town of Princess Anne[104]
- St. Mary's County Government[105]

3.3.3 Broadband affordability

As of July 2023, 242,252 Maryland households are enrolled in the FCC's Affordable Connectivity Program (ACP).[106] Those households represent about 33 percent of the 727,000 estimated eligible households in the State.[107]

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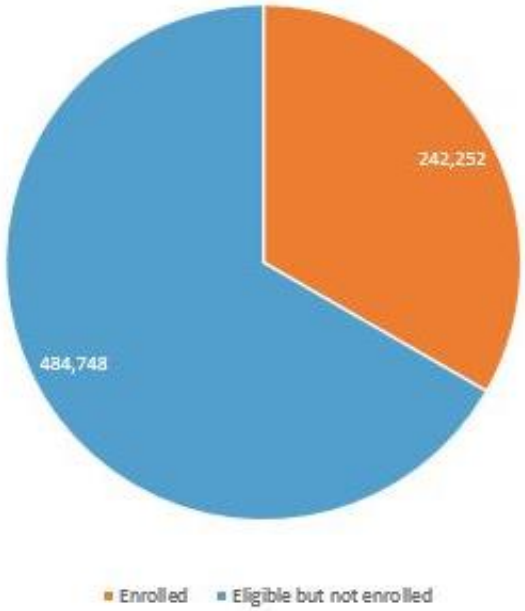
[94] "Baltimore, MD Electronics Recycling Center," PCs for People, https://www.pcsforpeople.org/locations/baltimore/.
[95] Charles County Public Library, https://ccplonline.org/.
[96] United Way of Frederick County, https://www.unitedwayfrederick.org/.
[97] Garrett County, https://www.garrettcounty.org/.
[98] "Kent County Local Management Board," Kent County, https://www.kentcounty.com/personal-services/family-support/kent-county-local-management-board.
[99] Montgomery County, https://www.montgomerycountymd.gov/.
[100] City of Greenbelt, https://www.greenbeltmd.gov/.
[101] Town of North Brentwood, https://www.northbrentwood.com/.
[102] Queen Anne's County Local Management Board Collective
[103] Crisfield Volunteer Fire Department, https://www.marylandvolunteer.org/department/crisfield-volunteer-fire-department/.
[104] Somerset County Library, http://www.somelibrary.org/.
[105] St. Mary's County Government, https://www.stmarysmd.com/.
[106] "ACP Enrollment and Claims Tracker," USAC, https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/#enrollment-by-state (accessed July 31, 2023).
[107] See also "Bipartisan Infrastructure Law State Fact Sheet: Maryland," the White House, March 2023, https://www.whitehouse.gov/wp-content/uploads/2023/03/Maryland-Fact-Sheet-March-Edition.pdf.

Figure 2: ACP enrollment in Maryland



The table below identifies a sampling of ISPs' discounted service and device programs for low-income subscribers and related broadband affordability assets in the State. These assets are available to most covered populations. The full list of providers in the State who participate in the ACP (including mobile providers) is included in Appendix A.

Table 8: Broadband affordability assets

Asset name	Description
Comcast Internet Essentials program	Comcast, an ISP, offers the Internet Essentials plan, priced at $9.95 per month, which is available to qualifying low-income and other households in Maryland.[108] Comcast Internet Essentials delivers speeds up to 50 Mbps and Comcast Internet Essentials Plus delivers up to 100 Mbps for $29.95 per month.[109] Households that subscribe to Internet Essentials can purchase a new Dell laptop or Chromebook for $149.99 plus tax.[110]

[108] Comcast, application for Internet Essentials plan, https://apply.internetessentials.com/.
[109] "Internet Essentials," Comcast, https://www.xfinity.com/learn/internet-service/internet-essentials.
[110] "Low-Cost Computer," Comcast, https://internetessentials.com/low-cost-computer.

Asset name	Description
Verizon Forward Program	The Verizon Forward Program provides an additional discount on Verizon Home Internet plans for customers enrolled in the ACP, offering Verizon's 300/300 Mbps Fios fiber plan at no cost and plans with higher speed tiers at a discounted rate. (The program also offers Verizon 5G Home Internet at no cost where available.)[111]
Spectrum Internet Assist Program	Spectrum Internet Assist offers qualifying low-income customers 30/4 Mbps service for $19.99 per month, or no cost with the ACP subsidy.[112]
Breezeline Internet Assist program	The program provides internet access with speeds of 15 Mbps downstream and 1 Mbps upstream, offered to customers who meet specific need-based qualifications, live in Breezeline's serviceable area, and do not have Breezeline service at home.[113] Breezeline reports that the service costs $0 for customers enrolled in the ACP.[114]

Maryland also offers the Maryland Emergency Broadband Benefit (MEBB) program that provides a $15 monthly broadband subsidy for eligible households. The subsidy is in addition to the federal ACP subsidy. As of March 2023, 125,509 households were enrolled in the MEBB program. The following ISPs participate in the MEBB program.[115] The italicized providers do not participate in the ACP.[116]

[111] "Free Internet with the Verizon Forward Program and ACP," Verizon, https://www.verizon.com/home/free-verizon-internet/.
[112] "Spectrum Internet for Low Income Households," Spectrum, https://www.spectrum.com/internet/spectrum-internet-assist; "Spectrum Internet Assist," Spectrum Support, https://www.spectrum.net/support/forms/spectrum_internet_assist.
[113] "What is the Breezeline Internet Assist program?", Breezeline, https://www.breezeline.com/support/internet/internet-assist-program/what-is-the-breezeline-internet-assist-program.
[114] Per provider data reported to USAC at https://cnm.universalservice.org/.
[115] "Maryland MEBB and ACP Provider List," DHCD, https://dhcd.maryland.gov/Broadband/Documents/Participating-Internet-Service-Providers.pdf.
[116]) ACP participation based on data provided to USAC by providers (see Appendix A); note that this list includes ISPs that offer mobile broadband, satellite internet, and fixed wireless services, some of which may not count as broadband under the BEAD program.

- *AirVoice Wireless*[117]
- American Broadband and Telecommunications Company DBA American Assistance[118]
- Antietam Cable Television DBA Antietam Broadband[119]
- Assist Wireless[120]
- Assurance Wireless[121]
- Bloosurf LLC[122]
- Choptank Fiber[123]
- Cintex Wireless[124]
- Comcast (Xfinity)[125]
- Declaration Networks DBA NeuBeam[126]
- Digital Harbor Foundation DBA Project Waves[127]
- Dish Wireless LLC DBA Boost Mobile[128]
- Excess Telecom, Inc.[129]
- Global Connection Inc. of America DBA StandUp Wireless[130]
- Great Wireless DBA US Connect[131]
- Hughes Network Systems, LLC[132]
- IM Telecom DBA Infiniti Mobile[133]
- Integrated Path Communications, LLC[134]
- *i-wireless, LLC DBA Access Wireless*[135]
- K20 Wireless[136]

[117] AirVoice Wireless, https://www.airvoicewireless.com/.
[118] American Assistance, https://www.americanassistance.com/.
[119] Antietam Broadband, https://www.antietambroadband.com/.
[120] Assist Wireless, https://www.assistwireless.com/.
[121] Assurance Wireless, https://www.assurancewireless.com/.
[122] Bloosurf, https://bloosurf.com/.
[123] Choptank Fiber, https://www.choptankfiber.com/.
[124] Cintex Wireless, https://cintexwireless.com/.
[125] Xfinity, https://www.xfinity.com/overview.
[126] NeuBeam, https://www.neubeam.com/.
[127] Project Waves, https://www.projectwaves.net/.
[128] Boost Mobile, https://www.boostmobile.com/.
[129] Excess Telecom, https://www.excesstelecom.com/.
[130] StandUp Wireless, https://standupwireless.com/.
[131] Website not available.
[132] HughesNet, https://www.hughesnet.com/.
[133] Infiniti Mobile, https://infinitimobile.com/.
[134] Integrated Path Communications, LLC, https://www.ipc-llc.com/.
[135] Access Wireless, https://www.accesswireless.com/.
[136] K20 Wireless, https://www.k20wireless.com/.

- Maxsip Telecom Corporation[137]
- Metro Communications LLC[138]
- Point Broadband Fiber Holding (Point Broadband)[139]
- Port Networks, Inc.[140]
- Prosper Wireless, LLC[141]
- QCOL, Inc.[142]
- Rogue Mobile Inc.[143]
- Sage Telecom Communications DBA TruConnect[144]
- Shenandoah Cable Company DBA Shentel[145]
- SkyPacket Networks[146]
- SWA Connect[147]
- Talkie Communications, Inc.[148]
- Telrite Holdings, Inc. DBA Life Wireless[149]
- Ting Fiber (Ting Internet)[150]
- Tone Communication Services LLC[151]
- TracFone Wireless Inc.[152]
- Unity Wireless, Inc.[153]
- Verizon (Cellco Partnership)[154]
- Verizon Maryland LLC
- Whoop Connect Inc.[155]

[137] Maxsip Telecom, https://maxsipconnects.com/.
[138] Website not available.
[139] Point Broadband, https://www.point-broadband.com/.
[140] Port Networks, https://portnetworks.net/.
[141] Prosper Wireless, https://prosperwireless.us/.
[142] QCOL, https://qcol.secureserversites.net/.
[143] Rogue Mobile, https://www.roguemobile.com/.
[144] TruConnect, https://www.truconnect.com/.
[145] Shentel, https://www.shentel.com/en/homepage.
[146] SkyPacket, https://skypacket.net/.
[147] SWA Connect, https://swaconnect.com/.
[148] Talkie Communications, https://talkiefiber.com/.
[149] Life Wireless, https://www.lifewireless.com/.
[150] Ting, https://ting.com/.
[151] Tone Communications, https://tonecomms.com/.
[152] TracFone, https://www.tracfone.com/home.
[153] Unity Wireless, https://www.gounitywireless.com/.
[154] Verizon, https://www.verizon.com/.
[155] Whoop Connect, https://www.whoopconnect.com/.

3.3.4 Broadband access

The following table identifies examples of public Wi-Fi networks, cellular connectivity (mobile broadband), and open-access middle-mile networks in the State. These assets are available to most covered populations.

Table 9: Broadband access assets

Asset name	Description
AT&T cellular service (mobile broadband)	AT&T delivers cellular connectivity (mobile broadband) throughout most of Maryland.
T-Mobile cellular service (mobile broadband)	T-Mobile delivers cellular connectivity (mobile broadband) throughout most of Maryland.
Verizon Wireless cellular service (mobile broadband)	Verizon Wireless delivers cellular connectivity (mobile broadband) throughout most of Maryland.
Thurgood Marshall State Law Library	The Thurgood Marshall State Law Library in Annapolis has eight public computers linked to the internet, with time limits. The Thurgood Marshall State Law Library also offers free Wi-Fi to patrons.[156]
Baltimore County public Wi-Fi	Baltimore County offers Wi-Fi networks at 28 recreation areas and parks; 19 Baltimore County Public Library locations; 20 senior centers, community centers, and Police Athletic League locations; and 55 of 165 Baltimore County Public Schools (BCPS) schools, with the rest due to have Wi-Fi soon.[157]
Howard County public Wi-Fi	Howard County, through a partnership with the Bright Minds Foundation,[158] provides Wi-Fi and devices to students and also offers public Wi-Fi locations.[159]
Montgomery County Public Libraries – public Wi-Fi	Outdoor public Wi-Fi is available at the Aspen Hill, Davis (N. Bethesda), Gaithersburg, Germantown, Long Branch, Maggie Nightingale (Poolesville), Marilyn Praisner (Burtonsville),

[156] "Public Computers and WiFi Access," Thurgood Marshall State Law Library, https://www.courts.state.md.us/lawlib/using-library/visiting-library/computers-wifi.
[157] "Wi-Fi Locations," Baltimore County, https://www.baltimorecountymd.gov/departments/information-technology/wifi-locations.
[158] Bright Minds Foundation, https://brightmindsfoundation.org/.
[159] "Public Wi-Fi Hotspots," Howard County, https://www.howardcountymd.gov/county-executive/public-wi-fi-hotspots/.

Asset name	Description
	Rockville Memorial, Twinbrook, Wheaton, and White Oak MCPL locations.[160]
Digital Harbor Foundation – Project Waves	This initiative, founded with the goal of bridging Baltimore's digital divide, offers free high-speed internet services to more than 800 households in the City.[161] Services include a point-to-multipoint wireless network to "fill the affordability gap in some of Baltimore's most historically underserved and inspirational communities,"[162] gig-speed cable service to five low- and mixed-income multi-dwelling-unit buildings,[163] and public Wi-Fi in several locations throughout the City.
Enoch Pratt Library System public Wi-Fi	Wi-Fi access is available at all library locations and outside of the library at 16 branch locations throughout the city. A library card is not required to access the W-Fi outside of the branch.[164] The library also offers free internet access to residents using neighborhood outreach vehicles acting as Wi-Fi hotspots, which make stops throughout Baltimore City.[165]
MoCoNet	Montgomery County operates a fiber network that provides a free service option for low-income and special needs residents of select affordable housing developments. The County is also partnering with Plume to provide in-home Wi-Fi.[166]
Baltimore City public Wi-Fi	Baltimore City offers public Wi-Fi at Penn Station, Northeast Market, Avenue Market, Hollins Market, Lexington Market, Cross Street Market, Broadway Market, and at the Inner Harbor and along the promenade.[167]

[160] "Computers and Technology," Montgomery County Public Libraries, https://montgomerycountymd.gov/library/services/computers.html.
[161] Project Waves, https://www.projectwaves.net/.
[162] "Home Internet," Project Waves, https://www.projectwaves.net/waves-home-internet.
[163] Sean Gonsalves, "Making Waves in Baltimore with Community-Driven Connectivity," *Community Networks*, February 23, 2023, https://communitynets.org/content/making-waves-baltimore-community-driven-connectivity.
[164] "Library Outdoor Wi-Fi," Enoch Pratt Free Library, prattlibrary.org/services/outdoor-wi-fi.
[165] "Community Wi-Fi," Enoch Pratt Free Library, https://www.prattlibrary.org/services/mobile-outreach/community-wi-fi.
[166] "MoCoNet," Montgomery County, https://www.montgomerycountymd.gov/obp/moconet.html.
[167] Free Wi-Fi Locations – Baltimore CityView, https://cityview.baltimorecity.gov/viewer/index.html?webmap=41397ec35f914627b70795d3e741a545.

Asset name	Description
St. Mary's County Public Schools (SMCPS) free Wi-Fi	Free Wi-Fi access is available to students and staff in the parking lots of all schools throughout the county. A SMCPS email address is required to connect.[168]
St. Mary's County Public Library free Wi-Fi	The St. Mary's County Library system offers free Wi-Fi access inside buildings during open hours, and outside of buildings including all parking lots 24/7.[169] The library also allows residents to check out mobile hotspots for 14 days at a time. [170]
City of Salisbury free Wi-Fi	The City offers free Wi-Fi access at the Downtown Plaza and the Salisbury Zoo.[171]

As noted above, cellular broadband is available from AT&T, T-Mobile, and Verizon Wireless throughout most of Maryland, but not all of it. While this Plan does not propose using BEAD funds to enhance mobile service, the Plan recognizes that having more robust fiber connectivity across the State will dramatically enhance the opportunities for mobile providers to offer better service to their customers. Thus, the projects funded by BEAD may also deliver the ancillary benefit of improved access to cellular internet.

The State of Maryland and its local jurisdictions, working with private entities, have also been at the forefront of engagement in the middle-mile fiber market for nearly two decades, dating back to the first (to our knowledge) public open-access middle-mile fiber initiative in the country, which was funded by the Carroll County Board of Commissioners in 2003 to expand middle-mile throughout rural and exurban areas of the county.

In the time since then, every county in central Maryland has invested in middle-mile infrastructure, as have the State of Maryland and a number of cities. The State and the counties have also very adeptly accessed federal resources to support these efforts.

[168] "Connecting Online," St. Mary's County Public Schools, https://www.smcps.org/offices/information-technology-services/connecting-online.
[169] "Wi-Fi Extended in Parking Lots," St. Mary's County Library, https://www.stmalib.org/wifi-extended-in-parking-lots/.
[170] "Check Out a Hotspot," St. Mary's County Library, https://www.stmalib.org/read-listen-watch/check-out-a-hotspot/.
[171] "Municipal Wi-Fi," City of Salisbury, https://salisbury.md/departments/information-services/is-connectivity.

The State's middle-mile efforts throughout the more rural parts of Maryland in the western, southern, and Eastern Shore regions have been very successful, in that the State delivered open-access fiber to the Maryland Broadband Cooperative (MdBC) in many of the routes where it built its own public service fiber, and the Cooperative has used that fiber to serve its members.

By way of background, in 2009, through a loose consortium known as the One Maryland Broadband program, the central Maryland jurisdictions, the State, and MdBC collectively applied for a grant from the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) as part of the Broadband Technology Opportunities Program (BTOP) and received $115 million,[172] the third-largest award in the country.[173]

Under the arrangement negotiated with the State, the central Maryland jurisdictions took ownership of approximately 750 miles of conduit and fiber assets built with $72 million of the funds within their boundaries. The jurisdictions committed to sustaining the operations using fiber to meet public sector communications needs and also making fiber available on an open-access basis. This became known as the Inter-County Broadband Network (ICBN).[174]

In the other regions of the State where the counties declined to participate financially with the One Maryland Broadband Network (OMBN), the State built and owns the grant-funded middle-mile fiber; the Maryland Department of Information Technology operates a high-speed data network ("networkMaryland") as a State asset that is available only for public sector use[175] except for the 96-count fiber cable it provided to the Maryland Broadband Cooperative as part of the OMBN framework.

The Cooperative has commercialized the 96-count fiber received from the State-operated networkMaryland, and a few Maryland counties have successfully commercialized their ICBN fiber on an open-access basis. The notable example is the Howard County government, which has used fiber to expand middle-mile lit service availability in significant parts of the county. To some degree, Baltimore and Harford Counties have also created commercialized opportunities

[172] "One Maryland Broadband Network (OMBN) Fact Sheet," BroadbandUSA, September 2010, https://www2.ntia.doc.gov/sites/default/files/grantees/fact_sheet_-_maryland.pdf.
[173] Only a project in West Virginia and a project in Los Angeles received larger grant awards. "BTOP Grants Awarded: Broadband Infrastructure Projects," NTIA, https://www2.ntia.gov/all-recipients.
[174] https://onemarylandicbn.wordpress.com/about-the-project/what-is-the-icbn/; see also, Maryland DoIT, "OMBN Project Overview & Status as of Nov. 1, 2013," https://doit.maryland.gov/ombn/Documents/OMBNPresentation.pdf.
[175] "networkMaryland," Maryland Department of Information Technology, https://doit.maryland.gov/support/Pages/networkMaryland.aspx.

on their fiber on a limited basis. Anne Arundel County also leveraged ICBN fiber by entering into a partnership with an ISP, Broadstripe, to deliver service to unserved communities in the southern part of the county.[176, 177]

Some of the counties have used their networks to support last-mile public policy goals. For example, Montgomery County provides free Wi-Fi service in certain low-income housing facilities over its ICBN fiber.

The following sections offer more details on OMBN and ICBN middle-mile fiber, as well as a more recent middle-mile effort in Baltimore City.

3.3.4.1 One Maryland Broadband Network

The One Maryland Broadband Network (OMBN) is a 1,294-mile fiber optic middle-mile network that links 1,068 government facilities and anchor institutions while also reaching every county in the State.[178]

OMBN was built with $115 million[179] awarded in September 2010[180] to the Maryland Department of Information Technology (DoIT) by NTIA as part of the Broadband Technology Opportunities Program (BTOP).[181] It linked and extended three independent networks: the rural nonprofit Maryland Broadband Cooperative, the State-run networkMaryland, and the 10-county consortium Inter-County Broadband Network.

