



Arizona Broadband Statewide Middle-Mile Strategic Plan

Arizona Commerce Authority

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Executive Summary



Over the last 25 years, state and local governments, non-profit organizations, and various public and private stakeholder organizations in Arizona have worked hard on expanding affordable high-speed broadband access for citizens and businesses. Together, their actions and broadband-focused programs have yielded tangible results in advancing the statewide broadband needs.

The COVID-19 pandemic has exposed the vital role of affordable and reliable broadband and communities without are severely disadvantaged. Low-income communities, tribal communities, unserved and underserved households are at greater risk of falling behind, as the COVID-19 pandemic has fundamentally transformed our society. The time has come to build upon the 2018 Arizona Statewide Broadband Strategic Plan (the 2018 Strategic Plan) by reviewing and identifying key middle-mile broadband infrastructure to address the connectivity needs of unserved and underserved communities. To that end, the Arizona Commerce Authority (ACA) and its Arizona Broadband Office have developed this update to effectively coordinate, manage and collaborate on the resources required to deliver Governor Ducey's goal of ensuring that every population center in Arizona has access to fast, affordable, and reliable broadband to population centers throughout Arizona.

This addition to the 2018 Strategic Plan is guided by the state's connectivity goals in terms of accessibility, affordability and performance. A comprehensive analysis of the current situation and path forward resulted in three primary recommendations. These recommendations are intended to serve as a roadmap for ensuring that Arizonans are afforded equal access to digital opportunities regardless of geographic location and develop the broadband middle-mile infrastructure needed to achieve the goal of 100 Megabits per second (Mbps) download and 20 Mbps upload across the State.

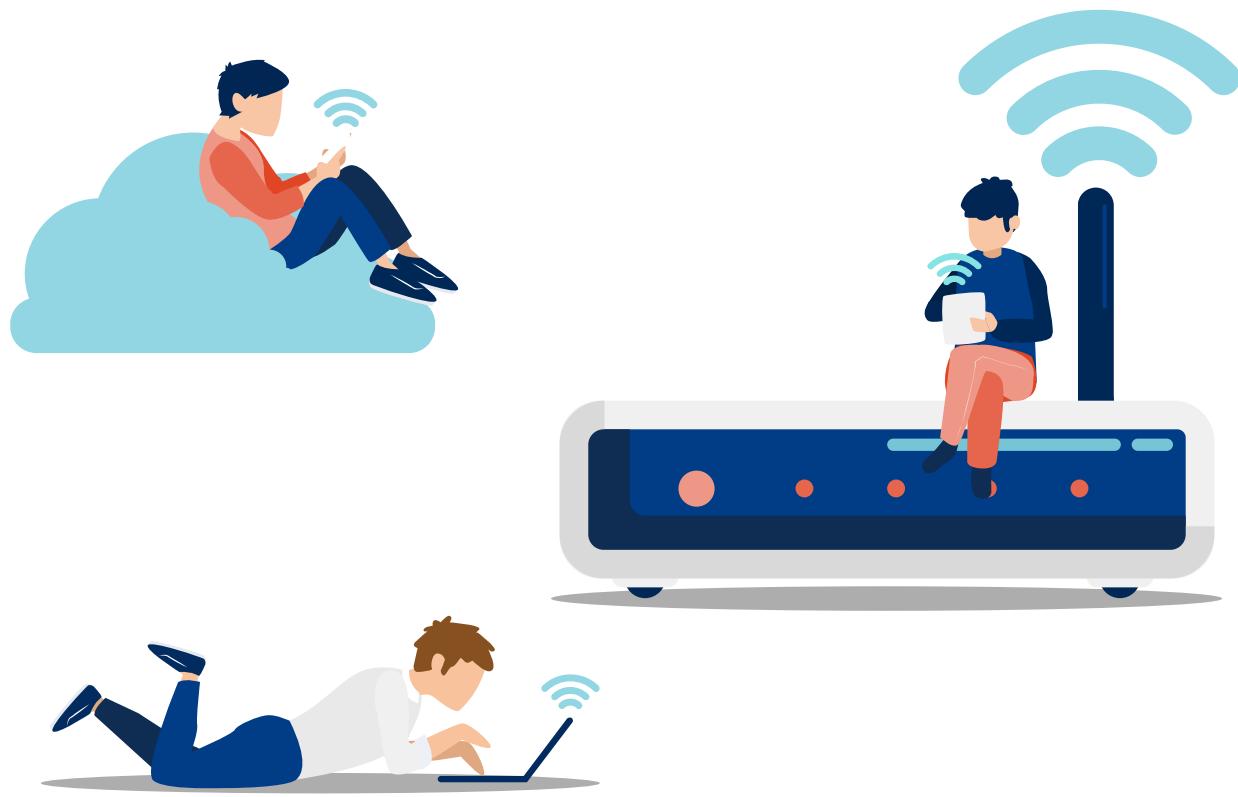
Table 1 – Summary of Recommendations

#	Recommendations
1	Implementation of Priority Interstate Corridors
2	Implementation of Selected State Routes
3	Implementation of Middle-Mile Program Governance

Source: ACA Analysis

These strategic recommendations are based on comprehensive analysis of hundreds of data points and input received from public and private stakeholders. Collectively, these recommendations set the direction for the Arizona Broadband Office and identify the core focus areas for middle-mile broadband networks¹ across Arizona over the coming years. The prioritization of public investment in the state's broadband infrastructure will include attracting and promoting investment by the private sector and strengthening the role of the Broadband Office in collaborating with partnering agencies, local government, electric co-ops, service providers and key stakeholders. ACA recognizes that the recommendations identified in this plan should be continually reviewed and adjusted, which will require on-going analysis and development.

This addition to the 2018 Strategic Plan lays a framework for the future. It is aimed at enhancing the efforts of the Broadband Office to develop robust middle-mile broadband infrastructure to reach the unserved and underserved areas of the State. Implementation of these recommendations will help expand Arizona's middle-mile network² along interstate highways and state routes. This will provide much-needed expansion of Arizona's existing middle-mile broadband network on a statewide basis, connecting communities and tribal nations to metropolitan areas. Arizona has a historic broadband opportunity through the federal and state broadband funding support to develop the necessary middle-mile network and related broadband infrastructure across the state to fully leverage tomorrow's opportunities and address future challenges.



¹ Refers to long-distance fiber optic network(s) between large, strategically interconnected networks and core routes – i.e., Arizona interstates highways and state routes

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Introduction



Background

Reliable high-speed internet has become a necessity in the 21st century. Business owners, medical professionals, first responders, teachers, students, farmers, consumers, and many others depend on high-speed internet every day. The response to the COVID-19 pandemic has exposed the vital role of affordable and reliable broadband. Access to high-speed broadband is essential and communities without that access are at a competitive disadvantage. Low-income communities, and unserved and underserved households are at greater risk of falling behind, as the COVID-19 pandemic has fundamentally transformed society. States and local governments across the nation have increased their efforts in developing broadband infrastructure to fully leverage tomorrow's opportunities and address future challenges.

But many rural and tribal communities are left behind in the digital age. Approximately 796,000 households in Arizona are without access to a wired connection capable of 25 Mbps download and 3 Mbps upload, and 862,000 households have access to only one internet service provider. In 2018, the Arizona Department of Administration published the Arizona Statewide Broadband Strategic Plan (the 2018 Strategic Plan) in furtherance of that goal. Since the 2018 Strategic Plan was published, the State has made significant progress in advancing the following broadband initiatives:

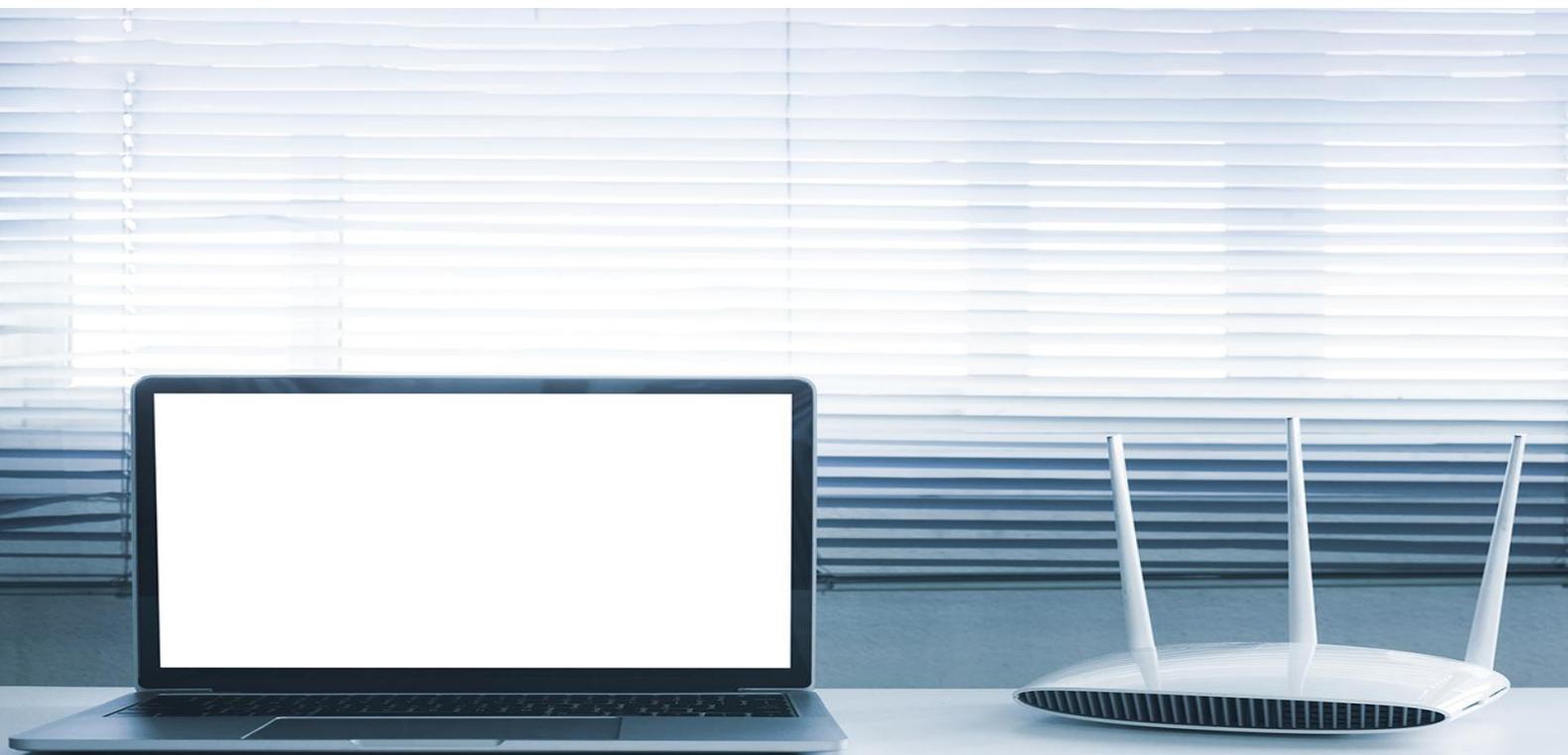
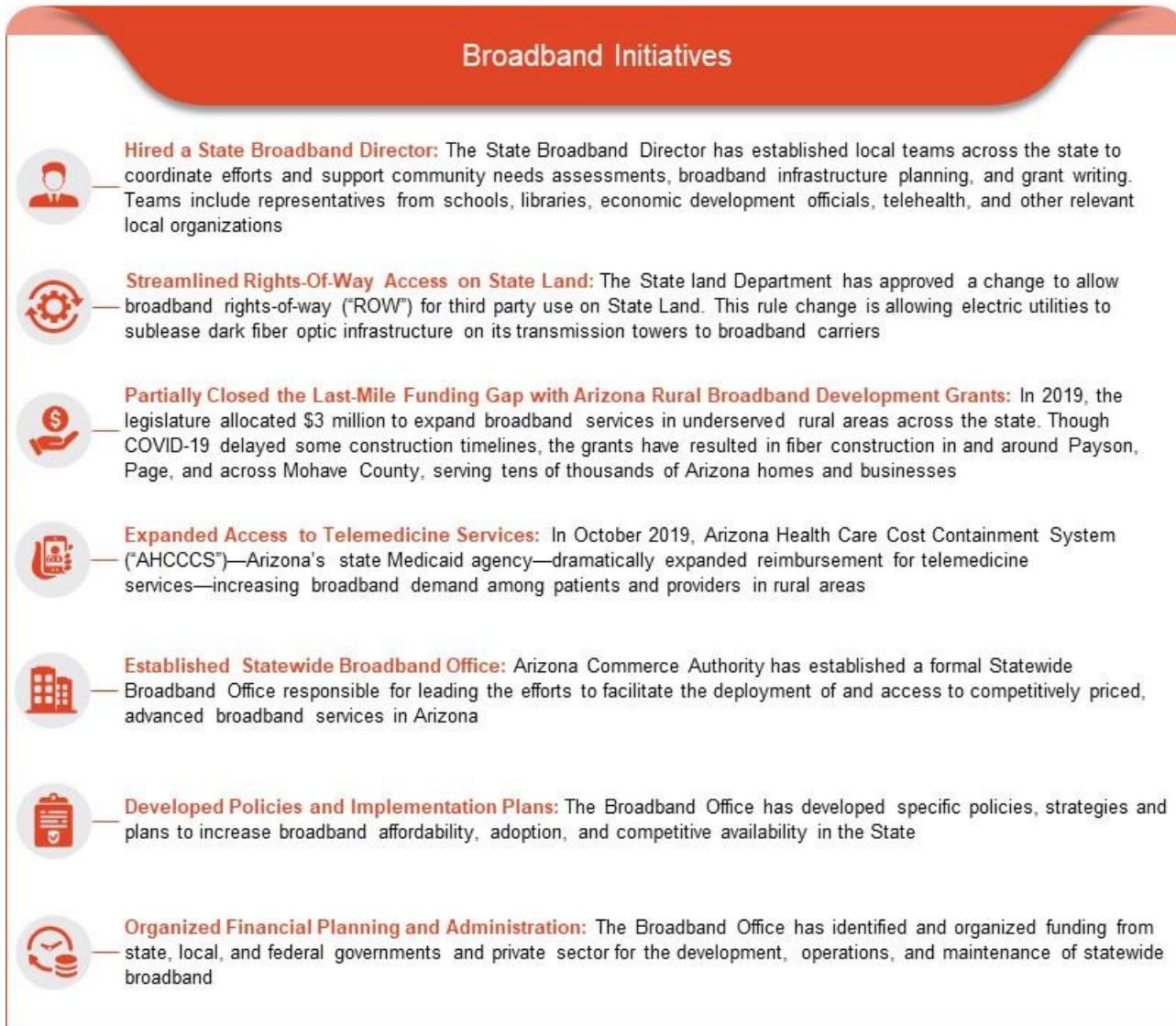


