UNITED STATES DEPARTMENT OF COMMERCE
Office of Inspector General
Washington, D.C. 20230

February 29, 2024

MEMORANDUM FOR: Alan Davidson
Assistant Secretary of Commerce for Communications and
   Information and NTIA Administrator
National Telecommunications and Information Administration

FROM: Arthur L. Scott Jr.
Assistant Inspector General for Audit and Evaluation

SUBJECT: Management Alert: *Challenges Industry Stakeholders Face with Broadband Deployment*
Final Memorandum No. OIG-24-015-M

Attached is a management alert about the challenges industry stakeholders are facing to deploy broadband to underserved and unserved communities. Consistent with the Inspector General Act of 1978, as amended (IG Act),[1] we are notifying you of the potential risks that could affect the broadband programs administered by the National Telecommunications and Information Administration (NTIA).

During our evaluation of broadband deployment challenges, industry stakeholders indicated that some of the top challenges they face are technology requirements and exclusions in applicable program provisions, lengthy permitting processes, and workforce shortages.

On September 11, 2023, we discussed our plans to issue this management alert with NTIA. Additionally, on September 25, 2023, we discussed the contents of this management alert with NTIA, and they also provided their input on industry challenges in this management alert. Also, on December 11, 2023, we further discussed our observations with NTIA. Lastly, on January 22, 2024, we issued a draft of this management alert to NTIA for comment. We considered their comments and made changes to the final management alert where appropriate.

Pursuant to Pub. L. No. 117-263, Section 5274, non-governmental organizations and business entities specifically identified in this report have the opportunity to submit a written response for the purpose of clarifying or providing additional context to any specific reference. Any response must be submitted to Ms. Rosheek Williamson, Division Director, at

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[1] The IG Act establishes that offices of inspectors general will "provide a means for keeping the head of the establishment and the Congress fully and currently informed about problems and deficiencies relating to the administration of such programs and operations and the necessity for and progress of corrective action" 5 U.S.C. § 402(b)(3).

rwilliamson@oig.doc.gov and OAE_Projecttracking@oig.doc.gov within 30 days of the report's publication date.

We will post the alert on our public website. If you have any questions or concerns about this management alert, please contact me at (202) 792-4192 or Division Director Ms. Rosheek Williamson at (202) 578-3621.

Attachment

cc: Stephanie Weiner, Acting Chief Counsel, NTIA
      MaryAnn Mausser, Audit Liaison, Office of the Secretary
      Christiann Burek, Acting Deputy Chief of the Employment and Labor Law Division, Office
         of General Counsel, Office of the Secretary
      Doug Kinkoph, Associate Administrator, Office of Internet Connectivity and Growth,
         NTIA

Key Issues

The National Telecommunications and Information Administration (NTIA) is administering almost $49.8 billion to promote broadband access for every American through the Consolidated Appropriations Act, 2021, and the Infrastructure Investment and Jobs Act (IIJA). NTIA is at the forefront of this endeavor and has listed expanding affordable, high-quality broadband to every American as an objective in its 2022–2026 Strategic Plan. However, the combination of standing up new broadband programs and increasing access to broadband is an ongoing national challenge. The Broadband Equity, Access, and Deployment (BEAD) program, the largest of the new broadband programs, provides $42.45 billion to expand high-speed internet access in all 50 states, Washington DC, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

Based on our ongoing work, we asked industry stakeholders to identify challenges they are facing with broadband programmatic deployment to unserved and underserved locations. In response, these stakeholders identified challenges regarding expanding high-speed internet access via infrastructure deployments: the BEAD Notification of Funding Opportunity's (NOFO's) Extremely High Cost Per Location Threshold (EHCPLT) provision for broadband technology could limit applications and reduce BEAD funding, programmatic exclusion of unlicensed spectrum or satellite could lead to overbuilding without oversight, lengthy permitting processes could lead to broadband deployment delays, and workforce shortages could slow infrastructure deployment. These challenges could impact stakeholders' ability to successfully deploy broadband as required by IIJA, discourage technology providers from applying for grants, decrease competition, encourage wasteful spending to connect locations with existing broadband access, and increase deployment cost.