DoIT estimates that networkMaryland alone provides a net annual value to the State of $111 million; that total comprises $126 million in "annual services value," defined as the estimated commercial value of the services public sector subscribers receive from DoIT (ethernet,

[176] Jenni Pompi, "Internet Service Speeds Up in South County," Patch, September 25, 2013, https://patch.com/maryland/edgewater/internet-service-speeds-up-in-south-county.
[177] Broadstripe's assets in Anne Arundel County were acquired by Astound Broadband in 2021; "Broadstripe | Astound Broadband | Meet Our Companies," Astound Broadband, https://www.astound.com/broadstripe/.
[178] See map at https://geodata.md.gov/ombn/ (accessed October 2022). See also the NTIA award summary: http://www.ntia.doc.gov/broadbandgrants/applications/factsheets/7392FS.pdf and MD DOIT Project Overview and Status: https://doit.maryland.gov/ombn/Documents/OMBNPresentation.pdf (accessed January 2023).
[179] "One Maryland Broadband Network (OMBN)," NTIA, https://www2.ntia.doc.gov/grantee/maryland-department-of-information-technology (accessed October 2022).
[180] "Award fact sheet," NTIA, September 2010, https://www2.ntia.doc.gov/sites/default/files/grantees/fact_sheet_-_maryland.pdf (accessed October 2022).
[181] Background and reporting: https://www2.ntia.doc.gov/grantee/maryland-department-of-information-technology; project completion report: https://doit.maryland.gov/ombn/Documents/OMBNPresentation.pdf.

Internet, government intranet, VPN and dark fiber), offset by $15 million in annual program expenses associated with the operation of the network.[182]

OMBN modestly exceeded program goals for number of fiber miles and number of anchor institutions served by the end of the grant period and the project was completed on budget and on schedule in 2013.[183]

3.3.4.2 Inter-County Broadband Network

The Inter-County Broadband Network (ICBN) consortium was a $72 million sub-grantee of the OMBN. Participating entities were the city of Annapolis, Baltimore City, Anne Arundel County, Baltimore County, Carroll County, Harford County, Montgomery County, and Prince George's County.[184]

In addition to the fiber controlled by the jurisdictions, the State of Maryland received 12 strands along all ICBN routes for serving public user needs (i.e., networkMaryland).[185] The Maryland Broadband Cooperative did not receive fiber along ICBN routes for commercialization purposes, though it received 96 strands along all other One Maryland routes (i.e., non-ICBN routes) owned by the State.

The ICBN fiber deployment was extensive and was designed to enable the open-access mission by filling gaps in existing publicly owned fiber. (Maps filed with the grant application illustrate the planned ICBN routes in each jurisdiction.[186])

In the case of central Maryland, almost all the jurisdictions already owned fiber that connected public facilities such as government buildings, schools, libraries, public safety facilities, public safety wireless towers, and other community anchor institutions (CAI). ICBN was designed to add hundreds of additional public facilities and CAI sites to the existing fiber footprints and to interconnect the existing networks among the jurisdictions.

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[182] "networkMaryland: Value & ROI Analysis," Maryland DoIT, https://doit.maryland.gov/Documents/Skyline_networkMaryland_ROI_WhitePaper.pdf.
[183] "OMBN Project Overview & Status as of Nov. 1, 2013," Maryland DoIT, https://doit.maryland.gov/ombn/Documents/OMBNPresentation.pdf (accessed January 2023).
[184] "One Maryland Inter-County Broadband Network," https://onemarylandicbn.wordpress.com/about-the-project/what-is-the-icbn/.
[185] The State owns fiber passing through ICBN jurisdictions that was built separately from the One Maryland/ICBN project. For example, pre-existing Level 3 Communications-owned fiber acquired by the state along the I-95 corridor passes through the ICBN jurisdictions.
[186] "Maps," One Maryland Inter-County Broadband Network, https://onemarylandicbn.wordpress.com/maps/.

3.3.4.3 BGE middle-mile fiber

Baltimore Gas and Electric (BGE) received $15.4 million in federal funding (see Table 4)[187] for its Underground Fiber Project to construct 69.9 route-miles of middle-mile fiber communications infrastructure across Anne Arundel, Baltimore, Howard, and Prince George's counties. The project is funded by the NTIA's Enabling Middle Mile Broadband Infrastructure Program.

According to the grant description, the project "will facilitate high-speed broadband deployment to currently unserved or underserved areas, improve affordability in already-served markets, catalyze lower priced broadband for economically vulnerable communities, bolster national security interests, and facilitate the provision of broadband service to anchor institutions. The $30.8 million project, with the applicant providing a funding match, will be comprised of 69.9 route-miles of underground middle-mile fiber communications infrastructure that will drive substantial end user benefits and encourage new last-mile broadband providers to enter this market, including those offering low-priced internet access plans."[188]

3.3.5 Digital equity

The following table identifies representative digital equity assets in the State of Maryland, including workforce development training and employment services related to broadband adoption; technical assistance programs aimed at supporting digital inclusion; and partnerships and coalitions that work toward digital equity. These assets are available to all covered populations.

Table 10: Digital equity assets

Asset name	Description
Baltimore City Digital Equity Framework[189]	The Office of Broadband and Digital Equity leads Baltimore City government's digital equity efforts. The Office published a publicly available Digital Equity Framework in November 2021 that establishes its vision for closing the City's digital divide by 2030.
Montgomery Connects	Montgomery County, Maryland offers the Montgomery Connects program, a collection of the County's digital equity

[187] "Funding Recipients," NTIA, https://broadbandusa.ntia.gov/funding-programs/enabling-middle-mile-broadband-infrastructure-program/funding-recipients.
[188] "Funding Recipients," NTIA, https://broadbandusa.ntia.gov/funding-programs/enabling-middle-mile-broadband-infrastructure-program/funding-recipients.
[189] "Broadband and Digital Equity," Baltimore City, https://technology.baltimorecity.gov/broadband-and-digital-equity.

Asset name	Description
	efforts, run by the Department of Technology & Enterprise Business Solutions (TEBS).[190] The program has distributed 40,113 free computers, primarily to low-income households, through February 13, 2023.[191] Montgomery Connects also helps eligible residents enroll in the FCC's Affordable Connectivity Program (ACP) and partners with federal, State and private internet service providers to fund and construct fiber to reach unserved rural areas. Through a partnership with Senior Planet, powered by OATS of AARP, the County offers in-person and online classes for adults ages 60 and over to learn new online skills, as well as other online programming. Montgomery Connects' MoCoNet also constructs and brings free, high-speed internet over fiber and in-home Wi-Fi to individual affordable housing communities in a partnership with Plume, a Wi-Fi company with a digital equity focus.[192]
Digital Harbor Foundation	This Baltimore-based nonprofit opened a Tech Center in 2013 that provides youth programming and workforce development around technology and has expanded into multiple initiatives including a Center of Excellence that supports educators in delivering equity-focused STEM programming and sponsorship for technology-focused social impact projects.[193]

[190] "Montgomery Connects," Montgomery County, https://www.montgomerycountymd.gov/obp/montgomery-connects.html.
[191] "Montgomery County to Distribute 10,000 Remaining Free 'Montgomery Connects' Computers to Eligible Low-Income Residents in February, March and April," Montgomery County Press Release, February 14, 2023, https://www2.montgomerycountymd.gov/mcgportalapps/Press_Detail.aspx?Item_ID=42866.
[192] Jim Salter, "Digital equity program in Maryland adds Plume Wi-Fi to its Internet access," *Ars Technica*, September 22, 2020, https://arstechnica.com/gadgets/2020/09/digital-equity-program-in-maryland-adds-plume-wi-fi-to-its-internet-access/.
[193] "Homepage," Digital Harbor Foundation, https://digitalharbor.org/

Asset name	Description
Maryland Digital Equity Scorecard Index Map[194]	This map of Maryland compiles three data points into an index of digital equity. The three data points are: 1) Whether a household has a wireline internet subscription at home, 2) Whether a household is reliant only on a cellular data plan for online connectivity at home, and 3) Whether a household has either zero or just one computing device for internet access.
University of Maryland Extension: Tech Extension Digital Literacy Project	The Digital Literacy Project aims to bridge the digital divide throughout the State by providing resources and education to help guide communities through the process of increased digital literacy.[195]
Baltimore County Public Library – NorthStar Digital Literacy	Baltimore County Public Library offers NorthStar Digital Literacy training, which covers computer and internet skills for daily use and employment and education opportunities. [196]
Baltimore County Career Center	Baltimore County's three Career Centers offer job seekers access to computers as well as training in introductory computer skills. Services are free for county residents who are economically disadvantaged or dislocated workers per federal eligibility guidelines. Eligible individuals can also receive an occupational training scholarship for the IT field.[197]
Baltimore County Department of Aging (BCDA)	BCDA is partnering with University of Maryland Extension to offer aging residents free one-on-one technical support for personal devices and applications through a Tech Helpline, as well as free training classes through the CyberSeniors Technology Mentors program. Additional classes are offered through a partnership with Senior Planet from AARP. BCDA can

[194] "Maryland Digital Equity Scorecard Index Map," https://bniajfi.maps.arcgis.com/apps/dashboards/de8d2f55435a4ff58ec80284ddd11fbf.
[195] "Tech Extension: Digital Literacy Project," University of Maryland Extension, https://extension.umd.edu/techextension.
[196] "Areas of Learning," Baltimore County Public Library, https://www.bcpl.info/services/digital-literacy.html.
[197] "Get Started With Career Services," Baltimore County Government, https://www.baltimorecountymd.gov/departments/economic-development/job-seekers/adult-job-seekers/.

Asset name	Description
	also provide Chromebooks and iPads for low-income households, depending on device availability.[198]
University of Maryland Grand Challenges Grant Program: Digital Equity Mapping Research and Training Program	A faculty member at the University of Maryland School of Architecture, Planning & Preservation received a grant from the University in 2023 to create a digital equity research and training program for priority neighborhoods in Prince George's County. The program will deploy a longitudinal broadband access survey and create a digital access map to inform community-based solutions to bridge the digital divide in local neighborhoods.[199]
Baltimore Digital Equity Coalition	The group works to bridge the digital divide through four main objectives—greater internet connectivity, affordable device access, digital skill training and tech support, and advocacy—each of which has a dedicated working group.[200] The Coalition held a Digital Equity Day event in Annapolis on March 14, 2023, to promote digital equity and connectivity efforts.[201]
Prince George's County Memorial Library System (PGCMLS) Digital Literacy, Equity and Inclusion Program	PGCMLS is helping to bridge the digital divide for the residents by allowing them to borrow Chromebooks, hotspots, and other devices for free, and access a variety of free digital services and classes.[202]
Transform Howard	Howard County launched a digital equity initiative in 2021 to enhance digital inclusion and broadband access. The initiative builds on the County's work in 2020 to distribute devices to students and provide free public Wi-Fi; the County intends to expand Wi-Fi access in community spaces, provide residents with devices, establish a broadband and digital inclusion office,

[198] "Tech Support," Baltimore County Government, https://www.baltimorecountymd.gov/departments/aging/programs-services/technology-resources/index.html.
[199] "Grand Challenges: Digital Equity Mapping Research and Training Program," University of Maryland, https://research.umd.edu/digital-equity-mapping.
[200] "Baltimore Digital Equity Coalition," https://digitalequitybaltimore.org/our-focus/.
[201] Alanah Nichole Davis, "Maryland HBCUs also get a $3 million boost from Baltimore Gas and Electric," Technical.ly, March 9, 2023, https://technical.ly/diversity-equity-inclusion/maryland-hbcus-funding-digital-equity-day/.
[202] "PGCMLS: Bridging The Digital Divide," Prince George's County Memorial Library System, https://www.pgcmls.info/digital-literacy-equity-and-inclusion.

Asset name	Description
	and develop a digital inclusion study and long-term plan. The County also redesigned its website following Website Content Accessibility Guidelines 2.1.[203]
Maryland Center for Veterans Education and Training (MCVET)	In 2023, Comcast awarded $20,000 to the nonprofit MCVET to support broadband adoption and digital skills training for veterans in Baltimore. 100 laptops were donated to participating veterans.[204]
Connecting Minority Communities Pilot Program – University of Maryland Eastern Shore (UMES)	UMES received a grant just under $3 million in 2023 for a program titled "Rebuilding Our Digital Road: Digital Infrastructure Re-imagining," which the University will use to expand broadband access for students at UMES, provide broadband capacity to grow its education and outreach programs, and assess how the University's digital infrastructure supports it as a community anchor institution.[205]
Connecting Minority Communities Pilot Program – Morgan State University	Morgan State received a grant of approximately $4.1 million in 2023 for a program titled "Miles of Education through Technology Access (META)." The project's objectives include distributing laptops and subsidizing internet subscriptions for students and community members, upgrading campus Wi-Fi infrastructure, engaging the community around telehealth, and programming related to Smart Tiny Homes.[206]
Connecting Minority Communities Pilot Program – Coppin State University	Coppin State University received a grant of approximately $4 million in 2023 for its "Connect Eagle Nation" project, which will help address the digital divide in Baltimore by distributing

[203] "Howard County Executive Launches Digital Equity Initiative, Unveils New County Website," Howard County news release, May 24, 2021, https://www.howardcountymd.gov/News052421.
[204] "Md. vets get digital training help from Comcast," The Daily Record, April 18, 2023, https://thedailyrecord.com/2023/04/18/md-vets-get-digital-training-help-from-comcast/.
[205] "Biden-Harris Administration Announces More Than $175 Million in Internet for All Grants to 61 Minority-Serving Colleges and Universities," NTIA news release, February 22, 2023, https://broadbandusa.ntia.doc.gov/news/latest-news/biden-harris-administration-announces-more-175-million-internet-all-grants-61.
[206] "Biden-Harris Administration Announces More Than $175 Million in Internet for All Grants to 61 Minority-Serving Colleges and Universities," NTIA news release, February 22, 2023, https://broadbandusa.ntia.doc.gov/news/latest-news/biden-harris-administration-announces-more-175-million-internet-all-grants-61.

Asset name	Description
	laptops to community members, creating a Cyber Apprenticeship Program through which participants can earn industry certification, launching a Digital Navigator program to serve residents, initiating collaboration between Coppin School of Nursing and Baltimore County in which Digital Navigators provide "health and technology assessment" in the City and the County, and creating a committee that will assess broadband services and needs in the community.[207]
Baltimore Gas and Electric (BGE) Scholars	BGE has committed a total of $3 million over four years (2023-2026) to sponsor scholarships at three HBCUs in the State: Bowie State University, Coppin State University, and Morgan State University ($1 million each). The funding will support scholarships for full-time STEM majors, "persistence funding" to enable students of any major to graduate, and funding for research projects. The partnership was launched in 2021, and as of February 2023 had awarded scholarships to 45 students and provided persistence funding to 94 additional students.[208]
Veterans Transition to Technology	This program is designed by Carroll Technology & Innovation Council to assist with digital equity and inclusion efforts for Maryland veterans. The program provides free hardware and software, workforce training, and digital literacy training through an online platform.[209]
Allegany County Pathways in Technology Early College High (P-Tech) Program	P-Tech is an early college program based on the high school and beyond (9-14) model, in which incoming ninth graders in Allegany County Public Schools can elect to study to earn an Associate of Applied Science Degree in Computer Technology with a Cybersecurity option within two years of graduating, and

[207] "Biden-Harris Administration Announces More Than $33.5 Million in Internet for All Grants to 12 Minority-Serving Colleges and Universities," NTIA news release, January 30, 2023, https://broadbandusa.ntia.doc.gov/news/latest-news/biden-harris-administration-announces-more-335-million-internet-all-grants-12.

[208] "BGE to Provide $3 million in Grants to Continue BGE Scholars Partnership with Three Maryland HBCUs," BGE news release, February 28, 2023, https://www.bge.com/News/Pages/Press%20Releases/230228-BGE-to-Provide-3-million-in-Grants-to-Continue-BGE-Scholars-Partnership-with-Three-Maryland-HBCUs.aspx.

[209] "Veterans Transition to Technology," Carroll Technology & Innovation Council, https://carrolltechcouncil.org/veterans-transition-to-tech/.

Asset name	Description
	gain workplace experience and mentoring through a partnership with Western Maryland Health System (WMHS). Further degree options are available once students earn their Associate Degree.[210]
Girls Who Code	Girls Who Code, a national nonprofit that works to bridge the gender gap in the tech field, offers free training in coding skills and computer science programming through clubs at 285 locations in Maryland.[211] Clubs are launched in partnership with libraries, schools, and after school programs.[212]
St Mary's County Library – computer classes	The library offers computer and technology instruction through scheduled classes and one-on-one appointments, which can include training on Microsoft Office, computer basics, and social media.[213]
MY Tech Clinic	A nonprofit based in Easton, Maryland, focused on bridging the digital divide. MY Tech Clinic offers 3 types of services: monthly free tech clinics at the Talbot County Free Library, private one-on-one sessions for a small donation, and outreach to local high school students.[214]
NPower	NPower, which has locations in East and West Baltimore neighborhoods, offers no-cost technology training and certifications and job placement for young adult job seekers and transitioning veterans. The organization also runs a Community Helpdesk through which IT professionals give free tech support to community members.[215]
EARN Maryland – Cyber/IT	This economic development initiative from the Maryland Department of Labor takes a regional approach and focuses on

[210] "Secondary Education," Allegany County Public Schools, https://www.acpsmd.org/Page/2186.
[211] "Locations," Girls Who Code, https://girlswhocode.com/locations.
[212] "Clubs," Girls Who Code, https://girlswhocode.com/programs/clubs-program.
[213] "Computer And Technology Instruction," St Mary's County Library, https://www.stmalib.org/events/computer-and-technology-instruction/.
[214] My Tech Clinic, https://www.mytechclinic.org/.
[215] "Maryland," NPower, https://www.npower.org/locations/maryland/.

Asset name	Description
	specific industry sectors, funding partners to provide workforce training and development.[216] Through its cybersecurity and IT pathway, job seekers can obtain training and certifications from 14 partners across the State.[217]
East Baltimore Development Inc. (EBDI) – East Baltimore Development Initiative	The nonprofit EBDI includes digital equity and access as a core component of its revitalization effort in the Eager Park neighborhood in East Baltimore, near Johns Hopkins University.[218] Pursuant to the project, $650 million has been invested, with a planned total of $1.6 billion of public and private investment.[219] The digital equity and access portion of the project is currently in its fact-finding phase.[220]. EBDI partnered with Airband, Microsoft's digital equity initiative, and community organizations to survey residents around digital equity needs and gaps to inform the development of its strategy.[221]

OSB meets with State government stakeholders quarterly, as required by Maryland's Digital Connectivity Act of 2021, "to collaborate with the appropriate units of State government, including the Department of Information Technology, the State Department of Education, the State Department of Transportation, the Maryland State Library, the Department of Commerce, the Department of Agriculture, the Maryland Department of Health, and the Department of Planning, and the appropriate units of local government, including the Maryland Association of Counties and the Maryland Municipal League, to ensure that efforts to expand and enhance broadband internet services are coordinated statewide."[222]

On a local level, Montgomery County, Maryland's partners in digital equity include:

[216] "EARN Maryland," Maryland Department of Labor, https://www.dllr.state.md.us/earn/earnwhatisearn.shtml.
[217] "Cyber/IT industry," EARN Maryland, https://www.dllr.state.md.us/earn/earncyber.shtml.
[218] "Master Plan," EBDI, http://www.ebdi.org/master_plan.
[219] "Financial Information," EBDI, http://www.ebdi.org/financial_information.
[220] "EBD: Core Values: Digital Equity & Access," EBDI, http://www.ebdi.org/digital_equity; "Digital Equity & Access Fact Sheet," EBDI, http://www.ebdi.org/uploads/DigitalAccessFactSheet_1.pdf.
[221] "Digital Equity & Access," East Baltimore Development Inc., http://www.ebdi.org/digital_equity.
[222] "Chapter 74: Department of Housing and Community Development – Office of Digital Inclusion Statewide Broadband – Established (Digital Connectivity Act of 2021)," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf.