Figure 1 – Arizona Broadband Initiatives – Actions Taken

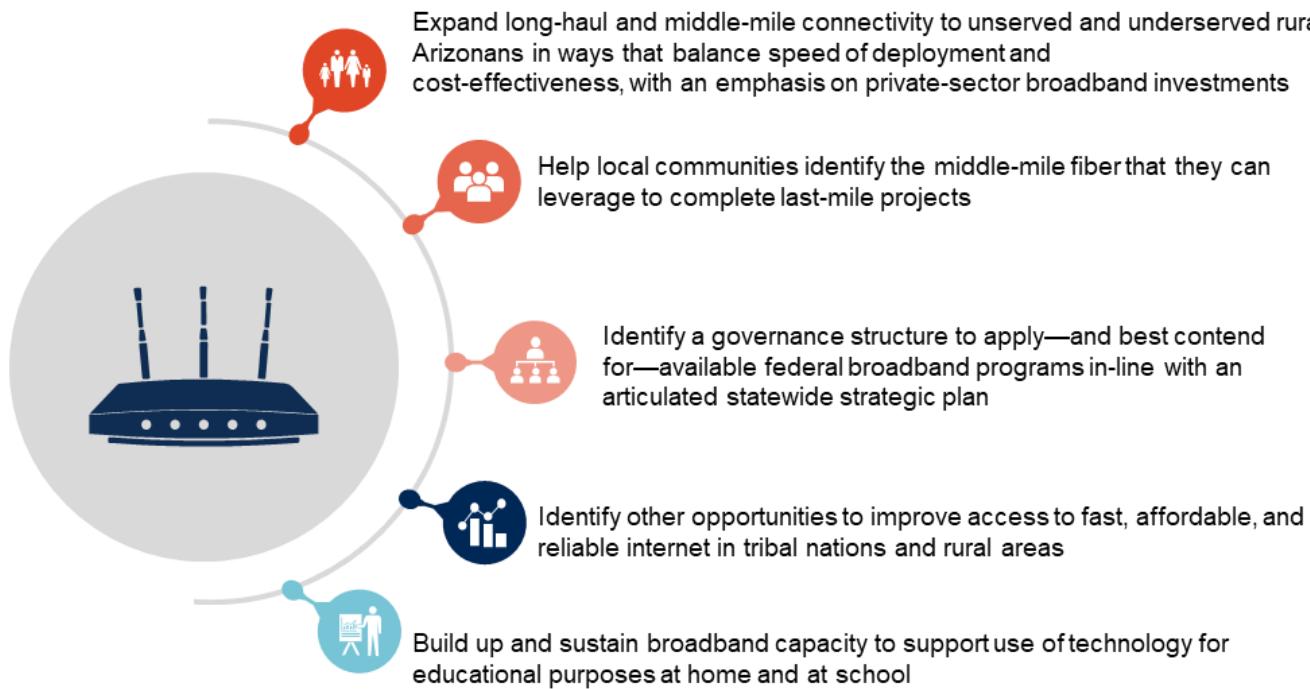


Source: ACA 2018 Strategic Plan

Goals and Objectives of this Strategic Plan Addition

The Arizona Broadband Office is mandated to continue to reduce barriers to commercial broadband development, leverage existing infrastructure for communities, and coordinate local, state, and federal funding efforts to promote fast, affordable, and reliable broadband service across the state. This plan seeks to build upon the 2018 Strategic Plan in ways that help the State accomplish the following goals:

Figure 2 - Arizona Broadband Goals:



Source: 2018 Strategic Plan

Approach to the Statewide Broadband Middle-Mile Strategic Plan

States across the country and governments around the world are racing to help ensure the deployment of broadband infrastructure vital for addressing connectivity, distance learning, telemedicine, and enhancing economic growth in the years ahead. The COVID-19 pandemic has demonstrated that community resilience is directly linked to broadband access. Further, next generation broadband networks are driving innovations that will change the nature of work, transportation, education, healthcare, and public services.

The State Broadband Office recognizes the importance of achieving comprehensive coverage across Arizona that provides fast, affordable, and reliable broadband service. Presently, the State of Arizona ranks 36th in the nation for broadband coverage, and approximately 31 percent of Arizonans are either unserved or underserved. Expanding affordable and reliable broadband access to unserved and underserved communities will provide opportunities to enhance the living standards of people in those areas. With expanded broadband access, residents will have more choices around how they shop, how they visit a doctor, and how they work.

This addition to the 2018 Strategic Plan outlines a path forward by identifying middle-mile corridors to achieve fast, affordable and reliable broadband service for those unserved and underserved households.

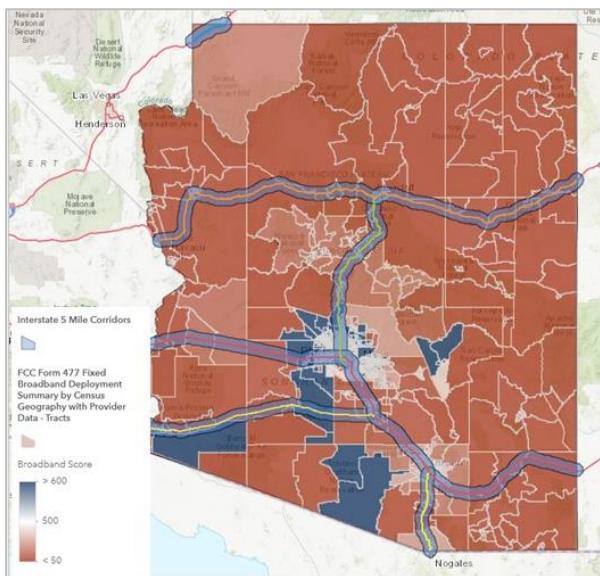
Assessment of Current State and Needs

Data was reviewed from various sources to evaluate the total number of unserved and underserved households in Arizona. This review included data from the American Community

Survey (ACS) conducted by the United States Census Bureau; data regarding number of service providers by county, and average internet speed reported in the FCC Form 477 data.

Approximately 399,000 Arizona households or 15.56 percent of households, have no internet connection, and an almost equal number of households are underserved and getting internet service through dial-up, satellite or non-subscription connections that do not meet the requirements of FCC's current definition of "broadband" service of 25 Mbps download / 3 Mbps upload connection.

Figure 3 - FCC Broadband Internet Score

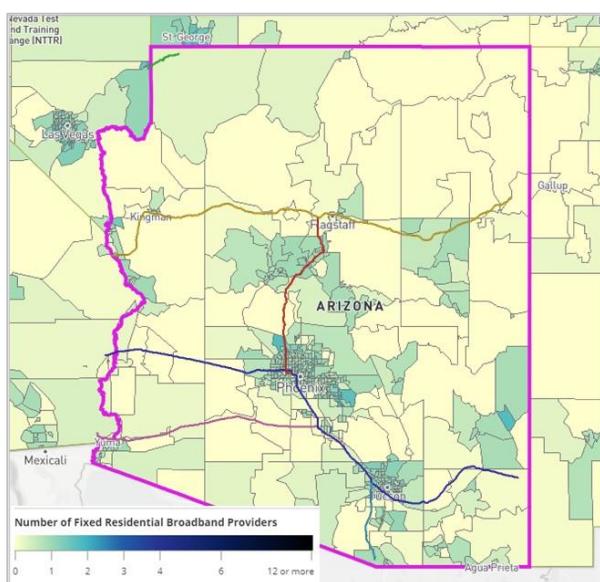


Federal Communications Commission (FCC) Form 477 collects broadband data from providers twice a year on a census block level. The average internet speed reported by service providers in FCC Form 477 indicate that except for major metropolitan areas, internet speed or "Broadband Score" are significantly less than the State's goal of 100 Mbps download and 25 Mbps upload speed.

The composite broadband score is calculated by aggregating the speeds of DSL, Cable, Broadband in the particular area adjusted by the mix of customers having these services.

Source: FCC Form 477 Data

Figure 4 - Number of Providers



Source: ESRI, FCC and ACS Data

The Broadband Office reviewed the number of internet service providers (ISPs) servicing residential customers in each county across the State. ACA found that in the rural area, areas with low population density, and tribal nations, there is frequently only one or no service provider.

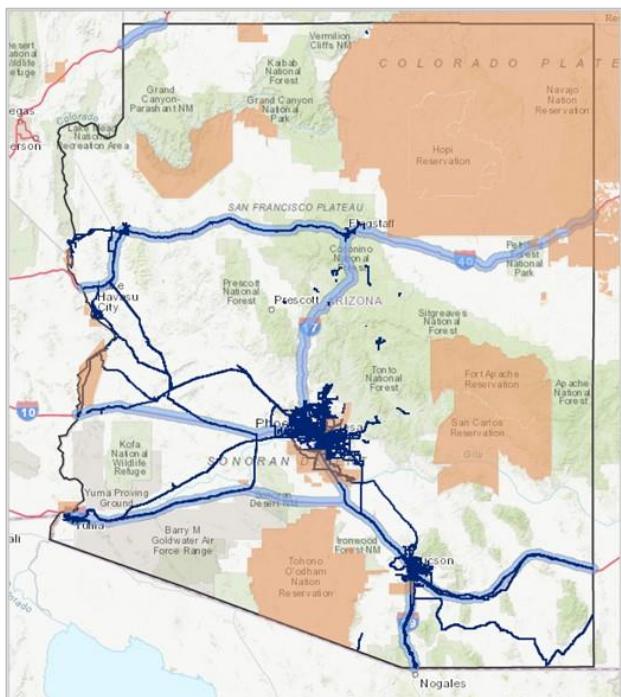
The current situation indicates that Arizona's rural and tribal communities lack accessibility to fast, affordable, and reliable broadband service. ACA's discussions with stakeholders and market participants indicated that one of the reasons for this situation is financial and operational unviability for the private sector service providers to expand their service network in these areas.

Public investment in the middle-mile and last-mile networks can help address this situation.

Investment in Middle-Mile and Prioritization

To assess the public investment needs for the broadband infrastructure in Arizona, the Broadband Office reviewed the existing fiber presence across the State by private sector service providers (refer to Appendix A for existing fiber presence in the State for top ten service providers), and examined geographic locations where a large majority of unserved and underserved households are residing.