NTIA officials acknowledged these challenges; however, these officials stated that IIJA allows the Assistant Secretary discretion to define priority broadband projects and reliable broadband service to meet deployment objectives. Additionally, NTIA officials said there will be opportunities for all forms of broadband providers to participate in the BEAD program and that industry concerns are due to misunderstanding of IIJA statute definitions and the BEAD NOFO requirements. Also, NTIA officials said they will assess whether proposed projects meet unserved and underserved service requirements to ensure overbuilding is limited to those locations permitted by IIJA, but they did not provide details regarding their oversight process for overbuilding. Moreover, NTIA said it is in various stages of developing initiatives to provide a more streamlined and efficient regulatory framework to comply with environmental and historic preservation obligations. Lastly, NTIA officials said their focus is to work closely with states and territories as they prepare their workforce development plan to address the BEAD workforce demand.

The identified challenges could significantly delay broadband deployment and negatively affect IIJA's implementation, execution, and goals to close the digital divide in unserved and underserved communities.

Proposed Actions for Change

To address the potential impacts of the identified challenges, NTIA should consider:

1. Relaxing the BEAD NOFO's fiber preference and Extremely High Cost Per Location Threshold provision to take into consideration the limited availability of resources to support fiber preference.

2. Developing a formal oversight process to ensure overbuilding would be limited to those locations permitted by IIJA, which NTIA identified as locations with existing internet service using unlicensed spectrum or satellite.

3. Working with or forming a coalition with the broadband industry, states, and territories to develop a national database of critical broadband industry jobs and national, standardized training programs, certifications, and licenses.

Background

NTIA is responsible for administering more than $48.2 billion provided by IIJA[2] for four different broadband programs, namely the BEAD program, the Middle Mile Broadband Infrastructure Grant (MMG) program, the Digital Equity Act program, and the Tribal Broadband Connectivity Program (TBCP). The largest of these is the BEAD program, for which NTIA received $42.45 billion.

NTIA issued a NOFO for each of these broadband programs, describing the requirements under which it will award grants. Broadband grant awards are intended to expand broadband use in America; lay the groundwork for sustainable economic growth, better education, public safety, and healthcare; and advance other national priorities. However, broadband industry stakeholders indicated several key challenges with broadband deployment. Additionally, in 2023, the Government Accountability Office (GAO) identified industry challenges that affect middle-mile network coverage and access. Mitigating these challenges is vital to closing the digital divide and deploying broadband service to unserved and underserved communities.

Our Observations to Date

Broadband industry stakeholders identified multiple challenges that affect cost efficiency to deploy broadband to unserved[3] and underserved[4] locations. These challenges relate to technology requirements and exclusions in applicable program provisions, lengthy permitting processes, and workforce shortages, as further described below.

BEAD NOFO Extremely High Cost Per Location Threshold Provision for Broadband Technology Could Limit Applications and Reduce BEAD Funding

The BEAD NOFO's established program provisions require states and territories to select fiber over non-fiber technologies, with an exception for locations where it costs too much. Specifically, the states and territories must establish a cost threshold to determine where to draw the line for locations that are just "too costly" for fiber, which is defined in the BEAD NOFO as the EHCPLT. The EHCPLT is a BEAD subsidy cost per location to be utilized during the subgrantee selection process; states and territories may decline to select a proposal of fiber technology if use of an alternative technology meeting the BEAD program's technical requirements would be less expensive. Essentially, the EHCPLT determines where awardees will be able to use fixed wireless and potentially other technologies. NTIA expects states and territories to set the EHCPLT as high as possible to help ensure that end-to-end fiber projects are deployed wherever feasible. This increases the opportunity for fiber applicants to automatically win over non-fiber applicants, which could significantly reduce BEAD dollars to bring high-speed, reliable internet to all.

According to NTIA, the intent of the EHCPLT provision is to award grants to fiber applicants first because it is the most sustainable and unlikely to become obsolete technology. OIG does not question that fiber is the most sustainable and future-proof technology, and our own telecommunication expert agrees with NTIA's

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[2] Pub. L. No. 117-58, Infrastructure Investment and Jobs Act (IIJA), (2021).

[3] Section 60102(a)(1)(A) of IIJA and the BEAD NOFO define "unserved locations" as broadband-serviceable locations without any broadband service at all or with broadband service offering speeds below 25 Mbps downstream and 3 Mbps upstream.