- Asian-American Youth Leadership Empowerment and Development (AALEAD), Maryland[223]
- CASA, a nationwide Latino community organization[224]
- Chinese Culture and Community Service Center[225]
- Gilchrist Immigrant Resource Center, a County-run organization offering services such as English classes[226]
- Global Sustainable Partnerships, focused on providing access to clean and safe drinking water[227]
- Department of Health and Human Services of Montgomery County[228]
- Identity, Inc., serving Latino and other historically underserved youth[229]
- Independence Now, advocating for people with disabilities[230]
- Manna Food Center, fighting hunger in Montgomery County[231]
- Montgomery Coalition for Adult English Literacy (MCAEL)[232]
- Montgomery County Public Libraries (MCPL)[233]
- Montgomery County Department of Recreation (Montgomery County Recreation)[234]
- Muslim Community Center (MCC) Medical Clinic[235]
- Nonprofit Montgomery, an alliance of leaders of nonprofits[236]
- Passion For Learning (P4L), serving students in low-income communities[237]
- The UpCounty Hub, assisting families in need[238]
- WorkSource Montgomery, supporting economic development and education in Montgomery County[239]

[223] AALEAD MD, https://www.aalead.org/what-we-do/locations/md/.
[224] "About," CASA, https://wearecasa.org/about/.
[225] CCACC, https://www.ccacc-dc.org/.
[226] "About Us," Gilchrist Immigrant Resource Center, https://www.montgomerycountymd.gov/gilchrist/about.html.
[227] Global Sustainable Partnerships, http://gspartnerships.org/.
[228] Montgomery HHS, https://www.montgomerycountymd.gov/hhs/.
[229] Identity, Inc., https://identity-youth.org/.
[230] Independence Now, https://www.innow.org/.
[231] Manna Food Center, https://www.mannafood.org/.
[232] "About," MCAEL, https://www.mcael.org/about-mcael.
[233] MCPL, https://www.montgomerycountymd.gov/library/.
[234] Montgomery County Recreation, https://www.montgomerycountymd.gov/rec/.
[235] MCC Medical Clinic, https://www.mccclinic.org/.
[236] Nonprofit Montgomery, https://www.nonprofitmoco.org/.
[237] P4L, https://www.passionforlearning.org/.
[238] The UpCounty Hub, https://www.theupcountyhub.org/.
[239] WorkSource Montgomery, https://worksourcemontgomery.com/about/our-mission/.

The following entities received State digital equity grants in 2022 under the Digital Inclusion Grant Program (MD-DIG):[240]

- Bowie State University[241]
- The Computer Foundations program of Byte Back[242]
- Caroline County Department of Social Services[243]
- Carroll Technology Council[244]
- Data Access One's[245] Westport/Mt. Winans/Lakeland broadband internet pilot project
- Central Baltimore Partnership[246]
- Centro de Apoyo Familiar[247]
- City of Baltimore
- City of Takoma Park
- Cross Community's The Equity Center program[248]
- Digital Harbor Foundation[249]
- Faith and Work Enterprises[250]
- AHC Greater Baltimore[251]
- Health Empowerment Network of Maryland[252]
- Islamic Society of Baltimore[253]
- MOCO KIDSCO Inc.[254]
- KindWorks[255]

[240] "Community & Provider Resources," DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.
[241] Bowie State University, https://www.bowiestate.edu/.
[242] "Computer Foundations: Grow Your Digital Confidence with Basic Computer Skills," Byte Back, https://byteback.org/apply/courses-tracks/computer-foundations/.
[243] "Caroline County Department of Social Services," Maryland Department of Human Services, https://dhs.maryland.gov/local-offices/caroline-county/.
[244] Carroll Technology Council, https://carrolltechcouncil.org/.
[245] Data Access One, https://www.dataaccessone.com/.
[246] Central Baltimore Partnership, https://www.centralbaltimore.org/.
[247] Centro de Apoyo Familiar, https://mycaf.org/.
[248] "The Equity Center," Cross Community, https://cross-community.org/equity-center/.
[249] Digital Harbor Foundation, https://digitalharbor.org/.
[250] Faith and Work Enterprises, https://faithandworkenterprises.org/.
[251] AHC Greater Baltimore, https://www.ahcinc.org/ahc-baltimore/.
[252] Health Empowerment Network of Maryland, https://henmaryland.org/.
[253] Islamic Society of Baltimore, https://isb.org/.
[254] "MOCO KIDSCO," ProPublica Nonprofit Explorer, https://projects.propublica.org/nonprofits/organizations/454070908.
[255] KindWorks, https://dokindworks.org/.

- LASOS[256]
- Montgomery County Housing Partnership[257]
- Neighborhood Service Center[258]
- NHT Communities[259]
- Open Works[260]
- Rebuild Johnston Square Neighborhood[261]
- Southern Maryland Regional Library Association[262]
- Talbot County Free Library Association[263]
- City of Salisbury[264]
- Interfaith Service Coalition of Hancock, MD[265]
- United Way of Frederick County[266]
- University of Maryland[267]
- Wide Angle Youth Media[268]

The following entities received grants in 2022 under the State's Connected Communities Grant Program (MD-GAPS):[269]

- Center for Educational Leadership's Westport/Mt. Winans/Lakeland Broadband Access program
- Digital Harbor Foundation[270]
- Islamic Society of Baltimore[271]

[256] LASOS, https://www.lasos.org/.
[257] Montgomery County Housing Partnership, https://mhpartners.org/.
[258] Neighborhood Service Center, https://nsctalbotmd.org/.
[259] "NHT Communities," ProPublica Nonprofit Explorer, https://projects.propublica.org/nonprofits/organizations/311662007.
[260] "A Makerspace For All," Open Works, https://www.openworksbmore.org/.
[261] Rebuild Johnston Square Neighborhood, https://rebuildjohnstonsquare.com/.
[262] Southern Maryland Regional Library Association, https://smrla.org/.
[263] "Talbot County Free Library Association," ProPublica Nonprofit Explorer, https://projects.propublica.org/nonprofits/organizations/520629774/201700449349301655/full.
[264] City of Salisbury, https://salisbury.md/.
[265] "Interfaith Service Coalition of Hancock, MD," Town of Hancock, Maryland, https://www.townofhancock.org/bc-interfaith/page/interfaith-service-coalition-hancock-md.
[266] United Way of Frederick County, https://www.unitedwayfrederick.org/.
[267] University of Maryland, https://umd.edu/.
[268] Wide Angle Youth Media, https://www.wideanglemedia.org/.
[269] "Community & Provider Resources," DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.
[270] Digital Harbor Foundation, https://digitalharbor.org/.
[271] Islamic Society of Baltimore, https://isb.org/.

- United Way of Central Maryland[272]
- Cecil County[273]
- Montgomery County Government[274]
- Community Services Foundation[275]
- City of Salisbury[276]

3.4 Needs and gaps assessment

This section describes the gaps between the current state of broadband and digital inclusion and the needs of residents and community anchor institutions in Maryland, as documented through rigorous and comprehensive data collection and stakeholder outreach efforts.

The needs assessment documented in this Plan reflect OSB's evaluation of the range of data sources identified by NTIA as well as data and insights gathered through the comprehensive stakeholder engagement process described in Section 5. It also reflects the results of a residential survey conducted in 2023 as part of the preparation of the State's Digital Equity Plan. We note, too, that OSB will continue its stakeholder engagement efforts on an ongoing basis to assess relative needs even after submittal of this Plan. The State will provide fuller details within the Digital Equity report, including a needs assessment and gap analysis.

3.4.1 Broadband deployment

As a result of years of work described earlier in this section, broadband is available to most residents of Maryland. According to analysis of the FCC's address fabric (June 2023), 98.3 percent of locations in Maryland are served at 100/20 Mbps (see Section 5.5.2).

However, Maryland has rural broadband deployment needs, particularly on the Eastern Shore and in the western areas of the State[277]—and those residences are the most expensive to serve. This is why receiving BEAD grant funding will be critical in fulfilling the State's mission to bring broadband access to all residents of Maryland. As discussed further in Section 5, Maryland's solutions to funding barriers in designated high-cost areas will play a critical role in reaching the remaining unserved residences in Maryland.

[272] United Way of Central Maryland, https://www.uwcm.org/.
[273] Cecil County, https://www.ccgov.org/.
[274] Montgomery County Government, https://www.montgomerycountymd.gov/.
[275] Community Services Foundation, https://www.csfnd.org/.
[276] City of Salisbury, https://salisbury.md/.
[277] See map in Taking Stock of Digital Inclusion in Maryland," Community Development Network of Maryland, https://communitydevelopmentmd.org/digital-inclusion. "Analysis for this map was conducted by John B. Horrigan, PhD, Senior Fellow at the Benton Institute on Broadband & Society."

Future broadband deployments in the State will be eased by Maryland's extensive middle-mile network, which includes the One Maryland Broadband Network[278] project described earlier.

OSB is working on two programs to address broadband deployment gaps: The Broadband for Public Housing program will provide funding to wire public housing units that lack a broadband connection, and the Broadband for Difficult to Serve Premises program will provide grants to counties to enable broadband deployment to properties whose characteristics cause excessive broadband deployment costs.[279] Again, any remaining BEAD grant funding after addressing unserved and underserved locations and CAIs could be a critical difference maker in addressing broadband gaps within public housing locations.

3.4.2 Broadband adoption

79 percent of households in the State subscribe to wireline internet service, according to 2021 data from the American Community Survey.[280] The most recent NTIA data (November 2021) suggest a similar rate of adoption; 77.9 percent of Maryland residents surveyed use internet at home[281] and 82.5 percent of residents use internet at any location.[282]

Data collected in a survey of residents conducted in 2023 for the development of the State's Digital Equity Plan suggests higher levels of adoption: 97 percent of all respondents report purchasing internet service at home. However, there may be notable gaps among some communities. 88 percent of households with an individual with a disability, 90 percent of households with a formerly incarcerated individual, and 91 percent of households with a senior subscribe to internet service.

Broadband adoption decreases marginally according to income level alone, with 4 percent of all households surveyed earning less than $50,000 per year reporting that they do not have service at home, compared to 2 percent of households earning between $50,000 and $150,000 and 0 percent of households earning more than $150,000.

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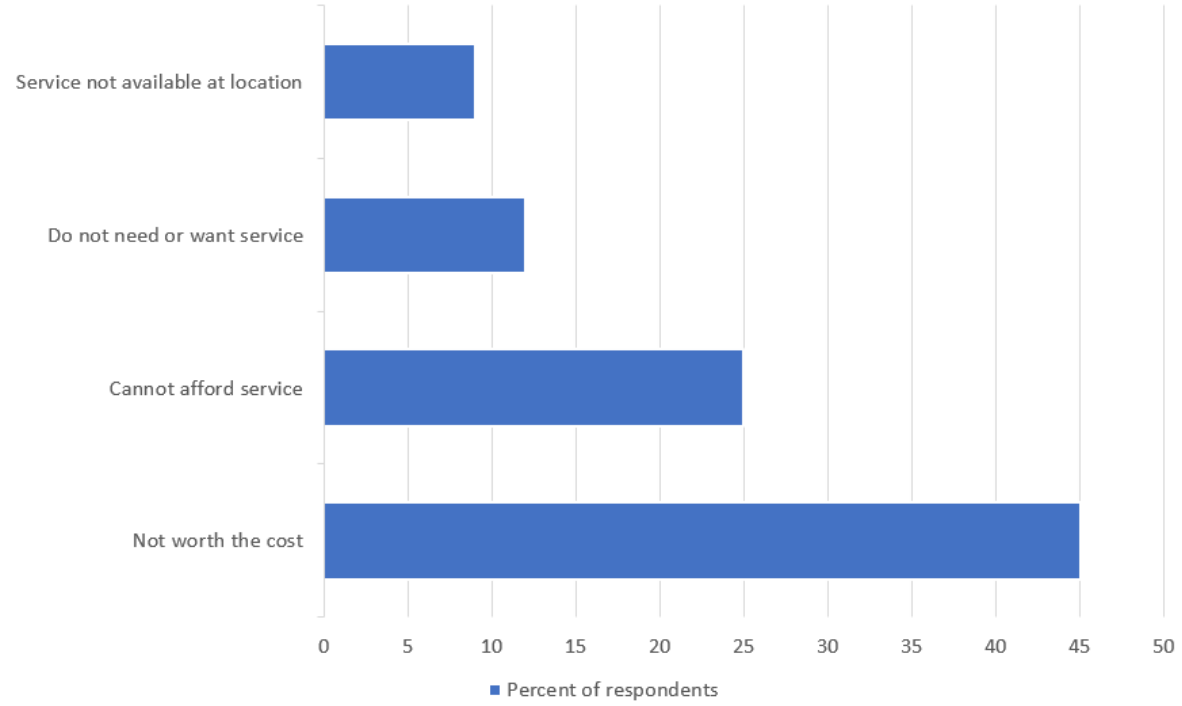
[278] "Maryland Department of Information Technology: One Maryland Broadband Network (OMBN)," NTIA, BTOP/SBI Archived Grant Program, https://www2.ntia.doc.gov/grantee/maryland-department-of-information-technology.
[279] "MD Outreach Conference BEAD Panel 1 Presentation," DHCD, April 17, 2023, https://dhcd.maryland.gov/Broadband/Documents/MD-Outreach-Conference-BEAD-Panel1.pdf, slide 7 (linked to from "Connect Maryland," DHCD, https://dhcd.maryland.gov/Broadband/Pages/default.aspx).
[280] American Community Survey Public Use Microdata 2021 1-year estimates, U.S. Census Bureau.
[281] "Digital Nation Data Explorer: Internet Use at Home," NTIA, November 2021 data, https://ntia.gov/other-publication/2022/digital-nation-data-explorer.
[282] "Digital Nation Data Explorer: Internet Use (Any Location)," NTIA, November 2021 data, https://ntia.gov/other-publication/2022/digital-nation-data-explorer.

Many factors can affect a household's ability or desire to subscribe to high-speed internet service where it is available, including the cost of service, access to sufficient computing devices, and the ability to navigate activities and content online.

While adoption is relatively high across income levels, survey data indicate that affordability (discussed in further detail in Section 3.4.3) is a concern for Maryland households who do not subscribe to service. Of households that do not purchase internet service, 45 percent say they do not subscribe because it is not worth the cost—and 25 percent indicate that they cannot afford service. In comparison, 12 percent of non-subscribers do not need or want service, and 9 percent say service is not available in their area. (Respondents could select more than one reason.)

Figure 3: Reasons for non-subscription



The majority of respondents without service do not access the internet at home (69 percent), while a relatively small but significant percentage (32 percent) rely on a cellular connection.

3.4.3 Broadband affordability

Affordability is a barrier to broadband adoption in Maryland for some and an obstacle for many, and while discounted services and subsidy programs are available there is low awareness of and participation in these programs.

Nearly three-quarters of all disconnected Maryland households have incomes below the State's median income, according to the Maryland Digital Equity Scorecard Index Map,[283] suggesting that many households that lack broadband cannot afford it.

According to the 2023 survey, the cost of service is a factor in some households' decision to subscribe. While only 12 percent of respondents who do not subscribe to internet service do so because they do not need or want service, close to half (45 percent) say "it [is] not worth the cost" and a significant portion (one-quarter) say they cannot afford the expense.

The majority of respondents who subscribe to service report paying $80 or more per month for service, with 33 percent paying $80 to $99 and 33 percent paying $100 or more. Just 16 percent pay $59 or less.

In addition to how much they currently pay for service, respondents were asked how much they were willing to pay for high-speed, reliable service. Even though 66 percent of all respondents pay $80 or more per month, only 29 percent were willing to pay that amount.

Among households earning $50,000 or less per year, 36 percent are willing to pay $60 to $79 for high-speed, reliable service, and 40 percent would like to pay $59 or less. However, only 11 percent of households at this income level currently pay $60 to $79, and 26 percent pay $59 or less. 63 percent of low-income respondents currently pay $80 or more monthly for internet service—although just 23 percent are willing to do so.

Recognizing affordability issues, the State has provided a supplement to federal broadband subsidy programs since 2021.[284] Maryland's Emergency Broadband Benefit program (MEBB) provides an additional $15 per month subsidy in addition to the $30 per month subsidy provided by the federal Affordable Connectivity Program (ACP).

Nevertheless, the State lags the national average in adoption of the ACP. According to April 2023 data (the latest data available) from EducationSuperHighway, Maryland's ACP adoption rate is 27 percent, compared to a national average of 34 percent.[285]

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[283] "Taking Stock of Digital Inclusion in Maryland," Community Development Network of Maryland, https://communitydevelopmentmd.org/digital-inclusion. "Analysis for this map was conducted by John B. Horrigan, PhD, Senior Fellow at the Benton Institute on Broadband & Society."

[284] "Maryland Emergency Broadband Benefit Program," DHCD, August 11, 2021, https://dhcd.maryland.gov/Broadband/Documents/Maryland-EBB-Presentation.pdf.

[285] See "Affordable Connectivity Program Enrollment Dashboard," EducationSuperHighway, https://www.educationsuperhighway.org/no-home-left-offline/acp-data/ and click on Maryland in the interactive map.

Only 7 percent of households in the 2023 survey earning less than $50,000 per year report that they are enrolled in the ACP. 82 percent are not enrolled in any subsidy programs (including Lifeline and ISP-offered programs).

3.4.4 Broadband access

Broadband access is available throughout most of the State (see Section 3.3.1), including through wired infrastructure, public Wi-Fi, and cellular connectivity. Remaining unserved and underserved locations throughout the State are some of the most difficult and expensive to serve. The coverage maps of AT&T, T-Mobile, and Verizon show 4G wireless service is available from at least one provider in most of the State, with some gaps in the east and west.[286]

Maryland's counties and cities have been proactive at the local level, creating broadband strategic plans described in Section 3.3.1, public Wi-Fi networks described in Section 3.3.4, and the extensive middle-mile networks that are also described in Section 3.3.4. Nevertheless, where gaps in public broadband access exist, they are likely in areas that also have digital equity needs.

3.4.5 Digital equity

Rural broadband deployment needs are discussed in Section 3.4.1. Digital equity, while a statewide challenge, shows the largest gaps and needs within Maryland's metro areas. Two-thirds majority of disconnected Marylanders live in Baltimore City or metro areas of other counties, and 40 percent of all Marylanders without wireline broadband are African American.[287]

The State's 2023 survey also indicates gaps in digital equity around access to devices and digital literacy.

Low-income households surveyed are more likely to lack a computer and have fewer devices on average than high-income households. 16 percent of households earning less than $50,000 report they do not own a computer—compared to 3 percent of households earning $150,000 or more. 62 percent of households in the top income bracket own three or more computers,

[286] See AT&T's coverage map at https://www.att.com/maps/wireless-coverage.html, T-Mobile's coverage map at https://www.t-mobile.com/coverage/coverage-map, and Verizon's coverage map at https://www.verizon.com/coverage-map/.

[287] "Taking Stock of Digital Inclusion in Maryland," Community Development Network of Maryland, https://communitydevelopmentmd.org/digital-inclusion. "Analysis for this map was conducted by John B. Horrigan, PhD, Senior Fellow at the Benton Institute on Broadband & Society." See also: "Disconnected in Maryland," Abell Foundation, January 2021, https://abell.org/publication/disconnected-in-maryland/.

while more than half of low-income households (55 percent) have one or none—and the majority (89 percent) have two or less.

Households with a formerly incarcerated individual are the most likely to not own a computer, with 28 percent of households reporting they have no computers. Additionally, 21 percent of primarily non-English speaking households and 19 percent of households with an individual with a disability do not own one.

In general, respondents report high levels of confidence in their ability to complete common tasks online. 93 percent are very confident they can send and receive emails and shop online, for example.