Figure 5 - Existing Fiber



Source: ESRI, FCC, ACS Data and Research

A majority of the existing fiber networks are present around the Phoenix and Tucson metro areas. Input received through stakeholder consultations has helped identify additional gaps in broadband coverage. Arizona can make the development of broadband infrastructure more cost effective by leveraging the State's resources, including right-of-way. A large majority of the population resides within a five-mile radius of the state highway network. For this reason, the Broadband Office examined all interstate highways and select state routes to prioritize public investment.

- A majority of unserved / underserved households can be covered by middle-mile network along Arizona's interstate highways and select state routes
- Public and private investment in middle-mile network will work complimentary to last-mile programs including State's broadband grants and E-Rate program
- Public and private investment in middle-mile network will help build an open access network that will create a multiplier effect, attract private sector interest, and improve overall broadband accessibility and affordability to population centers located along the corridors
- Increased competition will help drive innovation, affordability, and the deployment of future-proof broadband infrastructure

Development of Actionable Recommendations

Based on the analysis conducted, the Broadband Office developed three recommendations to expand fast, affordable, and reliable broadband service throughout Arizona. These recommendations are discussed in detail in the “Key Recommendations” section of the report. These recommendations are focused on the prioritization of public investment in middle-mile broadband infrastructure, including attracting and promoting investment by the private sector, and strengthening the role of the Broadband Office in collaborating with partnering agencies, local government, electric co-ops, service providers and key stakeholders.

Accelerating the deployment of broadband across Arizona will require additional access to funding. The Broadband Office will work with federal, state and local stakeholders, and partner agencies to identify areas eligible for funding for the Statewide Middle-Mile Broadband Program.



Assessment of Current State and Needs



Broadband Infrastructure Landscape

Analysis of US Census data has identified that the majority of U.S. Census blocks in Arizona have a single service provider with approximately 2.1 million out of 2.6 million Arizona households connected to some form of internet. However, internet speed in non-metropolitan areas is significantly less than the State's goal of 100 Mbps download and 20 Mbps upload.

The gap assessment indicated that a lack of financial and operationally viable broadband infrastructure development and lack of access to a middle-mile network are two major barriers to broadband expansion by private sector service providers in Arizona. Yet, a large majority of Arizona's population resides within a five-mile radius of major interstate highways and state routes.

Table 2 - Unserved and Underserved Households in Arizona

Internet Connectivity ³	Total	% of Total Households
Households with internet	2,166,207	84.44%
Households with broadband (25/3 Mbps or higher)	1,769,376	68.97%
Households with underserved internet (dial-up, satellite, other)	396,831	15.47%
Households with no internet	399,173	15.56%
Total Unserved/Underserved Households	796,004	31.03%
Total Households	2,565,380	100.00%

Source: ACS Data

³ The value for total households with no internet has been derived after reducing available input data for households with internet from the total number of households in Arizona. Households with internet has further been broken up into 2 categories; (a) households with a broadband internet connection, and (b) households with underserved internet comprising of dial-up, satellite, non-subscription, and any other forms of low-speed internet. Households with no internet and households with underserved internet have been added to estimate total underserved households. Five-mile radius buffer is used as a service area to ensure that financial viability of connecting unserved / underserved households is maintained. Source: ACS 2019 data

However, approximately 80 percent of Arizona's unserved and underserved households can be served by the middle-mile network on the interstate highways and select state routes.

ACA's review of existing commercial broadband infrastructure focused on assessing long-haul and middle-mile networks against key customer demographics, including the number of unserved and underserved households, number of service providers, and major population centers along Arizona's interstate highways and select state routes.

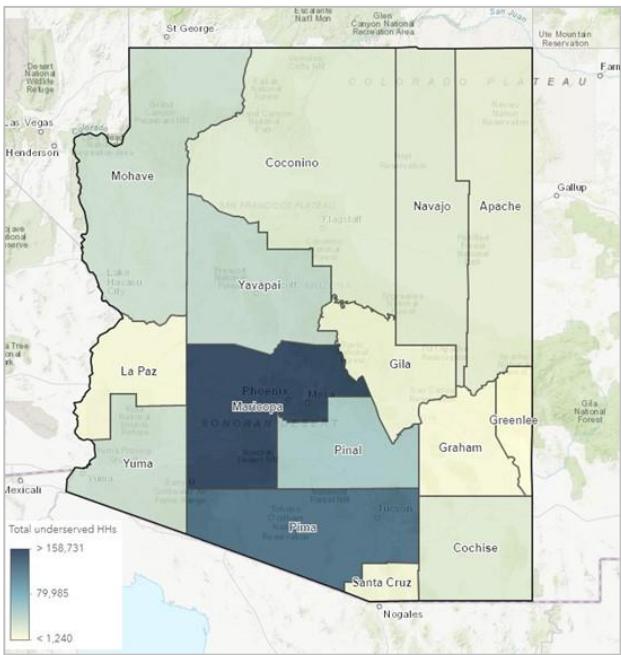
The following insights were observed from analysis:

- Approximately 800,000 households of an estimated total 2.6 million households in Arizona (~31 percent of Arizona's households) are either unserved or underserved in terms of basic broadband connectivity (25/3 Mbps or higher).
- Planned middle-mile network implementation along major interstate highways (i.e., Interstate 17 and Interstate 19) offers the opportunity to extend reliable and affordable broadband service to unserved and underserved households through private partnerships along these highways.
- Approximately 70 percent of unserved and underserved households may be served with a middle-mile broadband network along major interstate highways; An additional 10 percent may be covered through select state highway middle-mile network expansion.
- Interstate 10, Interstate 17, Interstate 19 and Interstate 40 appear to be most critical in terms of middle-mile prioritization, representing approximately 90 percent of the overall potential for major interstate highways.
- Broadband network deployment along major interstate highways could have the potential to generate commercialization revenues for the Statewide Middle-Mile Broadband Program. The commercialization revenues could help pay for annual operations and maintenance (O&M) costs and potentially help expand the broadband network in other parts of Arizona.
- The proposed implementation of middle-mile network infrastructure within prioritized corridors can help extend internet access and enable 5G use cases, while also reducing dependence on public investment.
- ACA has identified several third party broadband service providers as potential partners for the Statewide Middle-Mile Broadband Program implementation.

Coverage Gaps and Requirements

A new emphasis on remote work, e-education, telehealth, and internet-based applications have created a greater need to expand the broadband connectivity across the State of Arizona to address the digital divide, unserved and underserved households, and communities.

Figure 6 - Arizona - Current State of Internet Penetration



Source: ACS Data

Presently, a number of Arizona counties (i.e., La Paz, Coconino, Apache, Navajo, Mohave, Yavapai, Greenlee, etc.) have low accessibility to affordable and reliable internet service. Enhanced statewide broadband coverage is essential and communities without that access are at an unfair disadvantage. Low-income, unserved and underserved households are at greater risk of falling behind, as the COVID-19 pandemic has fundamentally transformed society. Coordinated public and private investment in broadband infrastructure will provide opportunities to enhance the living standards of people in those areas. Additionally, such investment will support economic growth and competition across Arizona while promoting technological innovation, safety, and network resilience.

Benefits of Statewide Middle-Mile Broadband Network to Arizona

The proposed development of a robust middle-mile network along Arizona's interstate highways and select state routes will help extend reliable and affordable broadband services to unserved / underserved households and area businesses. As noted above, approximately 80 percent of the State's unserved / underserved households are located within a five-mile radius buffer zone of the interstate highways and state routes. The statewide middle-mile broadband network (i.e. state owned fiber network(s) for state purposes and excess conduit(s) for private sector utilization) will support reliable and affordable 100 Mbps download and 20 Mbps upload speeds to population centers and businesses located within a five-mile radius of the interstate highways and state routes, help address public and private sector connectivity requirements, promote economic development, improve public safety, and encourage innovation in modern technology adoption (i.e., Artificial Intelligence, Virtual Reality, etc.), and support environmental sustainability and quality of life for Arizonians.

The State of Arizona is expecting to realize the following benefits through strategic investment in the statewide broadband infrastructure:

- Enhanced Connectivity: Investment in middle-mile broadband infrastructure will provide a reliable broadband network for unserved and underserved Arizonans in ways that promote speed of deployment, transparency, competition, and cost-effectiveness.
- Private-sector broadband investments: The focus on expanding the state middle-mile broadband network will promote additional “middle-mile” and “last-mile” networks construction by the private sector service providers (i.e., ISPs, Electric Co-ops, Telcos, etc.).
- Future proof the network: A state of the art “middle-mile” backbone for the State of Arizona that will support enhanced network security, performance, reliability, and data connectivity needs for several decades.

- Distance learning and telehealth: Address connectivity needs of counties and school districts, and increase telehealth access to 800,000 unserved / underserved households.
- Economic opportunities: Expanded job training opportunities through affordable online education and improved access to internet resources as well as access to remote work opportunities and e-commerce.
- Public safety: Will support connectivity needs of first responders and highway safety for Arizonans.
- Public agencies connectivity needs: The robust “middle-mile” network will address Arizona Department of Transportation (ADOT) and other public agencies’ connectivity needs, while preparing for future technology platforms (Connected and Automated Vehicles, modern Intelligent Transportation Systems, Artificial Intelligence, Virtual Reality, etc.).
- Environmental sustainability and quality of life: Open up opportunities for remote work and e-commerce reducing the need for travel, as well as promote cleaner and more efficient transportation options by enabling ITS infrastructure.

Stakeholder Consultation

ACA is working with the local governments, tribal nations, and private sector operators and service providers to address these unmet connectivity needs by strategically identifying public investment needs for the state of the art “middle-mile” network.

Consultation Process

This addition to the 2018 Strategic Plan was informed by a diverse group of subject matter experts, broadband infrastructure developers, local government representatives, and key stakeholders from across the State. Table 3 below presents a list of entities that participated in the stakeholder consultation process. A collaborative approach to developing the middle-mile strategic plan was guided by input and suggestions received regarding the program governance, identifying areas where public investment can help bridge current gaps in broadband coverage, attracting new private sector investment in the broadband infrastructure, and preparing the State for future technology platforms.

ACA conducted over 25 stakeholder consultation sessions with various public and private sector organizations to solicit their feedback and engage in vital discussions regarding the statewide middle-mile broadband program. These discussions provided valuable insights regarding the challenges and opportunities for developing robust broadband infrastructure and achieving the State’s broadband goals of fast, affordable, and reliable broadband service to all Arizonans.

Table 3 - Stakeholder Consultation Group

Stakeholder Consultation Group	
State & local government agencies including public safety	Broadband infrastructure developers
Universities & Arizona Department of Education (K-12 schools)	Broadband technology providers
Tribal stakeholders	Broadband operators
Economic Development Organizations	Internet Service Providers

Stakeholder Consultation Group

Telecommunications providers

Electric Co-operatives

Electric utility companies

Community anchor institutions

Source: ACA Stakeholder Consultation Process

Stakeholder Engagement

ACA's discussions with a diverse set of public and private sector stakeholders and tribal nations were focused on soliciting input on the ACA's statewide broadband strategy, potential barriers to serve unserved / underserved communities and ways to bridge digital divide, and input on potential middle-mile and last-mile networks partnerships.

Participants shared their views and suggestions on the following topics:

- **Middle-Mile Broadband Program Scope:** The current state of broadband infrastructure in their communities, future vision and strategies, desired capabilities, network performance and redundancy, and priorities for statewide broadband network development.
- **Existing Broadband Assets and Interface:** Existing broadband infrastructure and capacity to meet the State's goal of comprehensive coverage, address interface challenges between existing broadband assets and the planned investments to address coverage gaps.
- **Programmatic and Collaborative Approach for Statewide Coverage:** Key drivers that could impact the prioritization of public investment (i.e., technical specifications, performance regime, etc.) and long-term operational costs of the middle-mile broadband program.
- **Program Governance and Sustainability:** Potential strategies for enhancing broadband coverage in the State, roles of the partnering agencies and communities, collaboration with the private sector service providers, coordination of various funding sources, programmatic approach for broadband infrastructure development, and long-term sustainability of the broadband program.
- **Technical Considerations:** Review of technical specifications and performance requirements for the long-haul / middle-mile and last-mile networks, supporting policies (i.e., dig once, fiber swaps, cost share, resource allocation, etc.) and procedures.
- **Operational Considerations:** Review of broadband network(s) operational and maintenance requirements, role of neutral private sector operator(s) of the middle-mile network(s), etc.
- **Network Performance, Reliability and Security Considerations:** Critical areas for consideration relating to the network performance and potential security risks for the statewide broadband network.
- **Implementation Considerations:** Improving access, affordability and reliability of broadband connectivity, procurement and project delivery options, return on investment, operations and maintenance of the network, and how to effectively leverage public investment and attract private sector investment.