[4] Section 60102(a)(1)(C) of IIJA and the BEAD NOFO define "underserved locations" as broadband-serviceable locations without broadband service offering speeds of 100 Mbps downstream and 20 Mbps upstream.

assessment. Also, broadband industry stakeholders agree that fiber has its place. However, this EHCPLT provision could unintentionally impact the BEAD program in achieving the Administration's goal to deploy broadband service to unserved and underserved communities. Industry stakeholders we interviewed identified the following challenges about this provision that will impact prospective BEAD applicants:

- **States and territories setting the EHCPLT as high as possible.** Industry stakeholders we interviewed said the EHCPLT requirement narrows opportunities for non-fiber applicants because the threshold could be set so high that alternative technologies to fiber are never an option. This concern is driven by the fact that in the BEAD NOFO, NTIA requires states and territories to set the EHCPLT as high as possible to ensure that fiber projects are deployed wherever feasible. The EHCPLT applies even if other broadband technology applicants besides fiber providers could deploy broadband per IIJA requirements at a lower cost. Industry stakeholders told us that consequently, the EHCPLT provision discourages other technology providers from applying, limits the pool of applicants, and decreases competition. This is in direct conflict with one of IIJA's goals: to increase competition among broadband providers to offer more affordable, high-quality options for broadband services. In contrast, for TBCP and MMG, the NOFO allows a choice of technology "that best meets the needs of unserved and underserved locations," including fiber, wireless, fixed wireless, and satellite.

- **Labor market and supply chain concerns.** Industry stakeholders said they are concerned that as subgrantees are awarded BEAD funds, fiber material will be limited, and they will not have enough fiber technicians. For example, industry stakeholders said limited access to fiber and trucks could result in timeframes of 18 months or longer to get technicians out to install fiber. Additionally, they will need about 205,000 fiber technicians. GAO also noted concerns about the availability of fiber material in an October 2023 report on broadband infrastructure.[5] Specifically, GAO reported that a few providers expressed concerns over the availability of fiber, which was in short supply during the COVID-19 pandemic. The report also mentioned provider concerns about both cost and availability of fiber once the federal programs start distributing funds, due to increased demand that would drive the cost of fiber higher. We found that NTIA is addressing supply chain challenges with the Build America Buy America waiver, which will allow industry to purchase specific items from foreign sources to fulfill their obligations under the BEAD program.

NTIA officials said that IIJA gives them discretion to define priority broadband projects,[6] which resulted in the fiber preference. NTIA officials also said they recognize that fiber cost for broadband deployment could be expensive and thus they included the EHCPLT in the NOFO, which allows states and territories to select an alternative broadband technology for locations where deploying fiber would cost more than the threshold.

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[5] GAO, October 2023. *Broadband Infrastructure: Middle-Mile Grant Program Lacked Timely Performance Goals and Targeted Measures,* Report No. GAO-24-106131. Washington, DC: GAO.

[6] Section 60102(a)(1)(I) of IIJA defines "priority broadband project" as a project designed to provide broadband service that meets IIJA requirements for speed, latency, reliability, and consistency in quality of service and has a network built that can easily scale speeds over time to meet connectivity needs of households and businesses and support the deployment of wireless services and other advanced services.

Additionally, industry stakeholders said NTIA should consider leveling the playing field for fixed wireless and unlicensed spectrum[7] by modifying the BEAD NOFO to allow states and territories a choice of technology that best fits their needs. This would increase competition among broadband providers to offer more affordable, high-quality options for broadband services, similar to the TBCP and MMG broadband programs.

Programmatic Exclusion of Unlicensed Spectrum or Satellite Could Lead to Overbuilding without Oversight

An industry stakeholder we interviewed said the BEAD NOFO excludes unlicensed spectrum as reliable broadband. This exclusion increases the risk of overbuilding because locations served by fixed wireless networks using entirely unlicensed spectrum are categorized by the BEAD NOFO as unserved. According to the industry stakeholder, the Federal Communications Commission's map of broadband availability identifies more than 1.92 million last-mile locations that are currently served entirely by unlicensed spectrum. These locations would be eligible for BEAD funding as unserved locations, potentially taking funds away from locations that are truly unserved. The stakeholder cited research by an economist that determined connecting locations to fiber that are already receiving internet access via unlicensed spectrum would result in as much as $8.6 billion[8] in wasteful spending. The BEAD NOFO allows locations receiving broadband service from unlicensed spectrum to be included in an unserved or underserved project. These projects require at least 80 percent of the broadband serviceable locations to be unserved or underserved, resulting in up to a 20 percent overlap of connecting broadband service to locations with existing internet service using unlicensed spectrum or satellite, which could lead to potential overbuilding.