However, respondents' confidence shows a notable correlation with income, with households earning $50,000 or less annually reporting less confidence across all tasks surveyed. 78 percent of low-income respondents were very confident they could take a class or participate in job training online, for example, compared to 96 percent of respondents earning $150,000 or more. Respondents aged 65+ are also less confident in their abilities than other age groups across all tasks, with the exception of slightly outranking those 18-29 in their ability to operate a small home-based business.

As jobs increasingly require digital skills, nationwide and in Maryland, digital equity in terms of job seekers' digital skills is a particularly important issue. The Brookings Institution calls it "digitalization"—the transformation of employment opportunities to require some level of digital skills and comfort with technology.[288] Brookings finds that as of 2020, 77 percent of employment in the United States has either a medium or high digitalization level.[289] Brookings also finds that the fastest growing employment sectors have the highest demand for digital skills.

A 2020 report to the FCC's Broadband Deployment Advisory Committee (BDAC) finds growth in professions with high digitalization, finding for example that jobs in cybersecurity have increased by 43 percent in 2022, compared to just an 18 percent increase in the more general

[288] Mark Muro and Sifan Liu, "As the digitalization of work expands, place-based solutions can bridge the gaps," The Brookings Institution, February 7, 2023, https://www.brookings.edu/research/as-the-digitalization-of-work-expands-place-based-solutions-can-bridge-the-gaps/.
[289] Mark Muro and Sifan Liu, "As the digitalization of work expands, place-based solutions can bridge the gaps," The Brookings Institution, February 7, 2023, https://www.brookings.edu/research/as-the-digitalization-of-work-expands-place-based-solutions-can-bridge-the-gaps/.

labor market during the same time frame.[290] This trend toward requiring increased digital skills even for "low tech" employment opportunities in warehouses, construction sites, and retail further exacerbates the digital divide. Statistics further shows that people of color are underrepresented in employment with high levels of digitalization.[291] Where the digital divide is greatest, the digitalization of employment creates a larger digital divide by leaving those without the opportunity to gain digital skills farther and farther behind.

It is also the case that increased digitalization brings with it increased productivity and increased pay levels. Brookings finds that the "wage premium" for jobs with high digitalization levels as compared to those jobs requiring medium digital skills is 47 percent.[292] Thus, communities with a concentration of employment opportunities with high demand for digital skills—which tend to be concentrated in urban and metro areas and on the east and west coast—have overall increased pay levels than those with lower digital skills jobs and more opportunity for workers to develop the necessary digital skills.[293] Creating a workforce with increased digital skills will not only help to close the digital divide, but create socioeconomic opportunities that directly support families and entire communities.

USDA further notes that closing the digital divide is also critical to rural workforce development, as well as economic development with telehealth and remote work.[294]

The BEAD program's investment in expanding broadband access will lead to significant "indirect" job creation, which will require digital skills for those employees that intend to take advantage of these new jobs.

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[290] Broadband Infrastructure Deployment Job Skills and Training Opportunities Working Group Report (FCC BDAC Report), BDAC, https://www.fcc.gov/sites/default/files/bdac-job-skills-training-opportunities-approved-rec-10292020.pdf, p.5, citing Brent Parton, "Strengthening and Diversifying the Cybersecurity Workforce," U.S. Department of Labor Blog, September 19, 2022, https://blog.dol.gov/2022/09/19/strengthening-and-diversifying-the-cybersecurity-workforce.

[291] Mark Muro and Sifan Liu, "As the digitalization of work expands, place-based solutions can bridge the gaps," The Brookings Institution, February 7, 2023, https://www.brookings.edu/research/as-the-digitalization-of-work-expands-place-based-solutions-can-bridge-the-gaps/.

[292] Mark Muro and Sifan Liu, "As the digitalization of work expands, place-based solutions can bridge the gaps," The Brookings Institution, February 7, 2023, https://www.brookings.edu/research/as-the-digitalization-of-work-expands-place-based-solutions-can-bridge-the-gaps/.

[293] Mark Muro and Sifan Liu, The Brookings Institution, "As the digitalization of work expands, place-based solutions can bridge the gaps," February 7, 2023, https://www.brookings.edu/research/as-the-digitalization-of-work-expands-place-based-solutions-can-bridge-the-gaps/.

[294] "USDA Resource Guide for Rural Workforce Development: Together, America Prospers," U.S. Department of Agriculture, June 2021, https://www.rd.usda.gov/sites/default/files/060721-ic-ruralworkforceguide-final508.pdf.

For example, the National Governors Association has a program called the Workforce Innovation Network and members of that Network have created the State Digital Equity Scorecard.[295] This tool tracks how states are meeting digital workforce needs through trainings, apprenticeships, and funding programs.

Maryland scores 3.7 out of six possible points.[296] Based on a 2020 national estimate that one in three workers lacks basic digital skills,[297] the Scorecard projects that 69,407 of Maryland's 210,325 unemployed individuals [298] lack foundational digital skills, putting them at a disadvantage to compete for the roughly 165,000 jobs that require these skills (an estimated 76.6 percent of job openings in the State).[299]

[295] "Governors' Broadband Investments Are Creating Jobs," National Governors Association, September 13, 2021, https://www.nga.org/news/commentary/governors-broadband-investments-are-creating-jobs/.
[296] "Digital Equity Scorecard," NGA, https://digital-skills-map.digitalinclusion.org/scorecard/by_state/MD#indicator_4_full.
[297] Amanda Bergson-Shilcock, "The New Landscape of Digital Literacy," National Skills Coalition, May 2020, https://nationalskillscoalition.org/wp-content/uploads/2020/12/05-20-2020-NSC-New-Landscape-of-Digital-Literacy.pdf.
[298] Based on June 2021 data from the Bureau of Labor Statistics.
[299] Based on data from the Bureau of Labor Statistics.

4 Obstacles or barriers

This section describes known or potential obstacles or barriers that might impede the successful implementation of Maryland's BEAD Plan—as well as OSB's plan to address these challenges.

Figure 4: Obstacles or barriers

4.1 Legislative and regulatory barriers

The State of Maryland, under Governor Wes Moore's administration, is committed to achieving universal broadband connectivity for every resident. The Governor and the Legislature are aligned in their commitment to resolve all existing as well as potential barriers to do so. Universal connectivity will help ensure that no one is left behind in the State of Maryland.

The State recognizes the importance of efforts to streamline State and local permitting in such a way as to protect the State's interests while also ensuring effective and efficient broadband construction permitting.[300] We do not believe the two goals are incongruent. Maryland has a strong legislative history of identifying potential barriers to major social initiatives and arriving at practical solutions to solve them.

4.2 Labor shortages

Labor shortages in skilled positions for fiber broadband construction continue to be a concern in general. Overall, the pool of skilled workers for broadband deployment is smaller than experts predict is necessary for the broadband projects that BEAD will fund nationwide. This analysis compounds the State's general labor shortage; the U.S. Chamber of Commerce reports that Maryland has only "77 available workers for every 100 open jobs."[301]

However, OSB has worked closely with Maryland's ISPs to assess their labor needs—and this issue is not expected to pose a significant barrier to broadband infrastructure deployment in the State. Additionally, the NTIA State Workforce Research report reinforces this by indicating that only a limited number of additional skilled broadband workers were needed for the BEAD program implementation.

Maryland's ISPs have not directly expressed concerns about labor shortages as a potential barrier. When pressed, the ISP's have mentioned the lack of fiber optic splicers as their main deployment concern. This may be, in part, because the industry's operating model relies on a series of contractor companies to fulfill the construction needs of broadband providers. In addition, Maryland ISPs have carefully increased their broadband labor pools in response to current broadband funding under ARPA, and the companies believe those increases will allow them to move nimbly to meet the needs created by BEAD grant-funded deployments.

OSB is also working with other State agencies, Community Colleges, and workforce development centers to help ensure that broadband industry labor shortages do not negatively impact deployment timelines.

As described elsewhere in this Plan, the State plans to use new and existing relationships to promote workforce development efforts and to use its grant program to encourage service providers to hire and train employees as part of their BEAD projects. Workforce development

[300] Lindsay McKenzie, "NTIA chief says states have 'homework assignments' on broadband permits," *State Scoop*, https://statescoop.com/alan-davidson-ntia-state-broadband-permits/.
[301] "The Worker Shortage Across America," U.S. Chamber of Commerce, interactive map accessed March 21, 2023, https://www.uschamber.com/workforce/the-states-suffering-most-from-the-labor-shortage?state=md.

efforts supported by BEAD and Digital Equity Act funding will further enhance BEAD projects by providing a larger, more diverse pool of talent.

The State's efforts reflect its awareness of national issues around skilled broadband industry labor availability. In 2020 (prior to Congressional allocation of BEAD funding for broadband infrastructure), the FCC's Broadband Deployment Advisory Committee (BDAC) estimated there were 29,000 broadband-related technicians in the U.S. and that there would be a demand to hire 20,000 more technicians over the next 10 years.[302] This report suggests that "considerable doubt has arisen among broadband infrastructure industry stakeholders as to whether they can meet build-out projects due to current workforce challenges."[303]

The 2020 FCC BDAC workforce report discussed several workforce challenges that are creating barriers to meeting the expected demand for skilled workers caused by the increase in broadband projects. Subsequent reports, including the January 2023 FCC Working Group Report, as well as the GAO 2022 analysis, reinforce many of the FCC's 2020 findings as they update the analysis to factor in IIJA BEAD project demands.

A lack of standardized training and coordination of employment opportunities in the industry fails to create clear career pathways and broader skill sets among broadband workers that can be more generally applicable which, in turn, inhibits a flow of broadband workers to meet immediate demands for specific types of workers, as well as inhibiting career advancement and changes.

The GAO analysis further noted that recruiting necessary workers into rural areas may be more complicated due to the lower population density and remoteness of those communities, as well as statistics that suggest only 10 percent to 15 percent of telecommunications workers travel beyond 200 miles from their homes to work on remote projects.[304]

The National Governors Association notes that 83 percent of telecommunications line installers are white and only 6 percent are women, making it even more difficult to recruit workers if they do not see themselves in the positions.[305]

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[302] Broadband Infrastructure Deployment Job Skills and Training Opportunities Working Group Report (FCC BDAC Report), BDAC, https://www.fcc.gov/sites/default/files/bdac-job-skills-training-opportunities-approved-rec-10292020.pdf (page 7).
[303] FCC BDAC Report, https://www.fcc.gov/sites/default/files/bdac-job-skills-training-opportunities-approved-rec-10292020.pdf (page 6).
[304] GAO Report, https://www.gao.gov/assets/gao-23-105626.pdf at p. 14.
[305] "Governors' Broadband Investments Are Creating Jobs," National Governors Association, September 13, 2021, https://www.nga.org/news/commentary/governors-broadband-investments-are-creating-jobs/.

America Achieves and the GAO note there will be increased competition for workers from other broadband infrastructure projects just getting under way with funding from the ARPA grant programs and USDA and RDOF programs, as well as additional competition for trades such as construction, electricians, and other labor categories that support large infrastructure projects as a result of the IIJA's other investments in transportation, water, and other infrastructure.[306] The growth of fixed wireless and 5G installation could be viewed as competition for some of these labor categories, or as an opportunity and synergy to bring new workers into the telecommunications industry more generally. Experts note a boom in demand for high-wage, high-skilled workers for these jobs, many of which have crossover and adjacent skills to support wireline fiber broadband projects.[307]

4.3 Supply chain issues and materials availability

The extensive funding allocated to broadband infrastructure deployment by Congress—and the current and planned investments by State and local governments and ISPs nationwide[308]—has caused a spike in demand for labor and materials. This increased demand compounds an already disrupted market as COVID-19 caused factory closures and other issues in the supply chain.

Supply chain challenges in general reached unprecedented levels during the COVID-19 pandemic and have not disappeared. "Given that there are multiple new risk factors on the horizon, it is hard to envision trust in the system being restored to pre-COVID-19 levels any time soon," according to a 2023 S&P Global Intelligence report,[309] citing both geopolitical risks such as Ukraine and Taiwan and transportation risks including labor unrest and unanticipated cargo surges.

According to recent research, however, delays on orders of new fiber are decreasing.[310]

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[306] RISI Report, https://americaachieves.org/wp-content/uploads/2022/06/America-Achieves-Broadband-Workforce-Report-June-2022.pdf (page 8-9); See also, GAO Report (page 14) https://www.gao.gov/assets/gao-23-105626.pdf.

[307] RISI Report, https://americaachieves.org/wp-content/uploads/2022/06/America-Achieves-Broadband-Workforce-Report-June-2022.pdf (page 26).

[308] Diana Goovaerts, "Editor's Corner: Is the fiber hangover real?" *Fierce Telecom*, March 15, 2023, https://www.fiercetelecom.com/broadband/editors-corner-fiber-hangover-real.

[309] Peter Tirschwell, S&P Global Market Intelligence, "Risk Will Define Supply Chains for Years To Come," January 13, 2023, https://www.spglobal.com/en/research-insights/featured/special-editorial/look-forward/risk-will-define-supply-chains-for-years-to-come.

[310] "Fiber Broadband Association Reports Dramatic Improvements to Supply Chain," Fiber Broadband Association, May 2, 2023, https://fiberbroadband.org/2023/05/02/fiber-broadband-association-reports-dramatic-improvements-to-supply-chain/, reporting significantly improved lead times in several broadband categories, with

During 2023, inflation remains a potential barrier. "Even though inflation started to cool toward the end of 2022, it is still unclear how long it will take to return to its long-run average—that is, if currently high inflation will persist," the Federal Reserve Bank of St. Louis said in a blog post.[311]

For example, the fiber optic cable producer price index from the Federal Reserve Bank of St. Louis rose over 20 percent between January 2020 and April 2023, as shown below.[312]

Figure 5: Fiber optic cable producer price index, January 2020 to April 2023

OSB is aware of these labor shortages and supply chain issues, as well as potential distribution and logistics bottlenecks—none of which are uncommon in its experience in large-scale broadband deployment efforts.[313] OSB will address these challenges by working with partners and ISPs on efficient long-term planning.

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delays down to approximately 5 weeks, depending on the category – hand holes were still registering delays of 8 to 14 weeks as of March 2023.

[311] Michael McCracken and Trần Khánh Ngân, Federal Reserve Bank of St. Louis, *On the Economy Blog*, "Will High Inflation Persist?" January 10, 2023, https://www.stlouisfed.org/on-the-economy/2023/jan/will-high-inflation-persist.

[312] "Producer Price Index by Industry: Fiber Optic Cable Manufacturing: Fiber Optic Cable, Made from Purchased Fiber Optic Strand (PCU3359213359210)" for the period January 2020 to April 2023, Federal Reserve Bank of St. Louis. The latest available data is at https://fred.stlouisfed.org/graph/fredgraph.png?g=14Kos. Because the URL links to the latest available data, the data accessible via the link may be more recent the data in the graph above. The series data are available at https://fred.stlouisfed.org/series/PCU3359213359210.

[313] "Maryland Facilitated IIJA Workforce Development Session," DHCD, March 29, 2023, https://dhcd.maryland.gov/Broadband/Documents/MD-IIJA-Facilitated-Session-Workforce-Development.pdf, slide 18 (linked to from "Connect Maryland," DHCD, https://dhcd.maryland.gov/Broadband/Pages/default.aspx).

4.4 Industry participation

As OSB's experience in broadband grant-making illustrates, industry participation—that is, commitments by ISPs to share the cost and risk of last-mile broadband deployment in exchange for partial public funding—will be an important factor in closing the State's digital divide.

OSB anticipates no barriers in this regard—based on a successful history of effective collaboration between the State and the dozens of active ISPs serving customers across Maryland. The stakeholder outreach OSB conducted in preparation of this Plan confirmed that ISPs in the State intend to be collaborative partners in future broadband deployment efforts.

That said, industry participation may be impeded in one regard: The BEAD rules prohibit any state from allocating funds to areas that are served by the Rural Digital Opportunity Fund (RDOF). In Maryland, five bidders initially won over $48 million to serve 37,761 rural locations, and if any of those bidders does not complete their buildout, those locations will remain unserved and ineligible for BEAD funding. The primary RDOF awardee, Talkie Communications, Inc., has very large commitments in Maryland providing a potential vulnerability to our plan for universal service should the RDOF deployment fail or be delayed. In contrast, the FCC's rejection of Starlink's application in 2022[314] could open up several areas of the State that had been awarded to the provider.

4.5 Topography

Maryland's topography presents potential challenges for the deployment and resiliency of broadband infrastructure—though experience demonstrates that these obstacles are understood and surmountable.

Maryland has a west-to-east contrast in temperature. Larger seasonal variations occur in the highland west in the Appalachian Mountains, while temperatures in the east are moderated by the Chesapeake Bay and the Atlantic Ocean, according to the State Climate Summary for Maryland and Washington, D.C.[315] published by the National Oceanographic and Atmospheric Administration (NOAA) and the Cooperative Institute for Satellite Earth System Studies (CISESS). Temperatures and humidity are expected to increase, increasing the risk of flooding, according to the Climate Summary. The Chesapeake Bay area is the third most vulnerable area of the United States to sea level rise, behind Louisiana and South Florida.

[314] "FCC Rejects LTD Broadband, Starlink Bids for Broadband Subsidies," FCC news release, August 10, 2022, https://docs.fcc.gov/public/attachments/DOC-386140A1.pdf.
[315] "Maryland and the District of Columbia," NOAA and CISESS, https://statesummaries.ncics.org/chapter/md/.

One location that could present a unique challenge for the State is Smith Island. This community is accessible exclusively by boat and has three villages: Ewell, Tylerton, and Rhodes Point.[316] At 4.3 square miles and with a population of 238 residents,[317] Smith Island presents itself as a potential extremely high-cost location for broadband service; and while traditionally it has been losing population, those trends are recently changing. The island's low elevation also puts it at risk due to climate change.

Overall, topography presents a potential obstacle to broadband deployment to the extent that construction methods need to consider mountainous terrain with its snow, ice, and wind potential in the western portion of the State and ongoing maintenance and survivability in terms of flooding and other natural disasters in the east and other locations. However, given that this is a known concern, both the State and private deployers have a demonstrated history of successfully mitigating these issues.

4.6 Affordability

A survey conducted in early 2023 during the preparation of this Plan found that 66 percent of respondents—and 63 percent of households earning $50,000 or less per year—pay $80 or more monthly for internet service. Households that do not purchase service at home indicated that cost was the most significant factor in their decision not to subscribe.

While only 12 percent of respondents who do not purchase internet service say they do not need or want service, close to half (45 percent) say they do not subscribe because "it [is] not worth the cost" and a significant portion (one-quarter) say they cannot afford the expense.[318]

When asked how much they were willing to pay for reliable, high-speed internet service, most low-income households (76 percent) would like to pay less than $80 per month—although 36 percent are willing to pay $60 to $79—but only a little over a third (37 percent) have a service plan at this price point. 11 percent of those households pay between $60 and $79, and just 26 percent pay less than $60.

However, many households in the State that are eligible for the federal Affordable Connectivity Program (ACP), which provides a $30 monthly subsidy for broadband services to low-income and other eligible households, do not participate in the program. In Maryland, 242,252

[316] "Smith Island," Maryland Office of Tourism, https://www.visitmaryland.org/listing/scenic-points-landmarks/smith-island.
[317] "Smith Island," Census Reporter, https://censusreporter.org/profiles/16000US2472887-smith-island-md/.
[318] Respondents could choose more than one answer. When asked to rank which factor was most important in their decision not to subscribe, respondents ranked "not worth the cost" as first (48 percent of respondents) and "cannot afford" as second (25 percent of respondents).

households are enrolled in the FCC's Affordable Connectivity Program (ACP) as of July 2023,[319] representing about 33 percent of the estimated eligible households in the State.[320] This means households that might be able to sign up for free or low-cost service are not taking advantage of the opportunity.