Critical Challenges and Needs to Be Addressed

The following three challenges should be addressed to ensure successful deployment of the Statewide Broadband Middle-Mile Program.

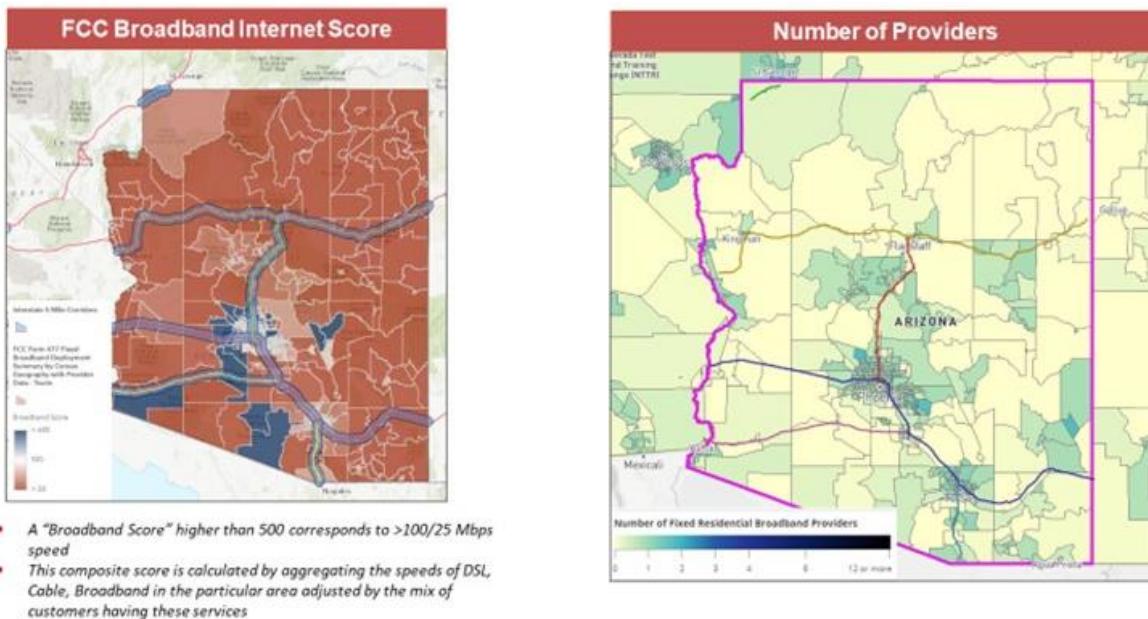
Coverage Gaps

The high number of unserved / underserved households in Arizona is a function of financial non-viability for private sector service providers to expand their networks / services to remote and less populated areas over a typical business planning cycle. This challenge is faced by almost every state in the nation. A combination of viability gap funding assistance to the local governments and partnerships with the internet service providers in the region could help address “last-mile” connectivity requirements of communities and tribal nations with low population density and dispersed population centers. The investment in the middle-mile network will establish point-of-presence (PoP) in all major population centers along the interstate highways and select state routes. This in turn will allow the local governments, electric co-operatives, and private sector service providers to provide affordable, reliable, and high-speed internet services to unserved / underserved communities.

Expand Middle-Mile Network

Presently, a number of Arizona's counties have inadequate internet speed and number of service providers to provide affordable, reliable, high-speed internet service.

Figure 7 - Average Internet Speed and Number of Service Providers



The reasons for this include lack of service provider(s), lack of competition among broadband providers, and lack of financial viability to expand existing network(s). To achieve the State's goal of high-speed (i.e., 100 Mbps download and 20 Mbps upload speeds or higher), additional investment in broadband infrastructure is required. The Statewide Middle-Mile Broadband Program seeks to address this deficiency in terms of lower internet speed and number of service providers by making strategic investment in middle-mile network(s) and attracting new investment



by the private sector service providers to expand the existing fiber optic network within interstate highways and select state routes throughout the State. Developing this critical middle-mile network across the State will help address a large portion of unserved and underserved households gain affordable, reliable and high-speed internet service in a cost effective and timely manner. Additionally, the planned investment in middle-mile network(s) will help existing service providers to expand their network(s) and new service providers to build new last-mile network(s) in an economically and operationally viable manner.

Implement an Integrated Approach

The Broadband Office within the ACA is responsible for the coordinating and development of statewide broadband infrastructure that provides fast, affordable, and reliable broadband service to every population center in Arizona. ACA recognizes that an integrated and collaborative approach by state agencies, local government and private sector service providers is required to achieve affordable and reliable broadband access within each Arizona community.

ACA is committed to work collaboratively with the partnering agencies (i.e., Arizona Department of Transportation (ADOT), Arizona Department of Education (ADE), Sun Corridor Network (SCN), Arizona Department of Administration (ADOA)) and other stakeholders to develop a comprehensive strategy to implement the middle-mile network along the interstate highways and select state routes. For the priority broadband investment projects, the Broadband Office will explore the most efficient and effective project delivery method(s) (i.e., public vs. private sector led development) and ensure that the private sector's interest to develop select corridors across the State are taken into consideration. For the long-term operations and maintenance of the broadband network, the Broadband Office will work with the partnering agencies and stakeholders to explore the feasibility of bundling various corridors and competitively procuring services of a neutral third party host on a long-term basis. ACA recognizes that the implementation of the middle-mile broadband program will require collaborations and shared responsibility with partnering agencies and stakeholders. Developing this addition to the 2018 Strategic Plan was a collective effort, just implementing the plan will require a team-based approach.

Role of the Arizona Broadband Office / ACA

The success of this plan depends on the successful governance of the statewide middle-mile broadband program by working collaboratively with local government, tribal governments, and internet service providers to effectively plan, administer, expand, and maintain broadband infrastructure. The Broadband Office will continue to serve in a central role to administer and implement the statewide middle-mile broadband program by performing the following functions:

Statewide Broadband Coordination:

- Lead the efforts to coordinate and facilitate the deployment of and access to affordable, reliable, high-speed broadband services in Arizona.
- Perform stakeholder engagement and coordination with public agencies, tribal nations, and private sector service providers to achieve statewide broadband objectives.
- Promote integrated broadband planning in the State through regular coordination and collaboration with the local governments and private sector entities.

- Maintain an inventory of broadband infrastructure assets to support planning, service coverage mapping, efficient use of resources, and reporting purposes.
- Enable public-private partnerships to increase the deployment and adoption of broadband services and applications across the State.

Policies and Implementation Plans:

- Develop and implement specific policies, procedures, strategies and plans to facilitate broadband infrastructure planning, deployment, and usage, which includes developing a strategy for each of the interstate highways and selected state routes as identified by the Statewide Broadband Middle-Mile Strategic Plan.
- Establish technical specifications and performance requirements for the statewide broadband objectives (i.e. middle-mile program and last-mile grants).
- Facilitate regulatory and policy changes towards meeting the statewide broadband objectives.

Financial Planning and Administration:

- Pursue funding from state, local, and federal governments and private sector for the planning, development, and operations and maintenance of the broadband network(s).
- Administer grant programs in support of broadband infrastructure development, innovation, and the digital inclusion related projects / initiatives.
- Evaluate the economic return on investment of any recommended public expenditures associated with the Statewide Middle-Mile Broadband Program.

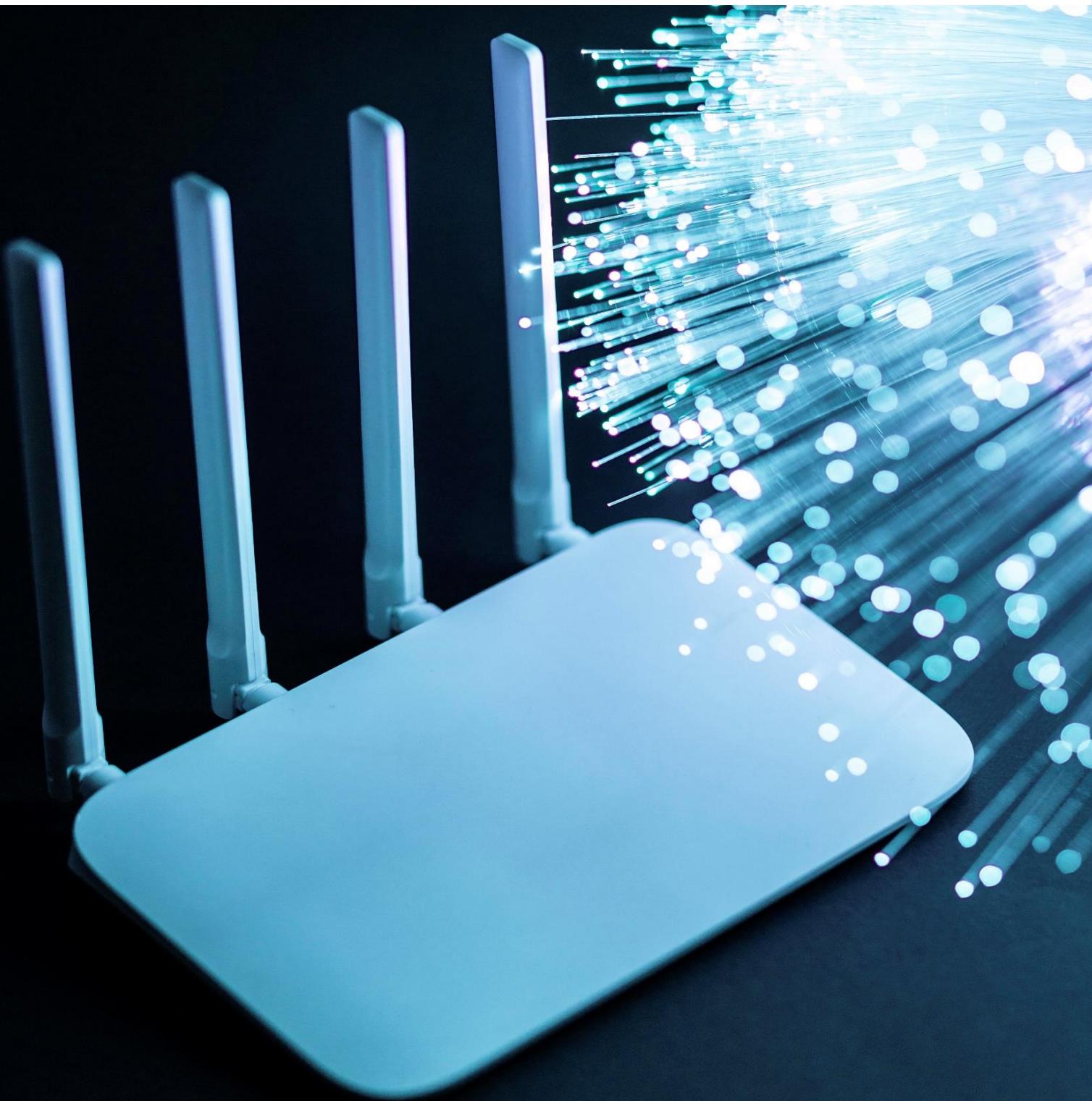
Network Operations:

- Maximize usage of the state owned fiber, conduit within the state owned middle-mile networks for the efficient allocation of network resources (fiber strands / bandwidth, conduits, etc.) to public agencies and private sector entities.
- Work with other state agencies to ensure optimal network performance and security for State owned fiber and conduit within the state owned middle-mile networks.
- Conduct quarterly performance reviews with private sector broadband carriers utilizing state owned conduit, rights of way and other State of Arizona assets.
- In partnership with ADOT oversight of a neutral private sector operators managing State of Arizona middle-mile network assets.

Roles of Partnering Agencies

The Broadband Office has a long and successful history of working closely with ADOT, ADE, SCN, and ADOA to coordinate various broadband related projects and initiatives. Going forward, the Broadband Office expects closer coordination with these public agencies and other stakeholders for successful development of broadband networks within priority corridors. A large majority of public agencies' connectivity requirements fall in three categories: (1) transportation related connectivity needs; (2) education related connectivity needs; and (3) other public agencies' (i.e., telehealth, public safety, economic development, etc.) connectivity needs. Partner agencies will play a critical role in the program governance and serving as a resource to the

Broadband Office for defining technical specifications and performance requirements, prioritization of public investments, and collaborating with the private sector service providers.