NTIA officials agreed that BEAD funding allocation and awards could be spent on locations serviced by providers that are defined as non-reliable service providers (i.e., unlicensed spectrum or satellite). NTIA officials said Congress openly considered that unserved and underserved service projects will have some potential overbuilding. NTIA said overbuilding would be limited to those locations permitted by IIJA, which NTIA identified as locations with existing internet service using unlicensed spectrum or satellite. Furthermore, NTIA officials said they will assess whether proposed projects meet unserved and underserved service requirements to ensure overbuilding is limited to those locations permitted by IIJA, but they did not provide details regarding their oversight process for overbuilding.

NTIA should consider developing a formal oversight process to ensure limited overbuilding in locations with reliable broadband services and locations using unlicensed spectrum or satellite broadband service.

Lengthy Permitting Processes Could Lead to Broadband Deployment Delays

Industry stakeholders we interviewed said requesting permits from multiple federal, state, tribal, and local governments can be time consuming, in some instances with a wait time of 2 years or more. Industry stakeholders also said the National Environmental Policy Act (NEPA) review process can create delays. One

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[7] The Federal Communications Commission (FCC) reserves certain bands of the electromagnetic spectrum to license to specific providers (for example, television and radio broadcasters and cellular companies). In contrast, unlicensed spectrum is free and open for anyone to use without permission from the FCC, although it is subject to FCC rules intended to mitigate sources of harmful interference to protected, authorized devices. Wi-fi and Bluetooth are examples of applications that use unlicensed spectrum.

[8] William Lehr, MIT, January 2023. *White Paper: Getting to the Broadband Future Efficiently with BEAD Funding*. The $8.6 billion number stems from analyst calculations that the cost to deploy fiber to each of the 1.92 million locations currently served by unlicensed spectrum could be as high as $4,500.

industry stakeholder said their members must go through the environmental review process required by the NEPA statute[9] and tribal consultation reviews, even if their projects do not touch federal or tribal land, because the entire project is considered a major federal action, which can be extremely time consuming and costly. Another industry stakeholder said NTIA's approach to NEPA reviews takes at least 3 to 6 months for NTIA to complete the reviews. These delays increase deployment cost, which could impact IIJA broadband program completion requirements to provide broadband access to close the digital divide across America. Industry stakeholders said the relevant agencies have neither enough employees to execute permitting processes nor the staffing and expertise to conduct NEPA reviews. In a recent GAO report, stakeholders also said the number of permit requests and the process for getting permits approved for MMG projects cause delays (that could take 2 to 3 years), additional cost, and other challenges.[10]

NTIA officials said they are aware of these challenges and are in various stages of developing and implementing initiatives to provide a more streamlined and efficient regulatory framework that complies with environmental and historic preservation obligations. NTIA officials also said they are in the process of developing a tracking system to monitor projects and escalate those that are having permitting problems to the relevant agency. In 2022, NTIA set up an intra-agency permitting team of subject matter experts to address the complex permitting processes that pose risks to the grant projects. Additionally, in August 2022, NTIA and the Bureau of Indian Affairs signed an agreement to streamline environmental permitting for high-speed internet projects on tribal lands.

Industry stakeholders said national attention is needed for government agencies to streamline the permitting process and hire staff who have expertise in the permitting processes and NEPA reviews.

Workforce Shortages Could Slow Infrastructure Deployment

Industry stakeholders we interviewed said the telecommunications labor force may not be sufficient to deploy the broadband infrastructure due to (1) recruiting challenges for trained and experienced workers, especially in rural areas, and (2) the inability to attract new workers because of a lack of national messaging that promotes telecommunications as a viable, long-term, and well-paying career field. Additionally, workforce labor shortages are putting significant economic pressures and delays on building broadband networks. For example, our review of Bureau of Labor Statistics data indicates that the number of telecommunications workers has declined since 2013, resulting in a 26 percent decrease between January 2013 and January 2023.[11] Furthermore, large increases in federal funding for broadband deployment are driving the need for an expanded workforce.