Recent research indicates there is low awareness of the program nationwide,[321] and the 2023 survey conducted by the State corroborates low rates of participation in Maryland: 82 percent of respondents earning less than $50,000 annually are not enrolled in any subsidy programs, including the ACP, Lifeline, or ISP-offered programs.

OSB is addressing affordability in a range of ways, including layering into ACP a State subsidy of $15 per month. OSB has also created and funded digital inclusion grant programs throughout Maryland to pilot various methods by which to effectively conduct outreach, education, and enrollment into programs such as ACP.

These include the State's two recipients of the FCC's "Your Home, Your Internet Pilot Program" grant awards—the Housing Authority of Baltimore City (HABC) and the Maryland Department of Housing and Community Development (DHCD)—and the Baltimore County Public Library (BCPL), which is a selected participant in the FCC's ACP Navigator Pilot Program.[322] OSB also is supporting local governments that develop ACP outreach efforts, such as Montgomery County, Maryland, which offers in-person enrollment help to residents who attend "Montgomery Connects" computer distribution events.[323]

The State partnered with EducationSuperHighway on a statewide outreach initiative to increase awareness of the ACP and promote enrollment. The State announced an ACP outreach program, Maryland ActNow, with the nonprofit EducationSuperHighway and ISPs to increase awareness and participation in the program.[324] The City of Baltimore launched an initial

[319] "ACP Enrollment and Claims Tracker," USAC, https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/#enrollment-by-state (accessed July 31, 2023).
[320] See also "Bipartisan Infrastructure Law State Fact Sheet: Maryland," the White House, March 2023, https://www.whitehouse.gov/wp-content/uploads/2023/03/Maryland-Fact-Sheet-March-Edition.pdf.
[321] "Half of ACP-Eligible Households Still Unaware of the Program," Benton Institute for Broadband & Society, March 17, 2023, https://www.benton.org/blog/half-acp-eligible-households-still-unaware-program.
[322] "WCB Announces Final List of Entities Selected for ACP Pilot Programs," FCC, Public Notice DA 23-288, April 6, 2023, https://www.fcc.gov/document/wcb-announces-final-list-entities-selected-acp-pilot-programs.
[323] "What Is the Affordable Connectivity Program (ACP)?" Montgomery County Technology & Enterprise Business Solutions, https://montgomerycountymd.gov/obp/affordable-connectivity-program.html#documentation.
[324] "Governor Moore Launches Maryland ActNow Campaign to Close the Digital Divide in Maryland," Office of Governor Wes Moore, News Release, July 18, 2023, https://governor.maryland.gov/news/press/pages/governor-moore-launches-maryland-actnow-campaign-to-close-the-digital-divide-in-maryland.aspx.

campaign, "Bmore Connected," in May 2023.[325] EducationSuperHighway developed a free online tool that residents can use to check their eligibility,[326] and the City will work with trusted local organizations to encourage residents to sign up for the subsidy program.

4.7 Digital literacy

According to the State's 2023 survey, residents generally indicate a high level of confidence in their ability to complete everyday tasks online, although notable percentages indicate they are only slightly confident or not confident in their skills for some activities, including accessing medical services online (10 percent), searching for a job online (13 percent), and working remotely (16 percent).

Significantly, households earning less than $50,000 per year report less confidence in their digital skills than high-income households across all tasks surveyed. Respondents aged 65 and over also rank their abilities lower than respondents in other age groups for each activity.

OSB intends to address these digital literacy issues by working with established partners and supporting innovative new programs statewide. For example, the State has supported multiple organizations working to close the digital divide in Baltimore City through technology education, from building everyday digital skills to workforce development training to help interested residents enter the technology field.

Organizations supported by the State include the Digital Harbor Foundation,[327] which runs a variety of community-based educational programs centered around technology, and Byte Back,[328] which provides free training and resources to help individuals in communities historically excluded from the technology field—including people of color and women—launch their careers.

The State also awarded $6 million to the University of Maryland (UMD) Extension for programming that promotes digital literacy statewide. Through the Tech Extension program, residents can receive in-person support through classes taught by digital navigators, call a free hotline to receive one-on-one technology support in English and Spanish, and access a hub of

[325] "Mayor Scott, BCIT to Bring Affordable Home Internet to Baltimore Households," press release from the Mayor's Office, May 18, 2023, https://mayor.baltimorecity.gov/news/press-releases/2023-05-18-mayor-scott-bcit-bring-affordable-home-internet-baltimore-households.
[326] Available at https://getacp.org/bal.
[327] Digital Harbor Foundation, https://digitalharbor.org/.
[328] Byte Back, https://byteback.org/.

educational resources available in English and Spanish on UMD Extension's website.[329] A portion of the award will also be used to help residents sign up for internet access subsidies and acquire a device.

[329] "Tech Education," University of Maryland Extension, https://extension.umd.edu/locations/charles-county/tech-education.

5 Implementation plan

5.1 Stakeholder engagement process

This section describes the comprehensive external engagement process OSB conducted in preparation of this Plan and that is a priority of Governor Wes Moore's administration. The stakeholder engagement effort, comprising statewide meetings and surveys with a complete range of stakeholders, demonstrated collaboration with local and regional entities (governmental and non-governmental). It reflects OSB's effort to facilitate an inclusive and effective engagement model. The stakeholder engagement process also included the covered populations[330] that have been identified as core stakeholder groups. Stakeholder engagement is critical towards ensuring that the BEAD grant funding priorities accurately reflect the needs of all Maryland residents.

OSB, housed in the Maryland Department of Housing and Community Development, was created in 2017 with the mission to ensure that every Marylander has access to broadband services. To achieve its goal, OSB has established a strong collaborative partnership with both private sector entities and local jurisdictions to fulfill the mission of working towards ensuring that all Maryland communities and residents are served affordable high-speed broadband internet.

For example, Maryland has established strong inter-agency coordination. Maryland's workforce development agencies, which are accustomed to working together as Maryland's Workforce System, comprise the Governor's Workforce Development Board,[331] Maryland's Division of Rehabilitation Service (DORS), [332] the Maryland Department of Labor, [333] the Maryland

[330] Per NOFO Section I.C.g, referencing IIJA Section 60302(10), the covered populations are:

1. Individuals who live in covered households;
2. Aging individuals;
3. Incarcerated individuals, other than individuals who are incarcerated in a Federal correctional facility;
4. Veterans;
5. Individuals with disabilities;
6. Individuals with a language barrier, including individuals who—
    a. Are English learners; and
    b. Have low levels of literacy;
7. Individuals who are members of a racial or ethnic minority group; and
8. Individuals who primarily reside in a rural area.

[331] "Governor's Workforce Investment Board," Maryland Manual On-Line, https://msa.maryland.gov/msa/mdmanual/25ind/html/80wo.html.

[332] "Division of Rehabilitation Services," Maryland State Department of Education, https://dors.maryland.gov/Pages/default.aspx.

[333] Maryland Department of Labor, https://www.dllr.state.md.us/.

Department of Housing and Community Development,[334] the Maryland Workforce Association (comprising 12 local Workforce Directors),[335] and Maryland's Department of Human Services.[336]

OSB has pursued its mission by, in part, utilizing its existing relationships with private and public entities and organizations to develop and continuously update its stakeholder contact list—creating a foundation for research that encompasses a wide-ranging group of constituents. The stakeholder list was actively updated throughout the engagement process to both diversify and expand OSB's outreach efforts with the aim to create an inclusive, comprehensive engagement strategy that provides multiple opportunities to meaningfully participate in the development of the Five-Year Action Plan.

OSB utilized multiple modes of engagement to obtain vital feedback from stakeholders and the public—including in-person regional engagements, virtual listening sessions, social media outreach, and phone surveys.

OSB intentionally engaged representatives of covered populations (as defined by the BEAD Notification of Funding Opportunity) to facilitate critical feedback from communities that have historically not been included in the public planning process. OSB intends to continue its comprehensive engagement of and outreach to stakeholders, the public, and covered populations to inform future planning efforts.

OSB initiated stakeholder engagement through four in-person regional community engagements across the State. The fourth engagement was held in partnership with the City of Baltimore. The engagements were designed to occur in geographically distinct areas to maximize access to organizational representation from urban, suburban, and rural communities.

Engagements were day-long events with multiple workshop panels convened. The workshops started with an introduction from Maryland State officials outlining the planned activities of the State of Maryland under the BEAD program. Next, an infrastructure panel comprising private

[334] Maryland Department of Housing and Community Development, https://dhcd.maryland.gov/.
[335] Maryland Workforce Association, https://marylandworkforceassociation.org/. The Maryland Workforce Association includes the Anne Arundel Workforce Development Corporation, (Baltimore City) Mayor's Office of Employment Development, Baltimore County Department of Economic & Workforce Development, Frederick County Workforce Services, (Salisbury-based) Lower Shore Workforce Alliance, WorkSource Montgomery Inc., Employ Prince George's, (Hughesville-based) Tri-County Council for Southern Maryland, Susquehanna Workforce Network, Inc., Upper Shore Workforce Investment Board (serving the portions of the Eastern Shore located in Caroline, Dorchester, Kent, Queen Anne's, and Talbot Counties), and Western Maryland Consortium (with offices in Allegany County, Garrett County, and Washington County).
[336] Department of Human Services, https://dhs.maryland.gov/.

and public representatives discussed details regarding broadband deployment. For the third panel, public representatives discussed digital equity programs and needs. Finally, a public panel featured representatives of nonprofits and faith-based organizations to discuss the specific needs of covered populations.

Attendees had numerous opportunities to participate in the discussions, ask questions, and provide invaluable feedback to inform the State's activities.

Additionally, OSB hosted four virtual meetings to address individual groups of stakeholders: State and regional agencies, internet service providers, community anchor institutions, covered populations, and workforce development organizations.

Participants were provided with a customized overview of broadband technology, broadband funding and programmatic opportunities, opportunities specific to their organizations and constituents, and avenues for engagement and input. After each virtual engagement, participants were given the opportunity to respond to surveys specific to their stakeholder group. All surveys were publicly available on the Maryland.gov website along with a speed test for residents to test their internet connection speed.

OSB additionally engaged the public through a statistically significant, residential phone survey to sample broadband availability, digital skills, and the broadband needs of adults in Maryland. The residential phone survey obtained randomized data from 1,932 adult residents in Maryland. To correct for potential bias based on household income, ethnicity, and the age of the respondent, responses were weighted based on region, household income, respondent age and ethnicity since respondents in lower income households, racial or ethnic minorities, and younger individuals were less likely to respond.

The Five-Year Action Plan development process, utilizing multiple modes of engagement of the public and a diverse range of governmental and private stakeholders, demonstrates OSB’s commitment to establishing an inclusive and effective Plan.

5.1.1 Full geographic coverage

To ensure the entire geographic range of the State of Maryland was engaged, OSB held engagements in western, central, and eastern Maryland and OSB partnered with the City of Baltimore to host a fourth engagement (central Maryland). These locations were selected to maximize the geographic range of these meetings and to engage underrepresented communities by hosting events at locations that are accessible, public, and provide and enable community support.

The engagements were held at the following locations:

Figure 6: Community engagement events

Central Maryland

- University of Maryland, College Park (April 17, 2023)

Western Maryland

- Frostburg State University (May 16, 2023)

Eastern Shore Maryland

- University of Maryland, Eastern Shore (May 24, 2023)

Central Maryland

- Coppin State University, Baltimore (May 25, 2023)

The following figures represent examples of the outreach conducted to inform potential attendees about these sessions.

Figure 7: Broadband Conference 2023 announcement (1)

Figure 8: Broadband Conference 2023 announcement (2)

The University of Maryland, Eastern Shore, and Coppin State University are HBCU higher education institutions. Representatives from the hosting universities also served as panel members to share both the broadband needs of their students and the initiatives the universities are leading within adjacent communities to extend internet access and adoption.

Panel topics at each of the four forums were broken out into the following: BEAD processes and opportunities; understanding the infrastructure needs of Maryland organizations and the residents who they serve; digital equity opportunities and challenges; and avenues to participate in the future grant process. Attendees were given multiple opportunities to provide feedback throughout the forums.

Virtual stakeholder meetings were also held online. By hosting these meetings online, OSB was able to meaningfully engage with a geographically diverse range of stakeholders who may otherwise be unable to attend and provide valuable input.

Virtual stakeholder engagements were held on the following dates:

- Monday, March 13, 2023, State and Regional Agencies
- Wednesday, March 15, 2023, Internet Service Providers
- Wednesday, March 22, 2023, Anchor Institutions and Covered Populations
- Wednesday, March 29, 2023, Workforce Development

In addition to these engagements, OSB hosts quarterly meetings with State, county, and local agencies to address the entire geographic range of the State. Meetings are held with the Department of Information Technology, the State Department of Education, the State Department of Transportation, the Maryland State Library, the Department of Commerce, the Department of Agriculture, the Maryland Department of Health, the Department of Planning, units of local government, the Maryland Association of Counties, and the Maryland Municipal League. Meetings with County and State agencies are held separately.

5.1.2 Meaningful engagement and outreach to diverse stakeholder groups

At each engagement, whether online or in-person, OSB implemented several strategies to ensure that stakeholders were informed of Maryland's broadband goals and were able to provide meaningful feedback. OSB utilized accessible engagement locations, variable announcement modes, and multiple modes of engagement (in-person and online meetings) to maximize the diversity of attendees. OSB tailored each event to the audience, including the substantive overview of each program and broadband technologies as well as the opportunities for stakeholder engagement.

OSB advertised the regional engagements through several avenues, including a public announcement on the Maryland.gov website, Maryland Department of Housing & Community

Development social media, direct emails to OSB partners and announcements by the hosting universities. Announcements were also advertised on the Maryland Economic Development Association and the Maryland Association of Counties websites. The range of announcements aimed to inform a diverse group of stakeholders to enable comprehensive feedback.

Participants at engagements in central Maryland provided feedback primarily on digital equity opportunities, including the need for digital navigators to assist residents with effectively adopting broadband through device and internet training.

Organizational representatives who attended the Baltimore City engagement were concerned about the accuracy of the FCC mapping. Specifically, multi-family housing structures may be designated as served although individual units are not. The building may, for example, be designated as a fiber drop location although the inside wiring is not sufficient to enable connectivity; or the building may appear to be served by fixed wireless even though some units may not have the line of sight to be served. Representatives expressed concern that unserved locations may actually be undercounted and could impact the receipt of BEAD resources.

Participants in western Maryland included representatives of several ISPs who asked questions about the BEAD grant process, such as participation in the challenge process and matching funds and insurance requirements.

Participants in the Eastern Shore of Maryland were concerned about the timeline for BEAD program implementation, noting that their need for broadband access is immediate.

5.1.3 Regular engagements

As mandated by Maryland State law,[337] OSB meets regularly with the appropriate units of State government to gather input and share plans related to broadband deployment and digital equity, including the Department of Information Technology, the State Department of Education, the State Department of Transportation, the Maryland State Library, the Department of Commerce, the Department of Agriculture, and the Maryland Department of Health.

OSB also meets with representatives of Maryland's counties and local government entities—including the Maryland Association of Counties (MACO), which consists of representatives from the State's 23 counties and Baltimore City, and the Maryland Municipal League (MML), which represents the 157 cities and towns in the State.

[337] "Senate Bill 66, Chapter 74: Digital Connectivity Act of 2021," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf, at 6.5-104(D), p.10.

5.1.4 Multiple awareness and participation mechanisms

To pursue its goal of ensuring that every Marylander has access to broadband internet, OSB implemented multiple awareness mechanisms and opportunities to participate in the planning process. OSB drew on its existing relationship with public and private stakeholders to develop and actively update a diverse and inclusive stakeholder list. OSB used this stakeholder list to send invitations to the virtual stakeholder sessions and in-person regional community engagements across the State. In total, stakeholders numbered over 175 for BEAD engagement including organizations representing hundreds of contacts.

OSB additionally advertised the regional engagements through multiple methods, aiming to inform a diverse group of stakeholders. These included public announcements on the Maryland.gov website, Maryland Department of Housing & Community Development social media, direct emails to OSB's partners and announcements by the hosting Universities. Announcements were also advertised on the Maryland Economic Development Association and the Maryland Association of Counties websites.

Attendees at both the in-person and virtual engagements had numerous opportunities to provide feedback through discussion and questions. In addition to participating in meetings, surveys were available afterwards as well as posted publicly online on the OSB website to collect data on agency asset inventories, internet service providers, community anchor institutions, and workforce development.

OSB also engaged the public through a phone survey which collected 1,932 responses from adult Marylanders about broadband availability, digital skills, and the broadband needs.

5.1.5 Clear procedures to ensure transparency

OSB took significant steps to ensure compliance with all applicable laws and best practice procedures. Participants were able to attend meetings anonymously and closed-caption transcripts were available in real time to enable additional engagement for some participants with differing abilities. The surveys allowed respondents to choose which questions to answer, allowing individuals to control the level of personal detail provided.

Information was collected from meeting chats, Q&A sessions, and surveys. If contact information was provided, individuals were added to the stakeholder list. The intent to include the participants in future stakeholder outreach was clearly communicated during meetings.

After meetings, the slide deck was sent to all attendees that provided OSB their contact information along with all invited stakeholders for that topic (e.g., the Community Anchor Institutions meeting slide deck was sent to all health care facilities, libraries, schools, higher education facilities, and other relevant organizations.) The slide deck and engagement surveys were also publicly available on OSB's website.

5.1.6 Outreach and engagement of unserved and underserved communities

OSB took a proactive approach in advance of all forums to engage representatives of and organizations that serve defined covered populations by ensuring the contact list used for outreach was both comprehensive and inclusive.

OSB additionally engaged with unserved and underserved communities by ensuring accessibility to materials, meetings, and information. The virtual stakeholder presentations were accompanied by closed captions and the slide decks were made publicly available online.

To maximize the engagement of historically underrepresented populations, two of the four public meetings were hosted at HBCUs. Representatives from these universities actively participated in the engagements as panel members.

OSB will continue to find opportunities to present to members of community organizations and meet constituents where they are. OSB will also host virtual town halls to give updates on the program and provide additional opportunities for the public to provide feedback on how OSB can best achieve its mission of serving all Marylanders with broadband internet.

5.2 Priorities

As established in the Maryland Digital Connectivity Act of 2021,[338] the State of Maryland's goal is to "ensure that every resident of the State has the ability to connect to universal, affordable, reliable broadband Internet that exceeds the Federal Communications Commission standard for upload and download speeds."[339]

This Plan presents the State of Maryland's primary objectives for broadband deployment, which are fully aligned with the requirements of the BEAD Program:

1. Serving 100 percent of unserved locations (i.e., below 25/3 Mbps) within five years–including public and non-profit owned multiple dwelling unit (MDU) locations that are determined to be unserved through the challenge process to ensure the availability of reliable and affordable high-speed broadband access in low-income and affordable public housing

2. Serving 100 percent of underserved locations (i.e., between 25/3 and 100/20) within five years

[338] "Senate Bill 66," Maryland General Assembly, https://mgaleg.maryland.gov/2021RS/chapters_noln/Ch_74_sb0066E.pdf.
[339] "Chapter 74, §6.5–104 (c)(1)(i)," Maryland General Assembly, https://mgaleg.maryland.gov/mgawebsite/Laws/StatuteText?article=ghs&section=6.5-104&enactments=False&archived=False.