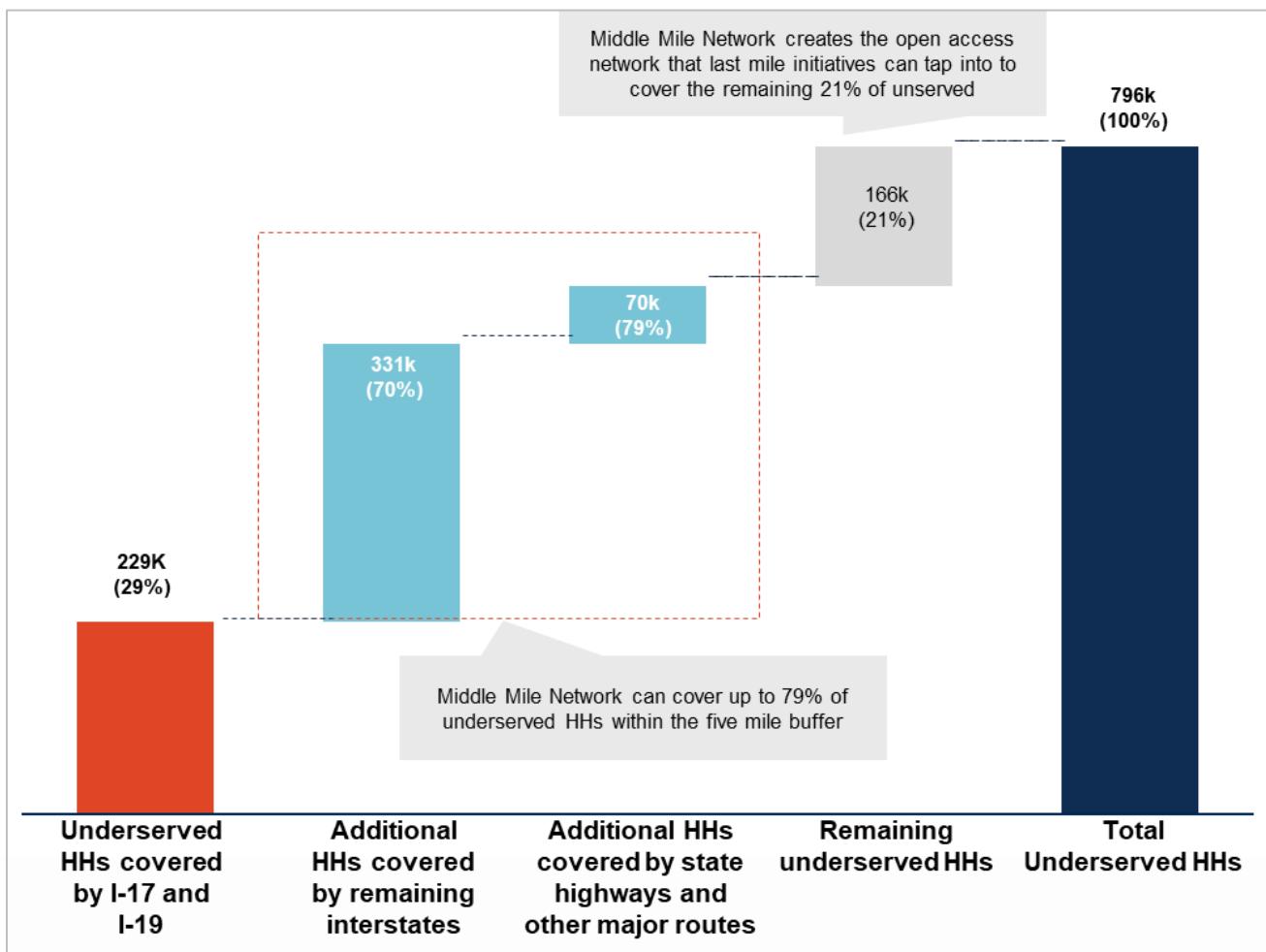
Public Investment in Middle-Mile Network and Prioritization



Why Invest in Middle-Mile?

The State requires a strategy to prioritize public investment based on broadband coverage gaps. Which middle-mile corridors to invest in first should be determined based on the State's prioritization framework and the corresponding evaluation criteria. This is especially true in rural areas and tribal regions of Arizona where access to middle-mile infrastructure is limited.

Figure 8 - Importance of Middle-Mile Network



Source: ACA Analysis

Strategic public investment in the development and/or expansion of middle-mile network infrastructure (i.e. state owned fiber network(s) for state purposes and excess conduit(s) for private sector utilization) to address gaps in broadband coverage can provide a multifold impact in improving broadband accessibility, affordability, and reliability, and attracting new private sector investment that would otherwise not be financially and operationally viable.

- For the currently unserved / underserved areas, the middle-mile network investment will provide a catalyst for private investment by reducing overall capital expenditures to connect the last-mile network by leveraging new interconnection points. One direct benefit of public investment in middle-mile network(s) is that it will help improve overall return on private investment and attract new entrants to serve the unserved / underserved communities.
- For unserved / underserved areas, the middle-mile network will help existing last-mile service providers expand their residential and commercial customer base by improving geographic reach of their networks, while enhancing affordability, reliability, and accessibility of high-speed internet service. The public investment in middle-mile network(s) will also help to lower costs for community anchor institutions for network access.

In addition, the middle-mile investment will provide the opportunity to prepare Arizona for continued economic development by:

1. **Future Proofing Arizona's Broadband Infrastructure:** The public investment will help develop a high-performance, secured, and reliable middle-mile network that will support connectivity needs for ADOT, including intelligent transportation systems, and enable adoption of modern technologies such as connected and autonomous vehicles, smart highways, and public safety initiatives.
 - a. Support the on-going initiatives by the Sun Corridor Network (SCN) to develop robust statewide connectivity infrastructure for education purpose (schools, libraries, colleges, universities, etc.).
 - b. Reduce reliance on leased lines by public agencies (ADOT, Department of Education, Public Safety, etc.) and help accommodate private sector connectivity requirements in a cost-effective manner (i.e., build once).
2. **State of the Art Backbone for Arizona:** The middle-mile network will serve the connectivity needs of other state and local public agencies to support distance education, telehealth, public safety, and promote economic development.
 - a. Support future technological innovations, including connected and automated vehicle technology and benefits to the freight and commercial vehicle industry (i.e., freight platooning).
 - b. Help improve Arizona's business competitiveness through e-commerce participation.
 - c. Support network redundancy and improved service levels to meet Arizona's goal of 100 Mbps download and 25 Mbps upload capabilities.
3. **Support Connectivity and Economic Development:** The middle-mile network will have a multiplier effect on middle-mile and last-mile connectivity by providing access to the robust backbone, improving the financial and operational viability for last-mile service providers, including non-profit entities, electric co-operatives and local internet service providers. This multiplier effect will help reduce the digital divide and expand affordable and reliable broadband service to communities.

To achieve these benefits of the middle-mile network, an effective strategy for public investment should address the following:

- Support creation of an open access network with sufficient capacity to serve public and private sector needs.
- Establish multiple interconnection points for all new middle-mile network deployment that supports non-discriminatory access to last-mile service providers and local governments.
- Leverage public investment in the middle-mile network – i.e., coordinate all planned investments with the last-mile programs including E-Rate Universal Service Program for Schools and Libraries, local government and private sector entities, and ACA's broadband grant program(s).

Where to Invest in Middle-Mile? – Interstates and State Routes

A large majority of the unserved / underserved households reside within a five-mile radius of Arizona's interstate highways and major state routes. As shown in Figure 8, strategic public investment in the middle-mile networks along interstate highways and select state routes could help address the broadband coverage gap in an economical and efficient manner.

Strategic public investment in the middle-mile network will help achieve comprehensive broadband coverage, promote economic growth and development, and increase competition across Arizona while promoting telehealth, distance learning, technological innovation, public safety, and network resilience. By leveraging existing broadband infrastructure and encouraging public and private sector investment, Arizona will be able to facilitate the development of broadband networks across the State that supports internet accessibility, affordability, and reliability.

The State is in the process of developing a robust middle-mile network (Interstate 17 and Interstate 19). ACA's approach recognizes and aligns with these existing efforts, and is focused on the “build once” approach to meet both the public and private sector connectivity needs for the next several decades to ensure that the planned public investment will yield adequate return on investment and the middle-mile network(s) will be financially and operationally viable.

Based on the analysis conducted and discussed below, strategic public investment in the middle-mile networks combined with collaborative approach to facilitate private sector investment will help the State to achieve its goal of comprehensive coverage and help improve overall affordability, accessibility, and reliability and complement last-mile programs, including ACA grants and E-Rate program.

Interstate Network

Major population centers near Interstate Highways in Arizona

Leveraging Arizona's interstate highways and state routes could address approximately 80 percent of unserved and underserved households. The Arizona interstate highway system with total mileage of 1,165 miles can address approximately 560,000 unserved and underserved households, while the state routes with total mileage of 2,488 miles can address approximately 340,000 unserved and underserved households⁴. There is some overlap in terms of the number

⁴ There is some degree of overlap between the interstate highways and state routes in terms of number of unserved / underserved households covered within a five-mile radius.

of unserved and underserved households covered between the interstate highways and state routes.

Population centers near interstate routes in Arizona⁵

Tables 4A and 4B below highlights population centers along Arizona's interstate highways. Population centers around Phoenix and Tucson metropolitan areas have not been included due to these metropolitan areas having a suitable presence of existing broadband middle-mile service providers. These areas should focus on initiatives addressing last-mile infrastructure and customer adoption.

Table 4A – Unserved / Underserved Households by Interstate Highways

County	Unserved / Underserved Households				
	I-10	I-17	I-19	I-40	I-8
Apache	-	-	-	1,013	-
Cochise	3,603	-	-	-	-
Coconino	-	6,008	-	9,081	-
Gila	-	-	-	-	-
Graham	-	-	-	-	-
Greenlee	-	-	-	-	-
La Paz	2,881	-	-	-	-
Maricopa*	101,000	108,367	-	-	470
Mohave	-	-	-	7,474	-
Navajo	-	-	-	2,326	-
Pima*	43,286	-	22,688	-	-
Pinal	14,867	-	-	-	9,584
Santa Cruz	-	-	6,468	-	-
Yavapai	-	4,774	-	590	-
Yuma	-	-	-	-	22,672

Source: ACA Research and Analysis

*Note: Number of unserved / underserved households that are residing within a five-mile radius of an interstate are presented above. Additionally, these figures exclude the Phoenix and Tucson metropolitan areas in Maricopa and Pima counties. Each interstate highway was analyzed separately; as such, there is some overlap in terms of the number of unserved and underserved households covered between the interstate highways.

Table 4B - Population Centers along Interstate Highways

City / Town	Interstates				
	I-10	I-17	I-19	I-40	I-8
Benson City	x				
Camp Verde Town		x			

⁵ Interstate 15: The highway enters the state in Mohave County (population as of 2019 - 212,1815) Northeast of Mesquite and Las Vegas, Nevada, paralleling the old US 91 heading northeast on an alignment north of the Virgin River Gorge. I-15 parallels the Virgin River for its entire length in Arizona and is located in the far Northwest region of the State. The nearest town to Interstate 15 is Littlefield (population as of 2019 - 394)

City / Town	Interstates				
	I-10	I-17	I-19	I-40	I-8
Casa Grande City	x				x
Eloy City	x				
Flagstaff City		x		x	
Gila Bend Town					x
Holbrook City				x	
Kingman City				x	
Marana Town	x				
Nogales City			x		
Quartzsite Town	x				
Sahuarita Town			x		
South Tucson City	x				
Wellton Town					x
Willcox City	x				
Williams City				x	
Winslow City				x	
Yuma City					x

Source: ACA Research and Analysis

As shown above, Arizona's interstate network passes through population centers and would serve as the routes to achieve broadband coverage in an efficient and effective manner. In addition, the interstate network serves as a catalyst for supporting additional investment in the middle-mile and last-mile networks by local governments and private sector service providers.

Additionally, ACA and the State can leverage its investment in the interstate network to drive additional revenue by sharing a portion of the network's installed capacity with the private sector entities, which could make the network financially sustainable over a long period of time.

State Routes

Arizona state routes present an opportunity to extend existing and develop new middle-mile network(s) to address unserved and underserved households. The public investment in state routes will complement investment in the interstate network. Collectively, state routes will help address approximately 9 percent of Arizona's unserved and underserved households and support additional investment by local governments and private sector services providers in the last-mile networks.

Major population centers near state routes in Arizona

Local governments, SCN, tribal nations, and private sector entities are expanding their existing middle-mile networks by leveraging various funding programs to address connectivity requirements of the region. State routes offer the opportunity to complement the interstate network.

The Table below highlights the population centers along Arizona's key state routes.