In addition, other government agencies have identified worker shortages as a key area of concern for broadband deployment. For example, GAO noted that thousands of additional skilled telecommunications workers will be needed to deploy broadband funded through selected federal programs, including the BEAD program.[12] GAO also reported that industry members described challenges finding labor to support the

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[9] Pub. L. 91–190, 42 U.S.C. § 4321 *et seq;* 40 CFR § 1500.3, NEPA compliance.

[10] GAO, October 2023. *Broadband Infrastructure: Middle-Mile Grant Program Lacked Timely Performance Goals and Targeted Measures,* Report No. GAO-24-106131. Washington, DC: GAO.

[11] U.S. Bureau of Labor Statistics, Occupational Employment and Wage Statistics. Available at https://www.bls.gov/oes/ (data extracted on August 30, 2023).

[12] GAO, December 2022. *Telecommunications Workforce: Additional Workers Will Be Needed to Deploy Broadband, but Concerns Exist About Availability,* Report No. GAO-23-105626. Washington, DC: GAO.

increased demand for broadband deployment for middle-mile networks.[13] In addition, the Telecommunications Interagency Working Group[14] has noted that the nation faces a serious shortage of trained fiber installers and frontline electrical workers, as well as network and cybersecurity professionals.[15] The semiconductor industry also has a shortage of skilled workers, forecasting a need for 250,000 workers in the next 5+ years,[16] which could compete for talent from the same pool of available workers. Building long-term opportunities for career advancement is key to developing a sustainable broadband workforce.

Industry stakeholders also said this is a national challenge because there are no national, standardized training programs, certifications, or licenses to develop a successful workforce. Therefore, industry stakeholders suggested White House involvement to develop a national database of critical broadband industry jobs and national, standardized training programs, certifications, and licenses.

NTIA officials said their focus is to work closely with states and territories on the broadband programs, and NTIA will continue to work with states and territories as they prepare their workforce development plan to address the BEAD workforce demand. For example, in October 2022, NTIA released workforce planning guidance to support states and territories developing their workforces for grant implementation as well as designing workforce plans and standards for subgrantees. NTIA also developed a workforce development webpage[17] to provide additional resources and has published case studies highlighting existing workforce development programs.

GAO Observations on Middle-Mile Network Coverage and Access

GAO has issued a report identifying industry challenges affecting middle-mile network coverage and access. In 2023, GAO reported the following challenges: (1) the cost of serving areas with low populations, (2) deploying infrastructure across challenging terrain, and (3) obtaining permits. This report also discussed challenges related to providers' ability to access middle-mile networks, such as a lack of redundant networks and lack of competition. For example, providers told GAO that rural areas often lack redundant middle-mile networks—that is, they are served by middle-mile networks with only a single route into a community. If the sole fiber route into a community is damaged, the entire community could lose internet service.[18]

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[13] GAO, October 2023. *Broadband Infrastructure: Middle-Mile Grant Program Lacked Timely Performance Goals and Targeted Measures,* Report No. GAO-24-106131. Washington, DC: GAO.

[14] The Telecommunications Interagency Working Group includes members from the Department of Commerce, Department of Education, Department of Labor, FCC, NTIA, Communications Workers of America Union, Directorate of Construction of the Occupational Safety and Health Administration, Indian tribes, institutions of higher education, labor organizations representing the telecommunications workforce, a public interest advocate for tower climber safety, a registered apprenticeship program in construction or maintenance, rural telecommunications carriers, telecommunications industry associations, a telecommunications contractor firm, and a wireless infrastructure association.

[15] Telecommunications Interagency Working Group, January 2023. *Recommendations to Address Workforce Needs.* Washington, DC: FCC.

[16] Sonderman, Thomas. November 16, 2023. *The U.S. Semiconductor Sector Is Surging. We Need the Workforce to Match.* Barron's.

[17] NTIA, Internet for All website, Workforce Development. Available at https://internetforall.gov/workforce-development.

[18] GAO, October 2023. *Broadband Infrastructure: Middle-Mile Grant Program Lacked Timely Performance Goals and Targeted Measures,* Report No. GAO-24-106131. Washington, DC: GAO.

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Our Future Work

The broadband industry stakeholder concerns presented here, and any action taken by NTIA as a result of this management alert, will be considered in our ongoing evaluation of broadband deployment challenges.