3. Assuming adequate funding, delivering gigabit connections to community anchor institutions that do not have that level of service within five years

Should BEAD funds remain after the first three objectives are fulfilled, Maryland will then focus on:

4. Supporting digital equity and inclusion programs to help drive higher adoption among BEAD-defined covered populations

OSB has established the following priorities to support the BEAD vision for broadband deployment and digital equity:

Table 11: Priorities for broadband deployment and digital inclusion

Priority	Description
Leverage existing local government partnerships	Work closely with local governments and coordinate deployment, outreach, and digital equity and inclusion activities; capitalize on the program creativity of local partners and nonprofit organizations for digital inclusion opportunities
Support existing and new public-private partnerships and cooperatives	Build on Maryland's history of public-private partnerships and cooperatives that build and run broadband assets
Reduce costs and potential barriers to deployment	Promote streamlined permitting opportunities, including cost-effective access to poles, conduits, easements and rights-of-way
Leverage existing State assets	Ensure that existing public assets described elsewhere in this plan, such as the One Maryland Broadband Network, are used to accelerate broadband deployment

5.3 Planned activities

OSB will undertake a number of planned activities to help ensure affordable, reliable, universal broadband service and digital equity for all Maryland residents. Additional activities may be included as the Initial Proposal is developed and continuing community feedback is received. Maryland's planned activities include the following:

Table 12: Planned activities

Planned activity	Description
Award competitive grants to potential ISP partners to reach unserved locations (top priority) and underserved locations	Award competitive grants to participating ISP partners to construct broadband infrastructure to unserved locations (first) and underserved locations (second) as identified by the FCC's data fabric and certified by the State's subsequent challenge process. The unserved locations will include multiple dwelling unit (MDU) buildings that are determined to be unserved through the challenge process. Grant awards will not duplicate prior and existing State broadband access programs; rather, BEAD funds will complement current efforts to achieve universal service.
Award competitive grants to achieve 1 Gigabit connection speeds for community anchor institutions (CAI)	Use remaining BEAD funding for competitive grants to potential ISP or jurisdictional partners to supply fiber 1 Gigabit connection speeds to identified CAIs that do not currently have such service today and are certified by the challenge process.

5.4 Key execution strategies

Maryland will build on its current strategies to achieve universal broadband service for all Maryland residents with BEAD funding. Maryland's key strategies to do this are:

- Design and fund a BEAD grant program that supports public-private partnerships for the construction and extension of end-to-end fiber service (as the first preference of the technology mix) to reach unserved and underserved locations.[340]
- Administer BEAD grant funding to potential ISP partners to help ensure that all eligible CAIs that do not currently have 1 Gigabit connections are served with those speeds.
- Design BEAD-funded grant programs to supply affordable broadband connections to public and non-profit owned multiple dwelling unit (MDU) locations that are determined

[340] Grants could include projects that extend existing hybrid fiber-coaxial (HFC) networks that are scalable to provide the required speeds. Though not preferable, these extensions could be part of the proposed technology mix in order to meet universal service goals in locations that make sense from a cost standpoint.

to be unserved through the challenge process to ensure the availability of reliable and affordable high-speed broadband access in low-income and affordable public housing.

- Engage partners for workforce development, utilizing the expertise and network of Maryland's community college system, the Fiber Optic and Wireless Associations and the local American Job Centers. These collaborations will help develop technical skill sets that will remain relevant and beneficial both during and beyond the BEAD grant funding period.

- Support digital inclusion activities should BEAD funding remain after the required infrastructure priorities.

- Support public-private partnerships for the construction and extension of affordable, high-speed broadband service.[341]

- Continue the success of Maryland's own grant programs, some of which, such as Connect Maryland,[342] use federal funds.

Maryland has a successful track record of using grant funding to create subgrant programs that invite private ISPs to construct and extend affordable high-speed broadband service to unserved areas of the State. OSB has the experience and technical capabilities to design and administer BEAD subgrant programs to award competitive funding.

5.4.1 Grant funding for community anchor institutions (CAI) without 1 gigabit broadband connections

Maryland has effectively utilized prior federal and State funding to successfully bring high-speed connectivity to State and local institutions.[343] OSB maintains an extensive partner network via past collaborations. This includes the creation and administration of the Maryland Connected Communities Grant Program (MD-GAPS) which was designed to assist local

[341] For an overview of the work of the Maryland Transport Authority (MDTA) on P3s, see "Public-Private Partnerships In Maryland," MDTA, https://mdta.maryland.gov/Partnerships/tp3Overview.html.
[342] "Connect Maryland: FY23 Network Infrastructure Grant Program, Request for Applications," OSB, https://dhcd.maryland.gov/Broadband/Documents/FY23NIGP/ApplicationPackage.pdf, p.3 ("The State of Maryland is utilizing $95 million in Federal Coronavirus Capital Projects Funding received by the Department of Housing and Community Development to support OSB in its efforts to assist in expansion of broadband into unserved areas of Maryland. The funding source for this budgeted expense is the American Rescue Plan Act (ARPA) administered by the US Treasury.").
[343] "Community & Provider Resources," DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.

community-based organizations, nonprofits, and anchor institutions in creating networks accessible to low-income and moderate-income households.

The MD-GAPS program has given OSB invaluable insight into the practical needs of CAIs and MDU's with respect to broadband coverage on behalf of the residents whom they serve. The MD-GAPS program has also established best practices and technical experience in effectively deploying service to CAIs, which OSB will apply should funding allow.

5.4.2 Grant funding for infrastructure to qualifying low-income multi-dwelling-unit housing

Should BEAD funding remain, Maryland will design and support a strategy to bring affordable high-speed internet to qualifying public and non-profit owned multi-dwelling-unit housing locations that are determined to be unserved through the challenge process to ensure the availability of reliable and affordable high-speed broadband access in low-income and affordable public housing. OSB has extensive experience working with housing agencies through prior and current State-funded broadband programs and as such will bring the technical expertise required to effectively carry out a BEAD-funded initiative.

5.4.3 Support digital inclusion activities such as ACP outreach, education, and enrollment programs

Remaining BEAD funding, after required priorities are fully funded and addressed, will be utilized to support digital inclusion and opportunity initiatives such as ACP outreach, education, and enrollment programs conducted by State and local partner organizations. OSB has a strong track record with respect to supporting and funding these critical initiatives, including creating and administering the Maryland Digital Inclusion Grants (MD-DIG) program.[344]

MD-DIG was created by OSB to support a series of pilot projects across the State of Maryland to further broadband adoption by covered populations, all of which were originated by local client-serving organizations. Should BEAD funding remain available, supporting complementary digital inclusion activities will be a key strategy in helping to achieve universal service for all Maryland residents.

5.5 Estimated timeline for universal service

This section presents the State's data-driven model and estimated timeline for the availability of reliable, universal broadband service in Maryland. It reflects the current state and gap assessment documented in Section 3; the potential barriers and obstacles identified in Section

[344] See the tab labelled "Digital Inclusion Grant Program (MD-DIG)" on the web page "Community & Provider Resources," DHCD, https://dhcd.maryland.gov/Broadband/Pages/Provider-Resources.aspx.

4; and the issues identified through the State's comprehensive stakeholder engagement and outreach efforts.

5.5.1 Timeline summary and assumptions

In summary, the State estimates that universal service can be achieved by deploying fiber during the BEAD grant period. The State currently believes (as of the time of the submission of this Five-Year Action Plan) that deployment can be achieved within the mandatory BEAD period (i.e., by 2028). Planning, design, and permitting are estimated to generally require up to 12 months to fulfill, followed by another minimum of 12 to 18 months for construction. Constructing "extensions" from existing networks may require less time.

OSB has consistently taken a data-driven approach toward creating, designing, and administering programs that construct and extend broadband infrastructure. As discussed in Section 3 of this Plan, the State has extensive resources and assets that will support the goal of achieving universal service with the critical support of BEAD funds, including complementary State funding, technical expertise, and experience with subgrant funding.

5.5.2 Mapping of served, unserved, and underserved locations

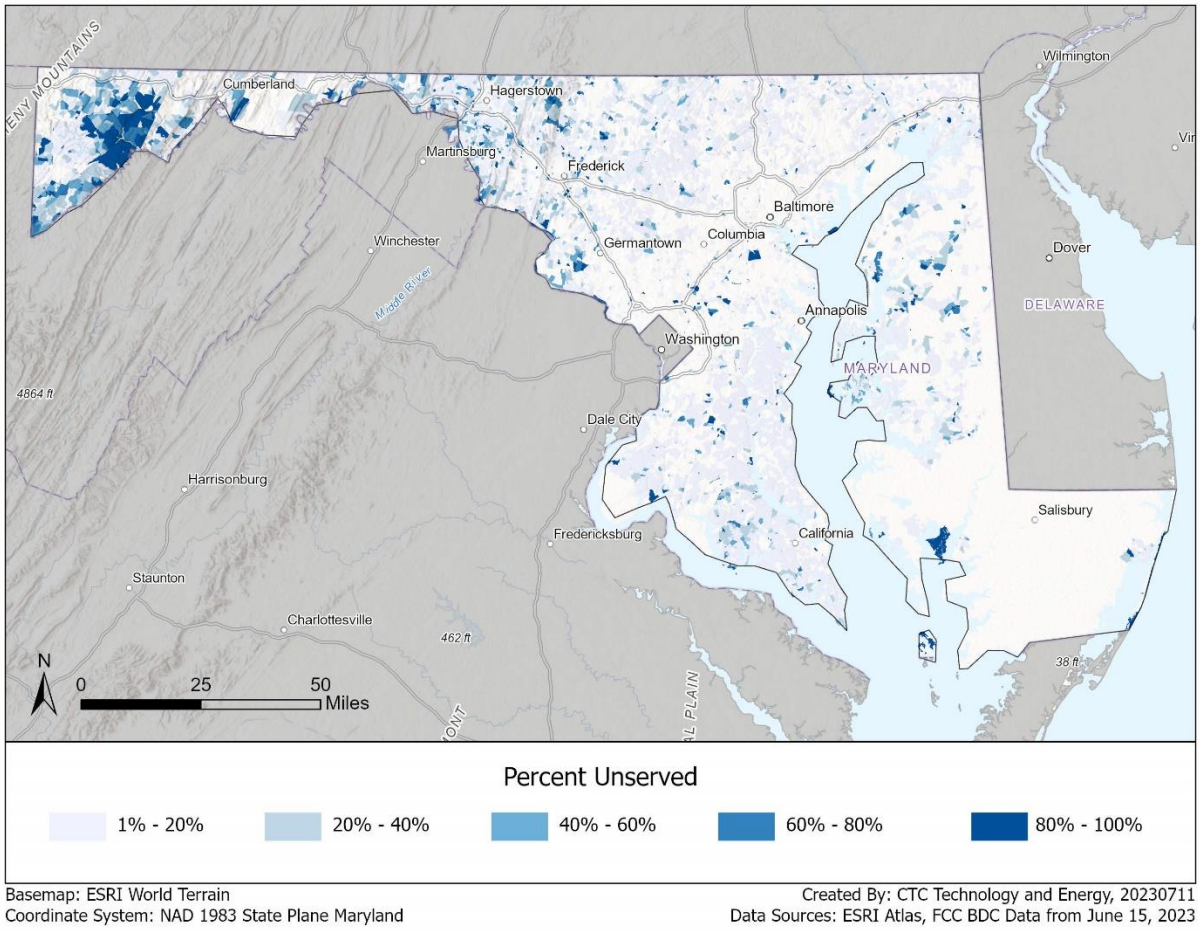
The model assumes the State's grant program will fund the deployment of fiber to pass each unserved or underserved location.

In summary, analysis of the FCC's address fabric (June 2023) found the following:

- 21,751 addresses (1.1 percent) are unserved
- 10,255 addresses (.6 percent) are underserved
- 1,816,044 addresses (98.3 percent) are served

The maps below illustrate the State's unserved and underserved locations. The served locations include those slated to receive connectivity under enforceable commitments such as RDOF funding.

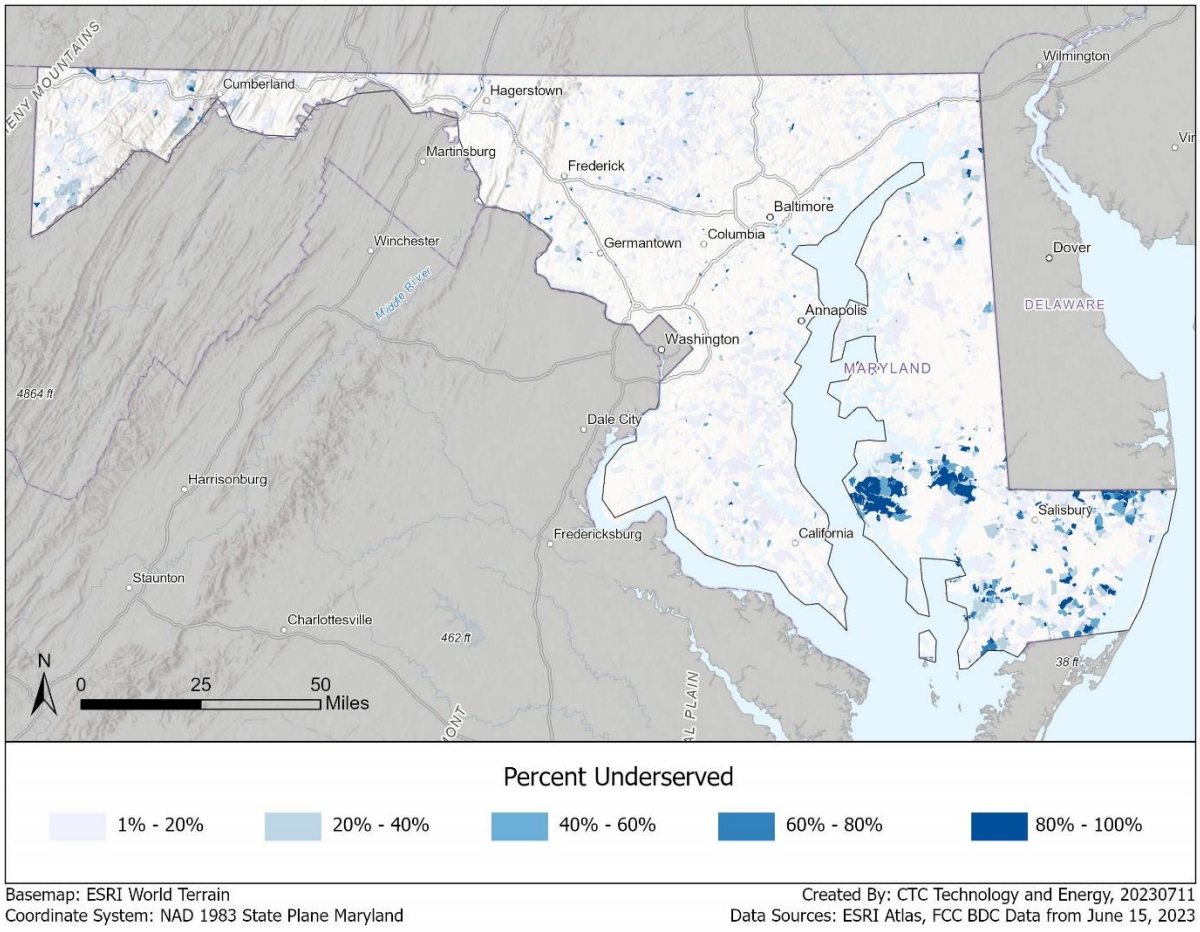
Figure 9: Unserved locations in Maryland



Basemap: ESRI World Terrain
Coordinate System: NAD 1983 State Plane Maryland

Created By: CTC Technology and Energy, 20230711
Data Sources: ESRI Atlas, FCC BDC Data from June 15, 2023

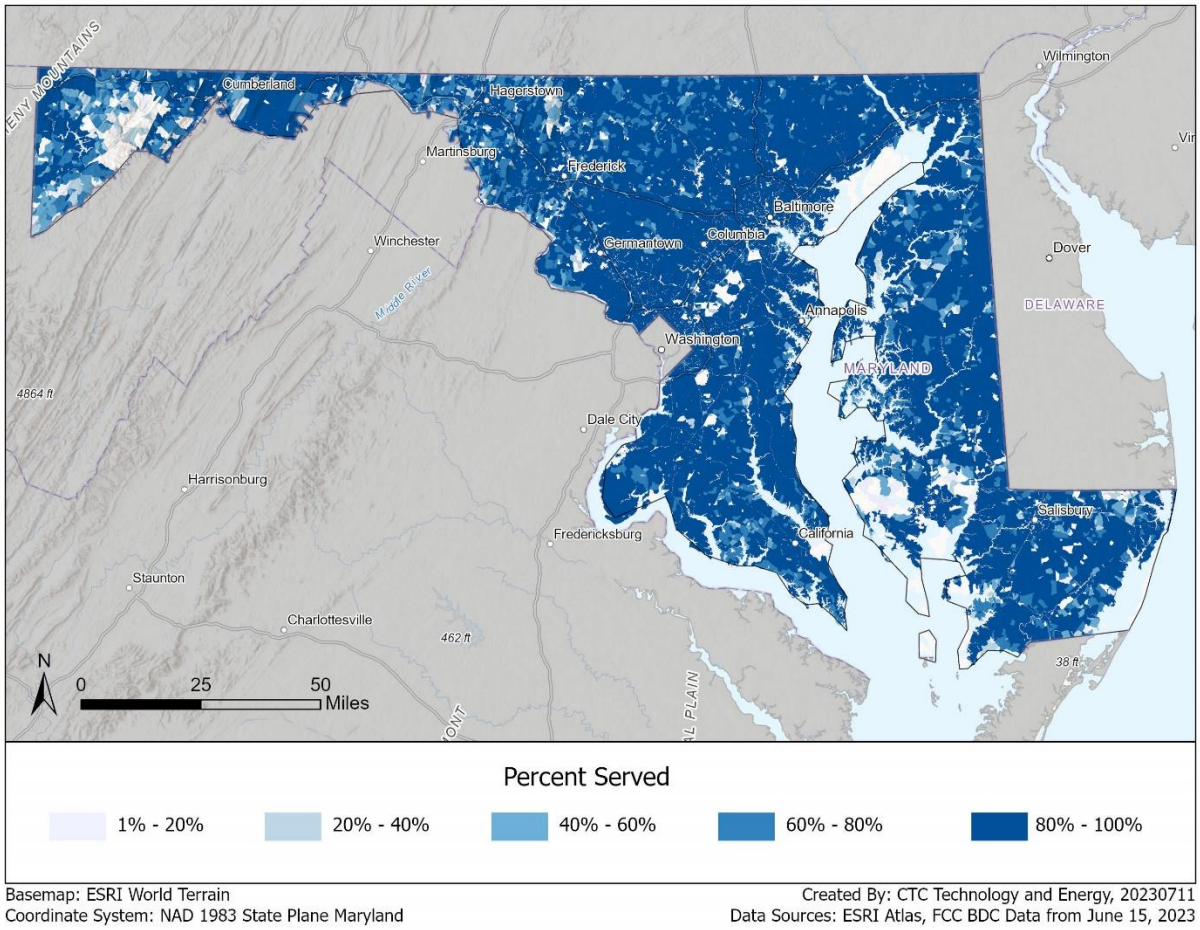
Figure 10: Underserved locations in Maryland