Table 5 - Population Centers along select State Routes

County	Key State Routes				
	US-89	US-60	US-191	US-93	US-95
Apache Junction City		x			
Bullhead City					x
Clifton Town			x		
Eagar Town			x		
Flagstaff City	x				
Globe City		x			
Kingman City				x	
Lake Havasu City					x
Page City	x				
Parker					x
Quartzsite					x
Safford City			x		
Show Low City		x			
Springer Ville Town		x	x		
St. Johns City			x		
Superior Town	x				
Wickenburg Town		x			x
Willcox City			x		

Source: ACA Research and Analysis

As shown in the table above, Arizona's state routes pass through population centers and the middle-mile network would help Arizona to achieve broadband coverage goals in an efficient and effective manner. In addition, public investment in the state routes will serve as a catalyst for supporting additional investment in the middle-mile and last-mile networks by local governments and private sector service providers.

Prioritization Framework - Evaluation Framework and Results

Evaluation Framework

Based on discussions held with ACA, ADOT, SCN, ADE, tribal nations and broad stakeholder consultations with the public and private sectors, an evaluation and scoring framework was developed to help the State of Arizona prioritize middle-mile network investment to maximize impact of public investment and deployment of broadband funding.

Table 6 - Evaluation Criteria for Prioritization of Public Investment

#	Evaluation Criteria	Maximum Score	Definition
1	Unserved/Underserved Households Covered per \$ Public Investment	40 points	<ul style="list-style-type: none"> — Measures effectiveness of public investment to address unserved / underserved households in the State — Evaluates number of unserved / underserved households covered per mile of highway / route / corridor — Evaluates estimated public investment requirements for each corridor
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households (see Figure Below)	30 points	<ul style="list-style-type: none"> — Evaluates existing fiber presence by major service providers — Measures lack of fiber presence and/or excess of capacity to serve the current market — Examines current speed score based on ACA's goal of 100 Mbps / 25 Mbps — Reviews number of service providers present in each census block / county to serve the connectivity requirements
3	Population Centers Covered / Points of Presence Addressed	15 points	<ul style="list-style-type: none"> — Measures number of population centers that could be covered by the public investment — Examines development of points of presence that could be addressed by public investment
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	15 points	<ul style="list-style-type: none"> — Examines the extent to which the corridor is a priority for public sector agencies and/or Tribal Nations to address their connectivity needs — Reviews planned investment by local governments in the corridor
TOTAL		100 points	

Source: ACA Evaluation Framework

ACA reviewed existing broadband infrastructure, capacity, geographic location where existing fiber is located, and demand for broadband connectivity to assess the broadband coverage gap in the State. The discussion below explains the approach for measuring the broadband gaps and assessing broadband accessibility, performance (i.e., network speed) and number of service providers to evaluate prioritization of public investment.

Interstate Network Evaluation and Results

The review of interstate middle-mile network focused helping each corridor address unserved and underserved households, the level of existing fiber presence along the corridor, number of population centers covered as part of each corridor, as well as the level of interest from local

governments, tribal nations, and/or public agencies to develop the corridor to address their connectivity needs.

Appendix B provides detailed information about how the evaluation framework was applied to each interstate highway to evaluate:

- Number of unserved and underserved households within a five-mile radius of the corridor (for the purpose of prioritization of public investment, Phoenix and Tucson metropolitan areas were excluded as they have suitable existing middle-mile broadband coverage)
- The level of existing fiber presence along the corridor and the existing fiber presence that can be leveraged to address connectivity requirements of the communities and businesses located along the corridor
- The level of service in terms of average internet speed reported in FCC's Form 477 data for residential customers
- Number of service providers present in the county and the percent of the population covered by existing service providers
- Input received from the stakeholder consultation and market participants regarding the need for additional investment by the public and private sector entities to achieve the State's goal of comprehensive coverage and internet speed of 100 Mbps download and 20 Mbps upload



Key observations from the analysis are presented below:

Figure 9 - Summary of Evaluation of Interstate Highways

Interstates 17 and 19

Interstates 17 and 19 are both under development as part of the Smart Highways Initiative. Together, these two corridors will help address approximately 30 percent of the state's total unserved / underserved households. Due to moderate to high population density along these two corridors, the estimated return on public investment is high

Interstate 40

Interstate 40 has shown significant interest from the private sector entities to develop this corridor with private sector investment. The corridor presents good opportunity for long-haul traffic and thus, could be financially and operationally viable. Considering that the private sector interest is mostly focused on developing the eastern section of the corridor (Flagstaff and east), the state could explore the feasibility of developing this corridor in two separate phases – i.e., Flagstaff and west and Flagstaff and east sections.

Interstate 10

Interstate 10 reaches across sixteen (16) population centers with approximately 800,000 households residing within a 5-mile radius. ADOT and Sun Corridor Network identified I-10 as a priority corridor and have expressed strong desire to develop this corridor to meet their operational needs. Navajo nation has received inquiries from the private sector to develop this corridor

Interstate 8

Interstate 8 has a low population density and lower number of unserved / underserved households as compared to other interstate highways; however, the stakeholder consultations indicated that there is a moderate interest by the private sector entities to develop this corridor

Source: ACA Analysis and Prioritization of Public Investment

The table below presents how each interstate highway scored against the evaluation criteria. For example, interstate highway corridors that have a higher number of unserved / underserved households within a five-mile radius of the corridor scored higher. Similarly, interstate corridors that have limited to no existing fiber presence, have lower speed (i.e., less than 25 / 3 Mbps), and/or have only one or no service provider, scored higher. Interstate corridors that have a higher number of population centers (i.e., cities / towns) were ranked higher.

Table 7 - Scoring of Interstate Highways

#	Evaluation Criteria	I-40 West	I-40 East	I-17	I-19	I-10	I-8
1	Unserved/Underserved Households Covered per \$ Public Investment	3	2	40	23	21	9
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	27	30	20	20	15	20
3	Population Centers Covered / Points of Presence Addressed	8	4	5	6	10	5
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	13	14	13	13	10	7
TOTAL		51 points	50 points	78 points	62 points	56 points	41 points

Source: ACA Analysis

State Routes Evaluation and Results

The review of state routes focused on how each corridor addresses unserved / underserved households, the level of existing fiber presence along the corridor, number of population centers covered as part of each corridor, and the level of interest from local governments, tribal nations, and/or public agencies to develop the corridor to address their connectivity needs.

Appendix C provides detailed information about how the evaluation framework was applied to select state routes for prioritization evaluation purposes.

Key observations from the analysis are presented below:



Figure 10 - Summary of Evaluation of select State Routes

State Route 69

State Route 69 has moderate to high population density. Public agencies and local government are interested in developing this short corridor as it provides maximum impact in terms of # of underserved households covered per public investment dollar

US Route 60

US Route 60 has the highest level of unserved / underserved households covered per public investment dollar . Public sector agencies and Tribal Nations are interested in developing a segment from Phoenix to New Mexico Stateline. This corridor could potentially compliment interstate I-40 – i.e., Phoenix to Show Low City and from the US-77 to I-40

State Route 95

State Route 95 has high levels of unserved / underserved households covered per public investment dollar. Corridor serves as an important north south thoroughfare for residents in the cities and towns of that area – public sector agencies are interested in developing this corridor as will create a loop between I-8, I-10, & I-40, and the corridor has a large # of unserved households

State Route 89

State Route 89 has a very low population density; however, public sector agencies and Tribal Nations are interested to develop a segment from Flagstaff to Utah border as this is a high value segment, particularly for Navajo Nation and Coconino county

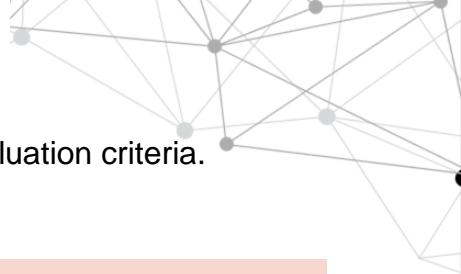
State Route 191

State Route 191 has a very low population density. Public Sector agencies and Tribal Nations are interested to develop a segment from Mexico border to Sanders or Red Mesa to develop fiber loop capabilities to the other existing fiber builds. This corridor will help connect a number of unconnected communities, and it will be difficult to get a commercial interest to build it alone.

State Route 93

State Route 93 has a very low population density. Stakeholder consultation indicated that that the segment from Wickenburg to Kingman has the most interest for connectivity. Additionally, Kingman to Nevada segment has an interest from public agencies in terms of adding value to an I-40 corridor as a pathway to Las Vegas data center market

Source: ACA Analysis and Prioritization of Public Investment



The Table below presents how select state routes scored against the evaluation criteria.

Table 8 - Scoring of State Routes

#	Evaluation Criteria	SR-69	US-60	SR-95	SR-89	US-191	SR-93
1	Unserved/Underserved Households Covered per \$ Public Investment	20	30	15	4	2	2
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	30	10	25	30	25	25
3	Population Centers Covered / Points of Presence Addressed	5	12	8	5	10	8
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	15	12	12	12	12	10
TOTAL		70 points	64 points	60 points	51 points	49 points	45 points

Source: ACA Analysis



Key Recommendations



Since 2018, the ACA has taken steps to develop and strengthen broadband infrastructure in the State, recognizing the importance of reliable and affordable high-speed internet access to all Arizonans.

In this section, three recommendations are presented to achieve the State's goal of providing fast, affordable, and reliable broadband service to all Arizonans. Implementing these recommendations will allow the State to bridge the digital divide and provide affordable and reliable access to broadband services to approximately 800,000 households in Arizona that have either no internet connection or are underserved in terms of access to a wired connection capable of 25 / 3 Mbps. Additionally, implementing the middle-mile broadband network(s) in the proposed corridors will allow residents and consumers more choices in terms of number of providers as more than 850,000 households have access to only one service provider.

This addition to the 2018 Strategic Plan is guided by the state's connectivity goals in terms of accessibility, affordability, and performance, which play critical roles in ensuring the success of broadband initiatives. A comprehensive analysis of the current state and path forward resulted in three primary recommendations. These recommendations are intended to serve as a roadmap for ensuring that Arizonans are afforded equal access to digital opportunities regardless of geographic location and develop the middle-mile broadband infrastructure to achieve the goal of 100 Mbps download and 20 Mbps upload across the State.

Table 9 – Summary of Recommendations

#	Recommendations
1	Implementation of Priority Interstate Corridors
2	Implementation of Selected State Routes
3	Implement Middle-Mile Program Governance

Source: ACA Analysis

These strategic recommendations are based on comprehensive analysis of thousands of data points and valuable input received from public and private stakeholders. Collectively, these recommendations provide the foundation for the Statewide Middle-Mile Broadband Program, set the direction for the Arizona Broadband Office, and represent a key focus area for broadband across Arizona over the coming years. These strategic recommendations offer ways for the State together with community leaders to foster an ecosystem that supports the expansion of middle-mile broadband access and increased adoption in an efficient and effective manner.

Recommendations

Table 10 - Recommendations

Implement Priority Interstate Corridors

- Commercial Due Diligence
- Market Outreach and Stakeholder Consultation
- Implementation Options Assessment
- State led corridors and Private Sector and Non-Partnering Agency Initiated Corridor(s)

Implement Select State Routes / Segments

- Commercial Due Diligence
- Market Outreach and Stakeholder Consultation
- Implementation Options Assessment

Implement Middle-Mile Program Governance

- Establish Governance Structure for the Broadband Office
- Expand the Role of the Broadband Office
- Establish Roles for the Partnering Agencies
- Integration with Last-Mile Program

Source: ACA Analysis

Recommendation # 1: Implement Priority Interstate Corridors

1 Implement Priority Interstate Corridors

The analysis of unserved and underserved households in Arizona indicated that approximately 70 percent (approximately 560,000 households) of the unserved and underserved households are residing within a five-mile radius of the interstate network.

The State is in the process of developing robust broadband networks along I-17 and I-19 to address connectivity requirements for the communities along these routes. These projects are designed to address public and private sector connectivity requirements through a “build once” approach.

Based on the analysis conducted and the State’s public investment prioritization framework, I-40 (analyzed in two segments: I-40 West and I-40 East) and I-10 are two corridors that are identified as priority corridors for broadband network development. I-40 corridor presents good opportunity for long-haul traffic, and I-10 corridor has approximately 640,000 households residing within a five-mile radius. I-8 and I-15 are ranked lower as compared to other interstate highways; however, the ACA and its partnering agencies will continue to explore financial and operational viability of developing these corridors by working collaboratively with the private sector partners.

The ACA, working closely with partnering agencies, is planning to perform additional due diligence to prepare the project scope, funding strategy and procurement approach for the priority interstate corridors.