Basemap: ESRI World Terrain
Coordinate System: NAD 1983 State Plane Maryland

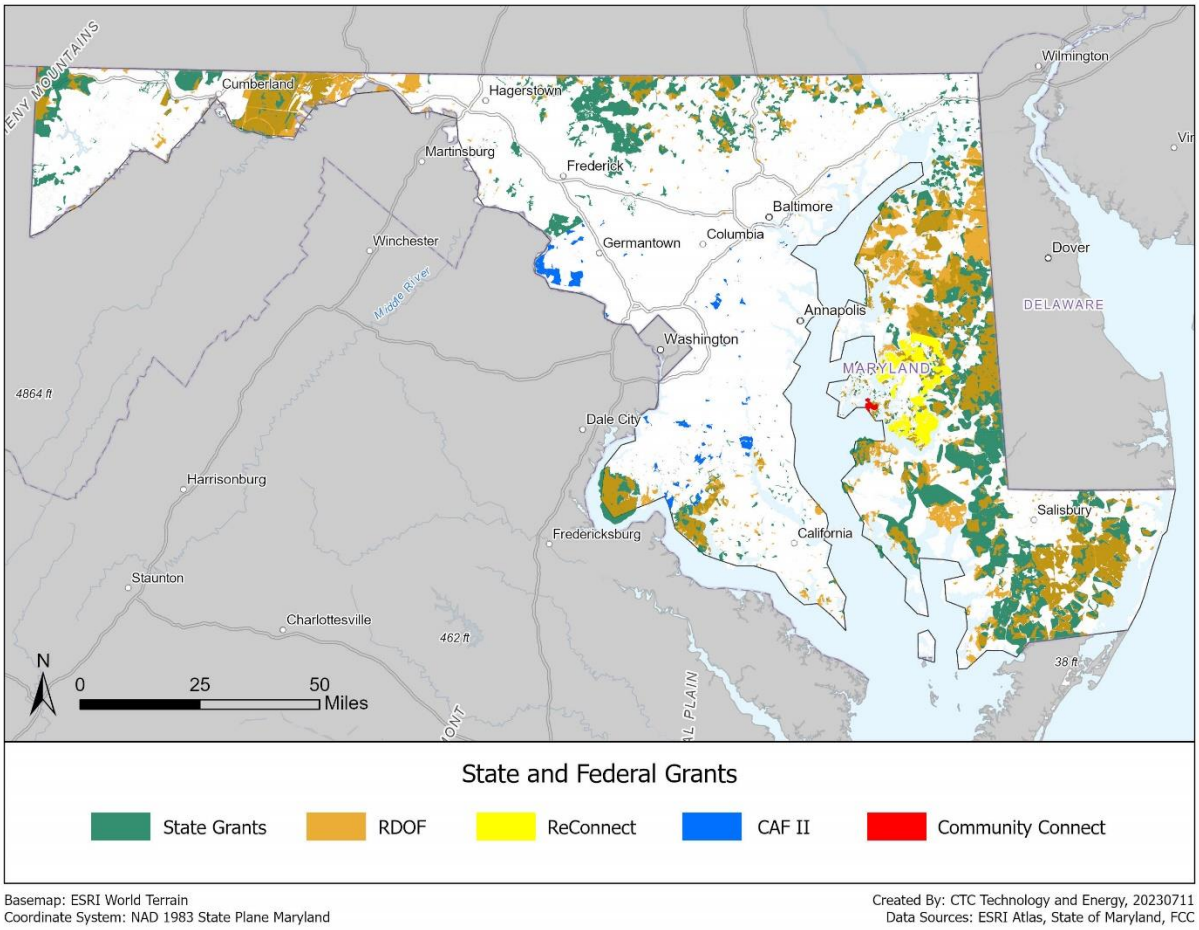
Created By: CTC Technology and Energy, 20230711
Data Sources: ESRI Atlas, FCC BDC Data from June 15, 2023

Figure 11: Served locations in Maryland



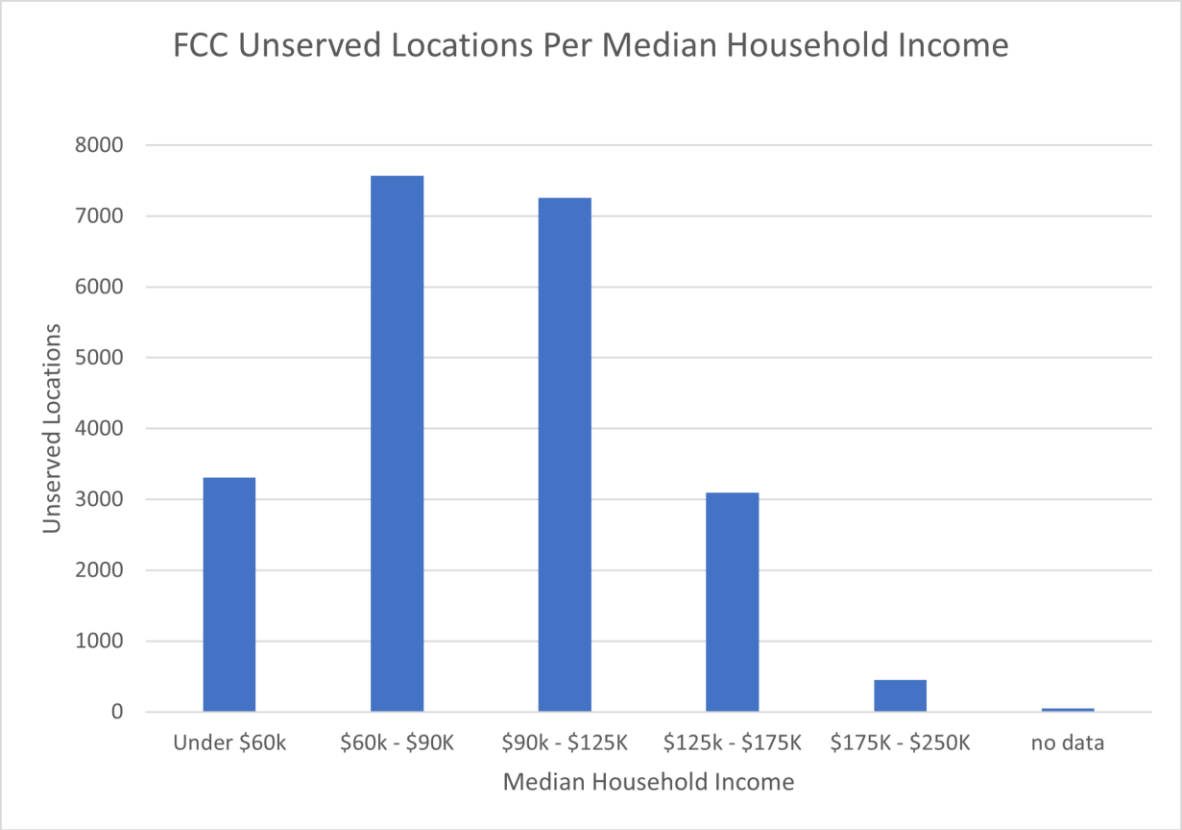
Approximately 98.3 percent of Maryland addresses are served at 100/20 Mbps. The map above shows areas of the State that have 100/20 Mbps service, while the map below shows areas of the State that have received federal or State funding for future broadband deployment.

Figure 12: Locations in Maryland that have received grant funding for future broadband deployment



The majority of unserved locations are households with annual median incomes of less than $125,000, with a significant portion of that total earning less than $90,000 per year (Figure 13). This could be indicative of the construction costs required to build the needed infrastructure to reach the remaining unserved locations, placing broadband out of reach for these households.

Figure 13: Number of unserved locations by household income level



5.6 Estimated cost for universal service

This section presents the State's estimated costs for providing access to reliable broadband service to unserved and underserved locations in Maryland. These estimates are based on an analytical model that incorporates local labor and material unit costs; the location of existing infrastructure that can be used as a starting point; and surveys of a statistically valid sample of unserved and underserved areas.

OSB acknowledges that these estimates are higher than NTIA's BEAD allocation. Maryland will adjust the proposed technology mix underpinning its cost modeling estimates as development of the Initial Proposal continues and in accordance with the BEAD allocation of $267,738,400.71 announced by NTIA on June 26, 2023.

We estimate the total five-year deployment cost to be approximately $358.3 million (Table 13) to reach the estimated 21,571 unserved addresses. This estimate assumes a timeframe of 36 to 48 months for the buildout of 3,246 miles of fiber-to-the-premises (FTTP) infrastructure passing each unserved address, with deployment activities related to customer activations, including service drop construction and installation of customer premises equipment (CPE), continuing through the five-year period of performance.

Table 13: Estimated deployment costs to reach all unserved addresses (five-year performance period)

Cost component	Estimated cost
Physical fiber plant construction (FTTP distribution network)	$296 million
Core and distribution network electronics	10.2 million
Subscriber drop construction	$44.3 million
Customer premises equipment	$7.8 million
Total	**$358.3 million**

A more comprehensive plan to address the State's broadband access needs, reaching all unserved and underserved addresses, would cost an estimated $484.3 million over a five-year period of performance (Table 14). This estimate includes a total of 4,332 miles of new fiber construction reaching all the estimated 10,255 underserved locations and 21,751 unserved locations after removing locations covered by existing grant programs. The new fiber plant construction is estimated to include 37 percent underground and 63 percent aerial construction using existing poles. In this scenario, the buildout of primary FTTP infrastructure and customer activations extends through the five-year performance period.

These addresses represent the last, hardest and most-expensive to build addresses in Maryland. Typically, the last 10 to 15 percent of locations account for at least 50 percent of the estimated costs of these addresses. Although there are efficiencies in fiber passings by building to both unserved and underserved locations, these account for the last 2 percent of Maryland's serviceable locations and are exponentially more expensive than the average of locations served under recent awards.

Table 14: Estimated deployment costs to reach all unserved and underserved addresses (five-year performance period)

Cost component	Estimated cost
Physical fiber plant construction (FTTP distribution network)	$396.5 million
Core and distribution network electronics	$14.9 million
Subscriber drop construction	$61.4 million
Customer premises equipment	$11.4 million
Total	**$484.3 million**

The State will work with its partners in the BEAD grant funding process, including through the design of grant areas, to achieve universal service through its BEAD allocation. The State will present its approach to do so in the Initial Proposal.

5.7 Alignment

The vision, goals, and proposed supporting actions documented in this Plan are fully aligned with the State's existing broadband initiatives.

The State legislature created OSB to lead Maryland's extensive broadband deployment and digital inclusion efforts—which now include effectively and efficiently deploying current State and future federal funding to address the needs identified in this Plan. Execution of the State's vision is being led by an experienced team at OSB who are well versed in forging the partnerships necessary to achieve both universal connectivity and digital inclusion. These prior State legislative actions have helped to align Maryland with the requirements of the BEAD funding. The State anticipates utilizing BEAD funding to fully complement existing initiatives and reach unserved and underserved locations sooner as a result.

The alignment of this Five-Year Action Plan with other State priorities traces its roots to the One Maryland Broadband Network (OMBN), a 1,294-mile fiber optic middle-mile network described in Section 2.

Since then, Maryland has taken a comprehensive approach toward achieving universal broadband access, with a layered and connected strategy at the State, county, and local levels. This includes local digital equity plans listed in Section 3.3.5 as well as county and municipal broadband strategic plans listed in Section 3.3.1.

Maryland is in a strong position to achieve the broadband service timelines as required by the BEAD funding grant.

5.8 Technical assistance

Although the State of Maryland does not anticipate requiring technical assistance, OSB has reached out to the State's designated Federal Program Officer (FPO) to ensure there is an existing channel of communication as needed. OSB and the FPO have formed a strong collaboration. This includes the FPO's participation on panels during stakeholder engagement opportunities. OSB anticipates working with the FPO as needed during the creation and design of the forthcoming challenge process.

6 Conclusion

This Five-Year Action Plan establishes Maryland's broadband goals and priorities—and presents a comprehensive needs assessment that will inform the State's Initial Proposal. Governor Wes Moore's administration has set a standard of excellence that includes leaving no one behind—especially in terms of digital connectivity.

The State of Maryland is a national leader in broadband infrastructure and is well-positioned to close the remaining digital divide among its residents. As of April 2023, the State's broadband office had invested more than $270 million in broadband infrastructure and programs since its establishment, enabling the deployment of high-speed internet access to an estimated 52,000 previously unserved homes and businesses statewide.

The State's priorities for broadband deployment (primary objectives) are aligned with the principal focus of the BEAD Program:[345]

1. Serving 100 percent of unserved locations (i.e., below 25/3 Mbps) within five years—including multiple dwelling unit (MDU) locations that are determined to be unserved through the challenge process to ensure the availability of reliable and affordable high-speed broadband access in low-income and affordable public housing

2. Serving 100 percent of underserved locations (i.e., between 25/3 and 100/20) within five years

3. Assuming adequate funding, delivering gigabit connections to community anchor institutions that do not have that level of service within five years

By creating strong partnerships and developing effective processes, including regular meetings with stakeholders, the State has already demonstrated substantive progress towards closing the digital divide. However, the need for access to affordable, high-speed broadband service remains significant for portions of our community.

On behalf of Maryland, OSB (the Eligible Entity), submits this Five-Year Action Plan—continuing the State's commitment of operating under a strong and unified guiding vision and through the lens of full transparency. OSB looks forward to next submitting the State's Initial Proposal.

[345] "NOFO: BEAD Program," NTIA, https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf, at p. 7.

Appendix A: Additional asset inventory data

The following table lists ISPs in the State (including mobile service providers) that participate in the ACP.[346] The table also indicates which ISPs offer a plan that delivers service at effectively no cost with the application of the ACP subsidy ("no cost with ACP"), whether the provider offers eligible customers the option to purchase a device at a discount,[347] and whether the provider also participates in the MEBB.

Table 15: ISPs participating in ACP (including no-cost plans and device discounts)

Provider name	Service type	No cost with ACP	Device discount	Participates in MEBB
Talkie Communications, Inc.	Home Internet		Yes	
Armstrong Utilities Inc.	Home Internet			
City Communications, Inc.	Home Internet	Yes	Yes	
Crowsnest Broadband LLC	Home Internet			
Port Networks, Inc.	Home Internet			Yes
Starry, Inc.	Home Internet			
Declaration Networks (NeuBeam)	Home Internet		Yes	Yes
Spectrum (Charter Communications Operating, LLC)	Home Internet	Yes		
Shentel, Glofiber, and Beam Wireless	Home Internet			Yes
Choptank Fiber, LLC	Home Internet			Yes
Bay Country Communications	Home Internet			
Point Broadband Fiber Holding, LLC	Home Internet			Yes
Spot On Networks, LLC	Home Internet			

[346] Based on data provided to USAC by service providers, available at https://cnm.universalservice.org/.
[347] Per USAC, customers must pay more than $10 but not more than $50 and must purchase the device through the provider; "Companies Near Me," USAC, https://cnm.universalservice.org/.

Provider name	Service type	No cost with ACP	Device discount	Participates in MEBB
Armstrong Telecommunications, Inc.	Home Internet			
Project Waves	Home Internet			Yes
Comcast Xfinity	Home Internet	Yes		
Telispire, Affinity Cellular, Club Cellular, Flex Cellular	Home Internet	Yes	Yes	
KGI Communications LLC	Home Internet			
Maxsip Telecom Corporation	Home Internet		Yes	Yes
Astound Broadband powered by RCN	Home Internet	Yes		
All Points Broadband	Home Internet			
SprintFone	Home Internet		Yes	
EARTHLINK, LLC	Home Internet			
Hughes Network Systems, LLC	Home Internet			Yes
True Wireless	Home Internet	Yes	Yes	
Clear Wireless, LLC	Home Internet		Yes	
IJ Wireless	Home Internet		Yes	
Viasat	Home Internet			
Easton Utilities Commission	Home Internet			
Fibercreek	Home Internet			
Cogeco US Finance, LLC d/b/a Breezeline	Home Internet	Yes		
Integrated Path Communications, LLC	Home Internet	Yes		Yes
ThinkBig Networks, LLC	Home Internet			
Verizon Maryland LLC	Home Internet	Yes		Yes
Figgers Communication Inc.	Home Internet		Yes	
Culture Wireless	Home Internet		Yes	
Lingo	Home Internet			
Mediacom LLC	Home Internet	Yes		
QCOL, Inc.	Home Internet		Yes	Yes

Provider name	Service type	No cost with ACP	Device discount	Participates in MEBB
SWA Connect, LLC	Home Internet		Yes	Yes
Ting Internet	Home Internet		Yes	Yes
SkyPacket Networks, Inc.	Home Internet			Yes
Verizon Wireless	Home Internet			Yes
Metro Communications LLC	Home Internet			Yes
Antietam Broadband	Home Internet			Yes
Quantum Telecommunications, Inc.	Home Internet	Yes		
Boost Mobile	Mobile Internet		Yes	Yes
Global Connection Inc. of America	Mobile Internet	Yes	Yes	Yes
LTE Wireless	Mobile Internet		Yes	
Sarver Wireless	Mobile Internet	Yes	Yes	
Life Wireless	Mobile Internet		Yes	Yes
AT&T Mobility LLC	Mobile Internet	Yes		
Selectel Wireless	Mobile Internet	Yes	Yes	
GO MD USA LLC	Mobile Internet	Yes	Yes	
Comlink Total Solutions Corp	Mobile Internet			
Comcast Xfinity	Mobile Internet	Yes		Yes
Culture Wireless Group, LLC	Mobile Internet		Yes	
Assurance Wireless	Mobile Internet	Yes		Yes
Unity Wireless, Inc.	Mobile Internet		Yes	Yes
Hello Mobile Telecom LLC	Mobile Internet	Yes		
Cricket Wireless	Mobile Internet	Yes		
Hadodo Wireless	Mobile Internet		Yes	
Verizon Wireless	Mobile Internet			Yes
Metro by T-Mobile	Mobile Internet			
GR8 CONNECT CORP.	Mobile Internet	Yes	Yes	
Infiniti Mobile	Mobile Internet			Yes
Talkie Communications, Inc.	Mobile Internet		Yes	Yes
AFNET, LLC	Mobile Internet		Yes	
North American Local, LLC	Mobile Internet		Yes	

Provider name	Service type	No cost with ACP	Device discount	Participates in MEBB
Cellspan Inc.	Mobile Internet		Yes	
Via Wireless, LLC	Mobile Internet		Yes	
Boomerang Wireless, LLC	Mobile Internet		Yes	
IJ Wireless	Mobile Internet		Yes	
SurgePhone Wireless LLC	Mobile Internet		Yes	
Tempo Telecom, Inc.	Mobile Internet		Yes	
City Communications, Inc.	Mobile Internet	Yes	Yes	
Gen Mobile, Inc.	Mobile Internet		Yes	
Culture Wireless	Mobile Internet		Yes	
Z1 Wireless	Mobile Internet			
Cintex Wireless, LLC	Mobile Internet	Yes	Yes	Yes
Airtalk Wireless	Mobile Internet		Yes	
Wrazzle, Inc.	Mobile Internet		Yes	
IDT Domestic Telecom, Inc.	Mobile Internet		Yes	
National Wireless	Mobile Internet		Yes	
SafetyNet Wireless	Mobile Internet	Yes	Yes	
PCs for People	Mobile Internet	Yes	Yes	
Ztar Mobile, Inc.	Mobile Internet		Yes	
Whoop Connect Inc.	Mobile Internet		Yes	Yes
Easy Wireless	Mobile Internet	Yes		
TAG Mobile, LLC	Mobile Internet		Yes	
Twigby	Mobile Internet			
Wireless Brands Co.	Mobile Internet		Yes	
Assist Wireless, LLC	Mobile Internet		Yes	Yes
US Connect	Mobile Internet		Yes	Yes
Public Wireless, LLC	Mobile Internet		Yes	
K20 Wireless	Mobile Internet	Yes	Yes	Yes
Sano Health LLC	Mobile Internet	Yes	Yes	
Torch Wireless	Mobile Internet			
Rural4G	Mobile Internet	Yes	Yes	
Tone Communication Services LLC	Mobile Internet			Yes
Excess Telecom, Inc.	Mobile Internet	Yes	Yes	Yes
TerraCom, Inc.	Mobile Internet		Yes	
Red Pocket & FreedomPop	Mobile Internet		Yes	

Provider name	Service type	No cost with ACP	Device discount	Participates in MEBB
Straight Talk, Total Wireless, Simple Mobile, Walmart Family Mobile, TracFone, Net10, Page Plus & Go Smart	Mobile Internet		Yes	Yes
Rogue Mobile Inc.	Mobile Internet		Yes	Yes
Bloosurf LLC	Mobile Internet		Yes	Yes
Prosper Wireless, LLC	Mobile Internet		Yes	Yes
Snapfon	Mobile Internet	Yes	Yes	
Q Link Wireless LLC*	Mobile Internet	Yes	Yes	
Clear Wireless, LLC	Mobile Internet		Yes	
BlueSkies Communications	Mobile Internet		Yes	
NewPhone Wireless, LLC	Mobile Internet	Yes	Yes	
American Assistance and Your Call Wireless	Mobile Internet		Yes	Yes
Digital Aid, LLC	Mobile Internet		Yes	
Liberty Mobile Wireless	Mobile Internet		Yes	
Hoop Wireless, LLC	Mobile Internet	Yes	Yes	
Sage Telecom Communications, LLC	Mobile Internet	Yes	Yes	Yes
Insight Mobile, Inc.	Mobile Internet		Yes	
InterConnection	Mobile Internet		Yes	

Appendix B: Survey instruments

OSB gathered input from stakeholders through surveys targeted to individual groups of stakeholders.

Survey instrument 1: Maryland agency asset inventory survey

Maryland Agency Asset Inventory Survey

By completing this short questionnaire, you will help Maryland's Office of Statewide Broadband identify infrastructure-related assets that may potentially help facilitate broadband deployment in Maryland. As the State engages with Internet Service Providers (ISPs) to extend network footprints and services, this information will support Maryland's goal of optimizing federal Broadband Equity, Access, and Deployment (BEAD) funding to achieve statewide universal access to high-speed broadband.

1. Please provide your contact information

Agency name	
Government level (State, regional, county, local, tribal)	
Name of jurisdiction	
First and last name	
Title	
Email	
Phone number	
Agency website URL (if any)	

2. Does your agency own or manage physical assets (i.e. conduit, fiber, structures, real estate, poles, etc.) that are available for lease to Internet Service Providers (ISP) for broadband deployment?

☐ Yes

☐ No

What information about these leasable assets would you like the State to include in its broadband planning and communications with ISPs?

3. Will your agency oversee capital construction projects between now and 2027 that include opportunities for the placement of communications facilities by your agency, other state or local agencies, regional or local consortia, or ISPs?

☐ Yes

☐ No

What information about these projects (i.e. scope, location, schedule) would you like included in State broadband planning and in communications with ISPs?

4. Has your agency analyzed workforce readiness (i.e., the availability of skilled labor) in Maryland as it may impact State broadband policies and deployment goals?

☐ Yes

☐ No

Please provide a URL link where relevant documents, presentations, or analyses are located or send to the following email address: OSB.BEAD@MARYLAND.GOV

5. Does your agency have a role in workforce development that would support wired or wireless broadband deployment (including training and recruitment for equipment technicians, cable installation and repair, and construction jobs)?

☐ Yes

☐ No

Please describe programs or initiatives that your agency operates or supports or relevant programs operated by other agencies.

6. Are you aware of, or does your agency have reason to track and monitor frequent or widespread broadband or other communications outages that have significant impact on your community (or, if you represent a statewide organization, on the communities in Maryland)?

☐ Yes

☐ No

If yes, please describe your agency's role in monitoring or tracking communications reliability in your community and discuss the impact of significant outages.

7. Are you aware of, or is your agency involved in, planning efforts or development of regulations related to reliable and resilient emergency-level broadband or other communications services, especially services for critical facilities in Maryland (e.g. hospitals, schools, evacuation sites, utilities, data centers, public safety locations)?

☐ Yes

☐ No

Please provide a URL link to any publicly available materials relating to these issues and briefly describe the relevant issues related to critical facilities, including planning for climate and weather-related hazards. You may also email these materials to OSB.BEAD@MARYLAND.GOV

8. Has your agency developed any policies, regulations, or guidance regarding emergency communications, network redundancy, climate resilience, disaster preparedness, or disaster recovery planning applicable to the broadband and communications industry in Maryland?

☐ Yes

☐ No

Please provide a URL link to any publicly available documents and briefly describe policies and other materials that you believe would be helpful to Maryland's broadband planning efforts. You may also email these materials to OSB.BEAD@MARYLAND.GOV

9. Has your agency developed policies or strategic planning documents that will facilitate broadband access efforts in Maryland (e.g. publicly available information that directly addresses digital equity, infrastructure deployment, economic development, network resilience, partnerships, business planning, or other related efforts)?

☐ Yes

☐ No

Please briefly summarize the material and provide a URL link or email information to OSB.BEAD@MARYLAND.GOV

10. If applicable please share information regarding broadband-related planning efforts of other Maryland state and local agencies or contact information for agencies involved in broadband-related planning efforts, that you believe would be helpful to the Office of Statewide Broadband's broadband planning efforts.

11. Please describe how your agency can collaborate with the Office of Statewide Broadband and participate in its efforts to achieve statewide universal access to high-speed broadband.

Survey instrument 2: Maryland community anchor institution survey

Maryland Community Anchor Institution Survey

Community anchor institutions play a critical role in facilitating greater use of broadband by underserved and vulnerable populations. Your responses to this brief survey will help the Office of Statewide Broadband identify programs to advance residents' opportunities to use broadband to work, learn, receive health care, and participate in civic events. This information will be an important part of Maryland's work toward achieving statewide universal access to high-speed broadband with federal funding through the Broadband, Equity, Access, and Deployment (BEAD) and Digital Equity Planning programs.

1. Contact information

Your name	
Your job title	
Your e-mail	
Your phone number	
Organization name	
Organization address	
Organization website URL	
Organization's number of employees	
Please indicate if your organization serves statewide, regionally, or locally	

2. Choose the option that best describes your organization. Select the one that best applies.

- ◯ K-12 school
- ◯ Higher education entity
- ◯ Library
- ◯ Health clinic, health center, hospital, or other medical provider
- ◯ Public safety entity
- ◯ Public housing organization (including HUD-assisted housing and tribal housing organizations)
- ◯ Neighborhood organization and community center
- ◯ Faith-based organization
- ◯ Community support organization that facilitates use of broadband service by low-income or other underserved populations

3. Which of the following programs or services do you offer to facilitate the use of broadband services by your constituents or clients? Select all that apply.

- ☐ Support for applicants to broadband subsidy programs such as the Affordable Connectivity Program (ACP)
- ☐ Loans or donations of devices (computers, tablets) to access the internet
- ☐ Hotspots and free or subsidized internet access
- ☐ Cybersecurity training
- ☐ Other digital literacy training
- ☐ Training, equipment, subsidized services, or other resources to facilitate access to telehealth and telemedicine services
- ☐ Training teachers of broadband skills and digital literacy
- ☐ Developing and distributing accessible online content or devices designed for us by persons with disabilities
- ☐ Developing and distributing accessible online content directed at populations with specific needs, such as seniors, low-income residents, those with low-literacy, and those whose first language is not English
- ☐ Broadband internet access services at community centers or other gathering spaces used by clients and constituents
- ☐ Funding of programs that provide any of the above programs, including broadband infrastructure, devices, and subsidies to support affordability
- ☐ Program development and planning of broadband-related services
- ☐ Advocacy for digital inclusion, affordability, and the broadband-related needs of vulnerable populations
- ☐ Emergency and disaster relief services such as evacuation centers, charging stations, replacement equipment, and information on grants, loans, and services to those impacted by disasters
- ☐ My organization does **not** offer programs that facilitate the use of broadband services
- ☐ Other (please specify)

Maryland Community Anchor Institution Survey

4. Does your organization conduct outreach or tailor its broadband-related services to the needs of any of the following communities or groups? Select all that apply.

- ☐ Veterans or current military personnel
- ☐ People with disabilities
- ☐ Seniors
- ☐ Incarcerated or formerly incarcerated residents
- ☐ Those in low-income households or without reliable housing
- ☐ Other (please specify)
- ☐ Those with a language barrier including English learners
- ☐ Those with a low level of literacy
- ☐ Specific racial or ethnic minority group(s)
- ☐ Those living in rural communities
- ☐ Not applicable

5. Based on your organization's observations and experience, please describe the barriers and obstacles (e.g. affordability, lack of digital literacy, language barriers) that prevent members of the communities your organization serves, including Tribal and Native populations, from accessing or using broadband internet services.

6. Do all of your organization's locations, offices, or community centers have access to broadband internet speeds of at least 1 Gigabit per second (Gbps) symmetrical (both upload and download)?

- ☐ Yes
- ☐ No
- ☐ I don't know

If **no**, please provide the addresses of the locations where your organization does not have access to broadband internet services of at least 1 Gbps symmetrical.

7. If your organization does not purchase service with symmetrical speeds of at least 1 Gbps, please describe why. Select all that apply.

- ☐ Service is unavailable
- ☐ Service is unreliable
- ☐ Service is expensive
- ☐ Customer service is inadequate
- ☐ Our operations do not require Gigabit-level services
- ☐ I do not know if 1 Gbps service is available at my location
- ☐ Other (please specify)

8. Does your current internet service meet the needs of your organization to deliver broadband-related programs to your clients and constituents?

- ☐ Yes
- ☐ No, service is unavailable
- ☐ No, service is unreliable
- ☐ No, service is expensive
- ☐ No, customer service is inadequate
- ☐ No, service is too complicated to set up and/or maintain
- ☐ Redundant connectivity necessary for our operations is too expensive/unavailable
- ☐ Other (please specify)

9. How essential is symmetrical Gigabit connectivity at your facilities to your ability to deliver your broadband-related services?

1 - Not important	2	3	4	5 - Critically important
○	○	○	○	○

10. Does your organization provide access to broadband internet services to clients, constituents, or visitors at each of your locations?

- ☐ Yes
- ☐ No

If **yes,** does your broadband internet service provide sufficient capacity to accommodate peak demand for such services at all of your locations? If **no**, is a lack of access to adequate internet services at your location preventing you from serving users?

11. Is it important to your organization's mission and service delivery to maintain communications with critical facilities such as hospitals, schools, data centers, and public safety agencies during natural disasters and emergencies?

- ☐ Yes
- ☐ No

Please briefly describe your organization's need to remain connected to critical facilities and whether you believe your organization's current communications services meet this need.

12. Has your organization been consulted on disaster planning, emergency communications, or disaster recovery by your communications service provider or a local/regional government agency?

- ☐ Yes
- ☐ No

If yes, please briefly describe any plans or reports you think would be useful to the State's broadband and emergency communications planning efforts.

13. Does your organization operate or sponsor any workforce development or training programs in the fields of telecommunications or technology? If so, select all that apply:

- ☐ We do not sponsor programs
- ☐ Mentorships
- ☐ Certification programs
- ☐ Registered apprenticeships
- ☐ Unregistered apprenticeships
- ☐ Pre-apprenticeships
- ☐ Internships
- ☐ Digital literacy training for specific employment opportunities
- ☐ Job placement and recruitment services
- ☐ Sponsorships/scholarships for third-party training and classes
- ☐ Other (please specify)

14. Would your organization offer additional broadband-related services or programs to its constituents or clients if it had additional resources?

- ☐ Yes
- ☐ No

If yes, please describe those additional broadband-related services and the additional resources your organization would need to offer them (e.g. funding, skilled workforce, access to broadband internet services with faster speeds or more capacity).

15. Please describe how your organization can collaborate with the Office of Statewide Broadband and participate in its efforts to achieve statewide universal access to high-speed broadband.

Survey instrument 3: Maryland ISP survey

Maryland Internet Service Provider Engagement Survey

The Maryland Office of Statewide Broadband seeks your input on a range of broadband-related issues. Your responses to this brief survey will be an important part of Maryland's work toward achieving statewide universal access to high-speed broadband with federal funding through the Broadband, Equity, Access, and Deployment (BEAD) and Digital Equity Planning programs.

1. Contact information

Your name	
Your job title	
Your email	
Your phone number	
Organization name	
Organization address	
Organization website URL	
Organization's number of employees	

2. Choose the option that best describes your organization and the services it offers:

	Internet service provider (ISP)	Other provider
Provider type		

3. What recruitment and hiring sources does your organization use to hire technicians, lineworkers, engineers, construction laborers and managers, and similar positions? (Select all that apply)

- ☐ Internet-based employment posting sites
- ☐ Workforce development and community job placement centers
- ☐ Communications industry-specific training classes
- ☐ Third-party hiring and recruitment firms
- ☐ Advertisements in trade association publications and websites
- ☐ Incentivizing employee referrals

4. Does your organization offer, sponsor, or participate in any workforce development or apprenticeship programs?

- ◯ Yes
- ◯ No

Maryland Internet Service Provider Engagement Survey

5. If you answered yes to Q.4, please specify the type of programs. (Select all that apply)

- [ ] Mentorship
- [ ] Certification programs
- [ ] Apprenticeship
- [ ] Internship
- [ ] Sponsorships/scholarships for third-party training and classes
- [ ] Other (please specify)

6. How would you propose to work with Maryland on workforce development issues related to broadband deployment, including programs to support diversity among your organization's employees?

7. Does your organization participate in the Affordable Connectivity Program (ACP)?

- ◯ Yes
- ◯ No

Maryland Internet Service Provider Engagement Survey

8. What is the monthly post-subsidy price of your lowest-price ACP-eligible tier for participating subscribers?

- ◯ $0
- ◯ $1 - $10
- ◯ $11 - $20
- ◯ $21 - $30
- ◯ More than $30

9. What is the speed of your lowest-price ACP-eligible tier?

- ◯ 25/3 Mbps
- ◯ Up to 50/5 Mbps
- ◯ Up to 100/20 Mbps
- ◯ Greater than 100/20 Mbps but less than 100/100 Mbps
- ◯ 100/100 Mbps or more

10. How do you advertise or promote your participation in the ACP?

11. Does your organization offer other programs for low-income customers?

- [ ] Yes
- [ ] No

Please provide service speeds, monthly pricing, and a description of your low-income or discounted offerings.

12. Does your organization have programs to support consumer broadband skills or use of the internet?

- [ ] Yes
- [ ] No

If yes, please describe and provide URL links to relevant materials.

13. Does your organization have programs to help consumers strengthen cybersecurity skills

- [ ] Yes
- [ ] No

If yes, please describe and provide URL links to relevant materials.

14. Does your organization have programs to support internet adoption?

- [ ] Yes
- [ ] No

If yes, please describe and provide URL links to relevant materials.

15. Please describe how your organization can collaborate with local communities on efforts to close the digital divide and, if applicable, please provide specific examples where you have done this successfully.

16. What strategies has your organization used to deploy broadband in the areas of Maryland that are most expensive to serve?

17. Please discuss your continuity and disaster recovery plans in the event of a natural disaster or human error, such as a fiber cut, and whether any of your plans target specific geographic areas.

Survey instrument 4: Maryland workforce development survey

Maryland Workforce Development Opportunity Survey

Broadband infrastructure deployment and network operations require a highly skilled workforce. Your responses to this brief survey will help Maryland's Office of Statewide Broadband identify opportunities for workforce training and readiness programs to prepare residents for new job opportunities in this field. This information will be an important part of Maryland's work toward achieving statewide universal access to high-speed broadband with federal funding through the Broadband, Equity, Access, and Deployment (BEAD) and Digital Equity Planning programs.

1. Contact information

Your name	
Your job title	
Your e-mail	
Your phone number	
Organization name	
Organization address	
Organization website URL	

2. Type of organization (one selection only)

- ◯ Internet service provider (ISP)
- ◯ Labor union
- ◯ Trade association
- ◯ Industry certification or standards body
- ◯ Government agency (state, county, local, tribal, or regional consortia)
- ◯ Economic development association or agency
- ◯ Regional or local workforce development board or agency
- ◯ K-12 education (private, charter, public)
- ◯ Higher education organization (all levels, public or private)
- ◯ Trade, technical or vocational school (public, nonprofit, or for-profit)
- ◯ Community based or nonprofit organization

Maryland Workforce Development Opportunity Survey

3. Do you offer workforce development programs for job placement and training in the communications industry in Maryland?

- ◯ Yes
- ◯ No

4. Do you offer training in any of the following industries that have transferable skills that can be applied to communications network deployment? (Select all that apply)

- ☐ Utilities such as electricity
- ☐ HVAC
- ☐ Computer science
- ☐ Cybersecurity
- ☐ General electrician
- ☐ General construction
- ☐ Other (please specify)

5. If you answered no to Question 3, are you interested in developing programs specifically targeted at employment opportunities in the communications industry?

- ☐ Yes
- ☐ No

Please describe your interest in developing these programs

Maryland Workforce Development Opportunity Survey

6. What type of workforce development programs do you offer? (Select all that apply)

- ☐ On-the-job training placement
- ☐ Standards certification and safety programs
- ☐ Training programs through a public or private K12 school
- ☐ Training programs through a school of higher education
- ☐ Trade or vocational certificate programs
- ☐ Job placement and recruiting services
- ☐ Formal apprenticeship opportunities

7. Which of the following communications designations are included in your programs? (Select all that apply)

- ☐ Construction laborers and heavy equipment operators
- ☐ Tower, line, equipment, maintenance, and testing specialists
- ☐ Supervisors / project managers
- ☐ Network design roles
- ☐ Locators

8. Does your program specifically reach out to any of the following populations for participation in your programs? (Select all that apply)

- ☐ Veterans or current military personnel
- ☐ People with disabilities
- ☐ Seniors
- ☐ Incarcerated or formerly incarcerated
- ☐ Those in low-income households or without reliable housing
- ☐ Those with a language barrier including English learners
- ☐ Those with a low level of literacy
- ☐ Specific racial or ethnic minority group(s)
- ☐ Those living in rural communities

9. How would you characterize your current capacity for developing and offering training programs to meet current workforce demands in the communications industry? (Select one)

- ◯ Underutilized
- ◯ Adequately utilized
- ◯ At capacity

10. How would you characterize your plans for developing and offering additional programs to meet future workforce demands in the communications industry? (Select one)

- ☐ We have plans to add capacity
- ☐ We have no plans to add capacity
- ☐ We are reducing our training capacity
- ☐ We are interested in adding capacity, but do not have resources to do so

Please describe your plans for additional or expanded programs or explain what additional resources you would need to add capacity.

11. What are the sources of funding for your training programs? (Select all that apply)

- ☐ Federal agencies and programs
- ☐ State agencies and programs
- ☐ County or local funding and programs
- ☐ Private foundations
- ☐ Fundraising and community grants
- ☐ Partnerships with employers
- ☐ Partnerships with unions or trade associations
- ☐ Fee-based services
- ☐ Other (please specify)

12. Do you serve "rural" communities?

- ☐ Yes
- ☐ No

What types of incentives are effective to recruit both skilled and manual labor to your rural community?

13. Please describe barriers to developing a diverse, skilled workforce in your community that can fill employment opportunities in the communications industry. Additionally, please provide examples or ideas of incentives or programs that can mitigate those barriers to create a diverse pool of highly skilled workers.

Maryland Workforce Development Opportunity Survey

14. Do you provide any in-house skills training, workforce development, or apprenticeship programs for your employees to support a highly skilled workforce?

- ◯ Yes
- ◯ No

15. If you answered yes above, please identify the types of programs. (Select all that apply)

- ☐ Mentorship
- ☐ Certification programs
- ☐ Apprenticeship
- ☐ Internship
- ☐ Sponsorships/scholarships for third-party training and classes
- ☐ Other (please specify)

16. In addition to any programs you directly provide, what other sources or programs do you use in Maryland to train and support workforce readiness among your employees? (Select all that apply)

- [ ] Standards certification and safety programs
- [ ] Training programs through a public or private K-12 school
- [ ] Training programs through a school of higher education
- [ ] Trade or vocational certificate programs
- [ ] Formal apprenticeship programs

17. What sources or programs do you use to recruit and hire employees, including technicians, linemen, construction laborers and managers, and similar positions? (Select all that apply)

- [ ] Internet-based employment posting sites
- [ ] Workforce development and community job placement centers
- [ ] Communications industry specific training classes
- [ ] Third-party hiring and recruitment firms
- [ ] Advertisements in relevant trade association publications and websites
- [ ] Incentivizing employee referrals

18. Do you have programs or incentives to support diversity among your employees when considering methods to attract, retain, and promote a skilled workforce?

19. Please describe your vision for workforce readiness programs, recruitment practices, and wrap around services to support broadband expansion in Maryland over the next five years.