The ACA will ensure that the development of broadband networks along the interstate highways will follow these key principles:

An open access network that addresses public and private sector connectivity requirements

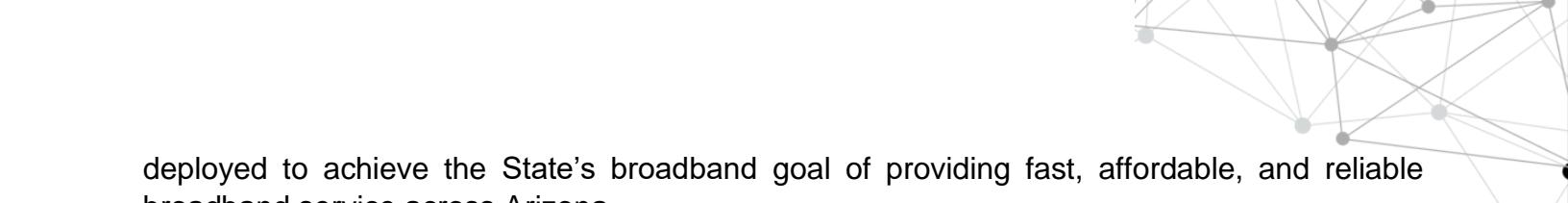
Supports shared use of right-of-way, and creates points of presence to all population centers along the interstate highways

Creates a multiplier effect rather than crowd out private sector investment in the broadband infrastructure

Improves overall accessibility, affordability, and reliability of broadband service across the state

Works complimentary with last-mile programs including grant programs and E-Rate program

The discussion below summarizes additional due diligence the ACA is planning to conduct to validate prioritization of interstate highways to ensure that public investment is effectively



deployed to achieve the State's broadband goal of providing fast, affordable, and reliable broadband service across Arizona.

Recommendation Overview

Commercial Due Diligence:

- Detailed assessment of commercial and residential landscape including key broadband players, customers, service providers in the markets along interstate corridors

Market Outreach and Stakeholder Consultation:

- Targeted outreach to those private sector entities with fiber presence in the corridor
- Assess available excess capacity if available
- Commercial investment plans on the specific corridor

Implementation Options Assessment:

- Detailed assessment of private sector-led and policy-led investment approaches

For the implementation purposes, the ACA is planning to explore two distinct approaches to ensure that public investment in the broadband infrastructure does not crowd out the private sector investment.

State Led Corridors:

- ADOT should lead the procurement process for all interstate corridors development (similar to I-17 and I-19 projects);
- Administer a non-discriminatory open access network to encourage private sector participation;
- Establish points of presence at major population centers along the corridor to incentivize last-mile network development;
- Sun Corridor Network should aggregate governmental needs for education, including K thru 12;
- Arizona Department of Administration should aggregate governmental needs for public safety, telehealth, economic development, and other connectivity needs, except for ADOT;
- Network operations, maintenance, and commercialization services to be performed by a neutral third party host;
- Integrate diverse funding and financing sources for the development of the planned corridors;
- Explore opportunities for a private sector operator to co-invest in the network; and

- Ensure long-term financial and operational sustainability of the planned middle-mile network(s) from capital costs invested and operating / maintenance costs requirements perspectives.

Private Sector and Non-Partnering Agency Initiated Corridor(s)

- Actively solicit proposals from the private sector and non-partnering entities (i.e., local governments, electric co-ops, etc.) for the planned state routes segments / corridors;
- Establish a clear pathway for unsolicited proposals from the private sector for broadband infrastructure development;
- Private sector / non-partnering entity to own, operate, and maintain the middle-mile network(s) as well as provide excess capacity for public use;
- Facilitate access to right-of-way requirements working with ADOT and Tribal nations;
- Encourage a non-discriminatory open access network available to all public and private sector participation;
- ADOT, Sun Corridor Network, and ADOA should assess public use requirements of the planned corridors / middle-mile network(s); and
- Allocate state funding / grants based on public use served and coverage metrics from unserved and underserved households.

The discussion below, outlines specific steps that the ACA is planning to take for the implementation of the interstate priority corridors (I-10, I-40 West, and I-40 East).

Approach to I-40 West Development

- “State Led Corridor” approach: Preliminary analysis indicated that the I-40 West corridor is a potential candidate for the “State Led Corridor” approach as this corridor has scored higher under established evaluation criteria for public investment;
- Evaluate I-40 West corridor (from Flagstaff to West Stateline) for the project development timeline and delivery method;
- Preliminary analysis indicated that ADOT and Sun Corridor Network are interested in developing this corridor to address their operational needs;
- Evaluate the feasibility of developing this corridor to address connectivity requirements of populations centers located along the corridor;
- Analyze commercial / long-haul traffic demand of this corridor as any excess capacity to serve the private sector requirements can make the project operationally and financially viable over long-term; and
- Allocate state funding / grants, if applicable, to partnering agencies based on public connectivity requirements served and other evaluation criteria for public investment.

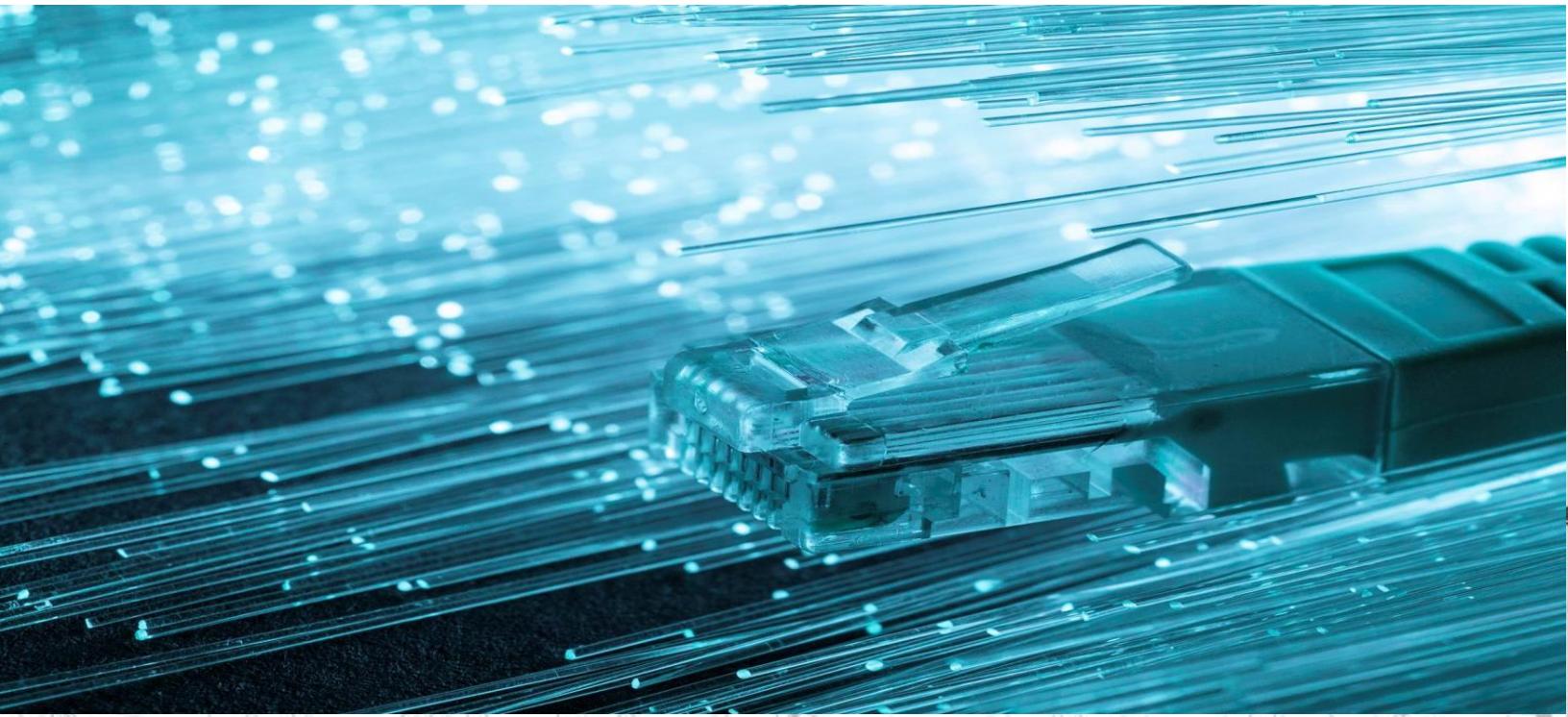
Approach to I-40 East Development

- Evaluate I-40 East corridor (from Flagstaff to East Stateline) for the project delivery method;

- Preliminary analysis indicates that the Navajo Nation (Navajo Fiber Optic Project Initiative and a recipient of ARPA funds) has an interest to develop this corridor;
- The commercial / long-haul traffic demand is primarily focused on the eastern section of the corridor (Flagstaff and East to Stateline) and this section does not have any existing fiber presence;
- ADOT and Sun Corridor Network should assess public use requirements for the I-40 East corridor;
- Evaluate agreement with Navajo Nation for bandwidth allocation / grant easements / collaborative approach for network development / address ADOT and Sun Corridor Network objectives;
- Evaluate the development timeline and funding commitment(s) from private sector partner(s) for I-40 East development; and
- Allocate state funding / grants, if applicable, to the partnering agencies / private sector partner(s) based on public connectivity requirements served and other evaluation criteria for public investment.

Approach to I-10 Development

- “State Led Corridor” approach: Preliminary analysis indicates that the I-10 corridor is a potential candidate for the “State Led Corridor” approach as this corridor has scored higher under established evaluation criteria for public investment;
- Coordinate with partnering agencies (ADOT, Sun Corridors/ADE) and other relevant stakeholders to assess public sector connectivity requirements for this corridor;
- Perform market sounding with broadband operators and telecom players along the I-10 corridor to assess excess capacity available for public use on an open access basis; and
- Structure a phased procurement approach to potentially reduce public investment requirements.



Recommendation # 2: Implement Select State Routes / Segments

2 Implement Select State Routes / Segments

The analysis of unserved and underserved households in Arizona indicated that state route networks can work complimentary with interstate and last-mile networks. Approximately 9 percent (approximately 70,000 households) of the unserved and underserved households are residing within a five-mile radius of the select state routes.

Based on the analysis conducted and the state's public investment prioritization framework, state routes US-60, SR-69, SR-95 have scored higher as compared to other state routes analyzed (i.e., SR-89, SR-93, US-191). The ACA acknowledges that in addition to the select interstate routes evaluated as part of this addition to the 2018 Strategic Plan, there are additional state routes / segments that could be of interest from the statewide middle-mile broadband network development perspective. The ACA and its partnering agencies will explore the financial and operational viability of developing select state routes / segments by working collaboratively with local governments and private sector partners.

The ACA will ensure that the development of broadband network along the state highways that such network(s) follow these key principles:

Are open access networks that addresses public and private sector connectivity requirements

Support shared use of right-of-way, and creates points of presence to all population centers along the state highways

Creates a multiplier effect so as not crowd out private sector investment in the broadband infrastructure

Improves overall accessibility, affordability, and reliability of broadband service across the state

Works complimentary to last-mile programs including grant programs and E-Rate program

The discussion below summarizes additional due diligence the ACA is planning to conduct to validate prioritization of state routes to ensure that public investment is effectively deployed.

Recommendation Overview

Commercial Due Diligence:

- Detailed assessment of commercial and residential landscape including key broadband players, customers, and service providers in the markets along state routes

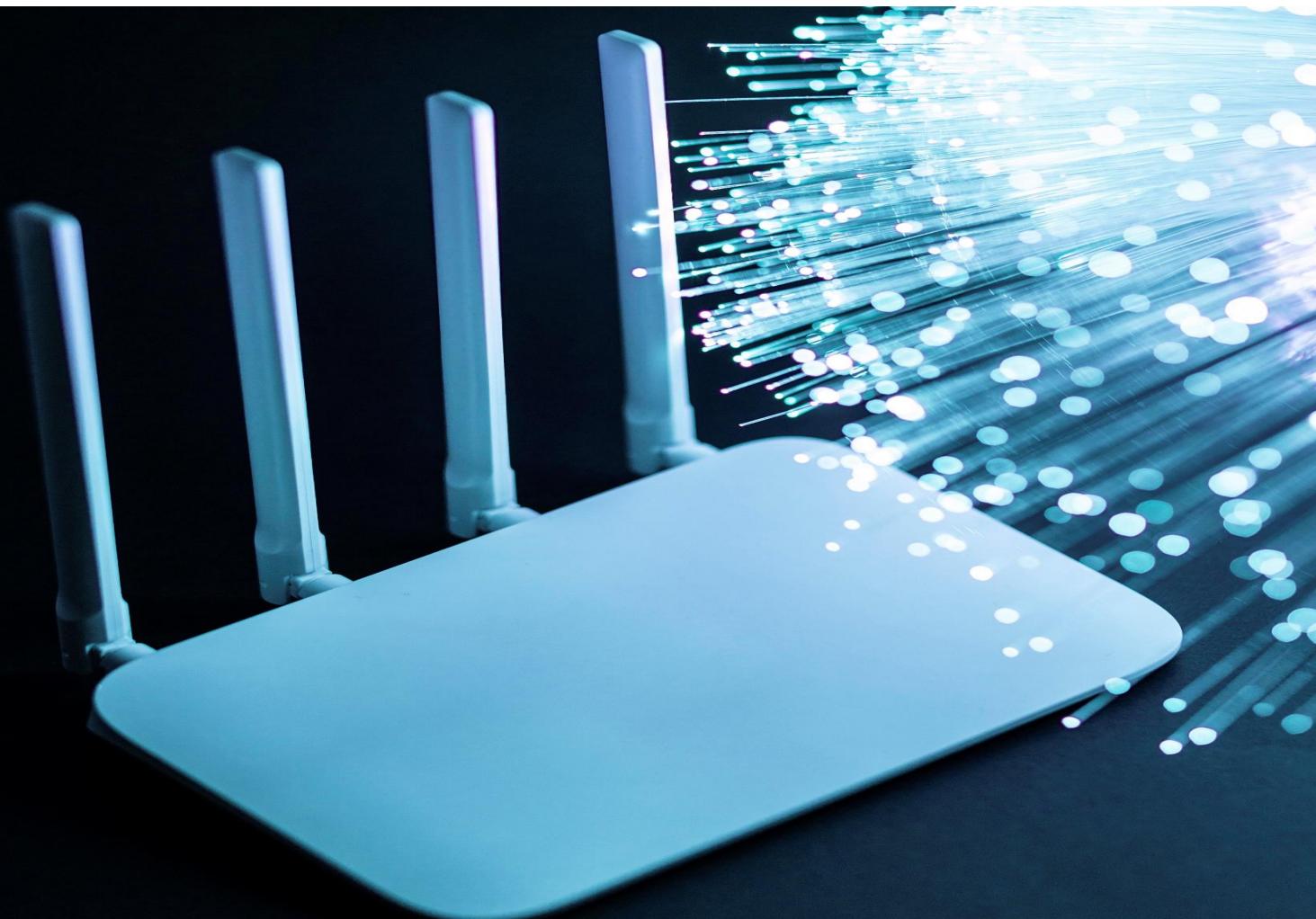
Market Outreach and Stakeholder Consultation:

- Find potential ways to bridge the broadband coverage gaps
 - Continue to engage with local governments, electric co-ops, and private sector partners that are interested in developing state routes to address network development, network redundancy, and expand existing network(s)
-

Implementation Options Assessment:

- Detailed assessment of private sector-led and policy-led investment approaches for state route development

This approach for the development of select state routes / segments will allow local governments and/or private sector partners to identify select routes and segments for development in coordination with the ACA as a provider of state funding and grant assistance to make these projects financially and operationally viable



Recommendation # 3: Implement Middle-Mile Program Governance

3 Implement Program Governance

Since 2018, the ACA has taken a number of actions to reduce potential barriers to broadband development in the state, expand broadband coverage in communities and tribal nations, and coordinate local, state, and federal funding efforts to promote fast, affordable, and reliable internet service across the State.

This recommendation is intended to establish a governance structure for the broadband office, expand the role of the broadband office, and establish roles for the partnering agencies (i.e., ADOT, SCN / ADE, ADOA, etc.). Implementation of this recommendation will help the ACA and the State to expedite the development of broadband infrastructure in an efficient and effective manner with greater buy-in from key stakeholders. Additionally, the ACA will support local governments and private sector partners in working collaboratively with the broadband office for the planning, development, and operation of the broadband network.

Establish Governance Structure for the Broadband Office

Establish an Interagency Coordination Council that includes representatives from ADOT, ADE / SCN, ADOA, and other State of Arizona Agency stakeholders. The council should be responsible for:

- Advising the Broadband Office on key decisions and strategies including public investments and prioritization; and
- Providing advise on the broadband program's implementation activities and strategies.

The purpose of the council is to advice on priorities, facilitate coordination with local governments and private sector partners, and obtain early buy in for broadband infrastructure and public investment related decisions and strategies.

Establish and scale the Management Team to address program buildout. The team would:

- Be responsible for day-to-day operations in implementing broadband strategies and policies; and
- Acquire the required personnel and resources to administer roles of the broadband office and the plan for broadband deployment and expansion.

Expand the Role of the Broadband Office

The ACA and its Arizona Broadband Office are critical to the success of broadband expansion statewide. The broadband office serves a central role to administer and implement the strategic plan and business model. As part of its existing mandate, the ACA will formalize its role to perform the following functions:

Act as a Single Point of Contact for the Statewide Broadband Coordination

- Management and administrative functions of the broadband program
- Inventory and mapping of broadband infrastructure
- Knowledge base on policy, regulation and legislation regarding broadband

Stakeholder Consultation and Coordination

- Collaborate with tribal nations for broadband infrastructure development
- Coordinate with partnering agencies and private sector service providers
- Resource to local communities and private sector service providers
- Coordinate deployment of broadband infrastructure (public and/or private sector-initiated projects)

Plan and Implement Public Investment in Broadband Infrastructure

- Assess and prioritize public investments
- Administer state and federal grant programs
- Establish evaluation criteria for public investment / grant programs
- Training to public sector stakeholders

Advise State leaders on policies and procedures to expedite broadband deployment and adoption

- Right-of-Way policy
- Fiber swap / resource sharing policies
- Cost share procedure
- Technical requirements for broadband network(s)
- Performance requirements / service levels for broadband network(s)
- Standard contract agreements

Establish Roles for the Partnering Agencies

In Arizona, establishing formal partnerships between key agencies and clearly defining their roles and responsibilities (i.e., network development and operations, funding contributions, etc.) is critical for the broadband infrastructure plan's success. The examples of key roles to be played by ADOT, Arizona Department of Administration, Arizona Department of Education / Sun Corridor Network and other key stakeholders in working collaboratively with the ACA are summarized below.

Arizona Department of Transportation Roles:

- Anchor tenant and asset owner, as required, for the state initiated broadband infrastructure developed on state's right-of-way (ROW);
- Coordinate transportation connectivity needs with other stakeholders and private sector partners;
- In partnership with the State Broadband Director coordinate network operations & maintenance by leveraging a neutral third party host on state-initiated corridors (i.e., interstate highways);
- Develop and maintain state ROW policy and procedure(s); and
- Serve as a technical resource for statewide broadband infrastructure development.

Arizona Department of Administration Roles:

- Aggregator of public sector connectivity requirements (except for ADOT); and
- Coordinate with AZNet II, the official telecommunications program servicing all State of Arizona agencies, boards and commissions

Arizona Department of Education / Sun Corridor Network Roles:

- Anchor tenant for all education connectivity needs; and
- Active participant in the procurement and implementation of federal E-RATE funded networks.

Integration with Last-Mile Program

Last-Mile Network Funding Support Strategy:

- Identify gaps in broadband coverage – i.e., unserved / underserved / communities
- Provide planning grants and technical support to local communities
 - Assess project readiness and benefits
 - Pooling of funding sources
 - Matching funds
- Provide procurement and funding support guidance to local communities
 - Standard procurement documents
 - Standard contract agreement(s)
- Minimize viability gap funding through competition to drive down project costs
- Establish standards for network performance, reliability, and affordability
- Encourage public-private partnerships
- Safeguard public investment and interest

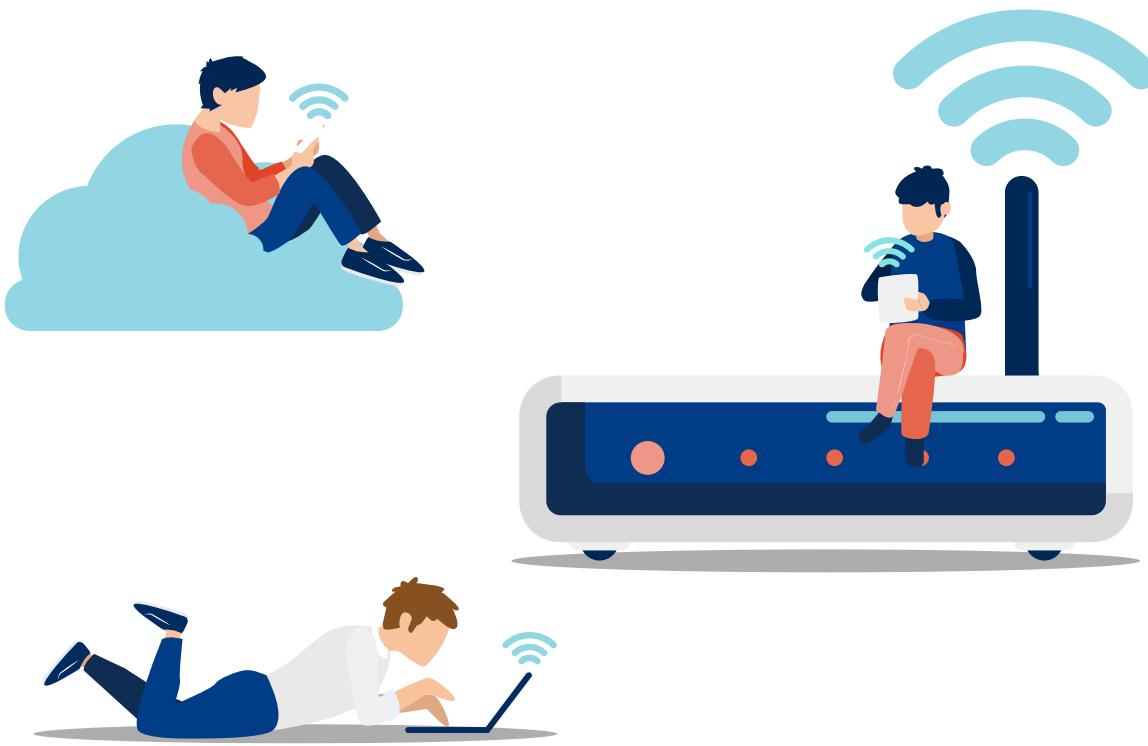
Role of a Neutral Third Party Host

For the state invested middle-mile network(s), incorporation of the concept of a neutral third party host that brings broadband network operations and maintenance experience and telecommunication expertise to meet the goals and objectives of the State ensures that the public investment is operationally and financially sustainable over for long-term. The neutral third party host will be directly accountable to the State/ACA and can perform the following functions.

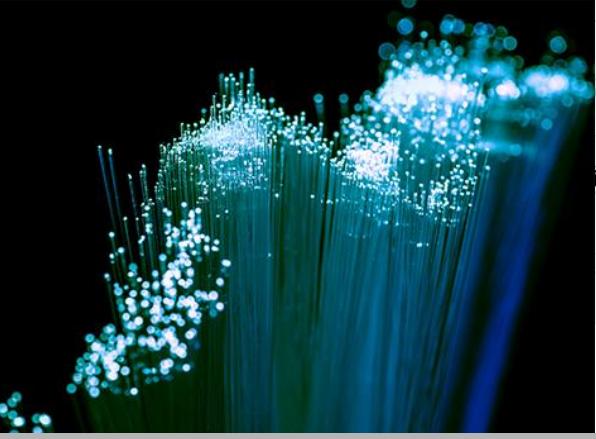
- Perform network design, construction and maintenance of State of Arizona owned middle-mile broadband infrastructure.
- Operate and maintain the middle-mile network to meet consolidated governmental need including that of ADOT, ADOA, ADE/SCN and other partnering agencies. The neutral host will be responsible for meeting the performance specification required by ACA and ADOT and work closely with ADOA AZnet to meet the requirements.

- Operate and maintain an open access non-discriminatory network to address the state connectivity goals. The neutral host will provide points of presence to support middle-mile connectivity to advance adoption in unserved/underserved areas.
- Provide connectivity services across a broad swath of technologies including wireline and wireless broadband infrastructure to maximize adoption and utilization of the middle-mile network.
- Drive financial performance of the network leveraging private sector expertise and innovation to ensure that the upfront investment by the State is financially sustainable. Strong financial performance can further support expansion in coverage, driving overall network operations scalability.
- Leverage broadband sector experience and expertise to incentive last-mile connectivity working closely with the ACA, local governments, and private sector service providers to meet the desired performance metrics.

The concept of a third party host has been adopted by several state and transportation agencies including in Pennsylvania, North Carolina and Georgia.



Appendix A: Maps of Major Service Providers

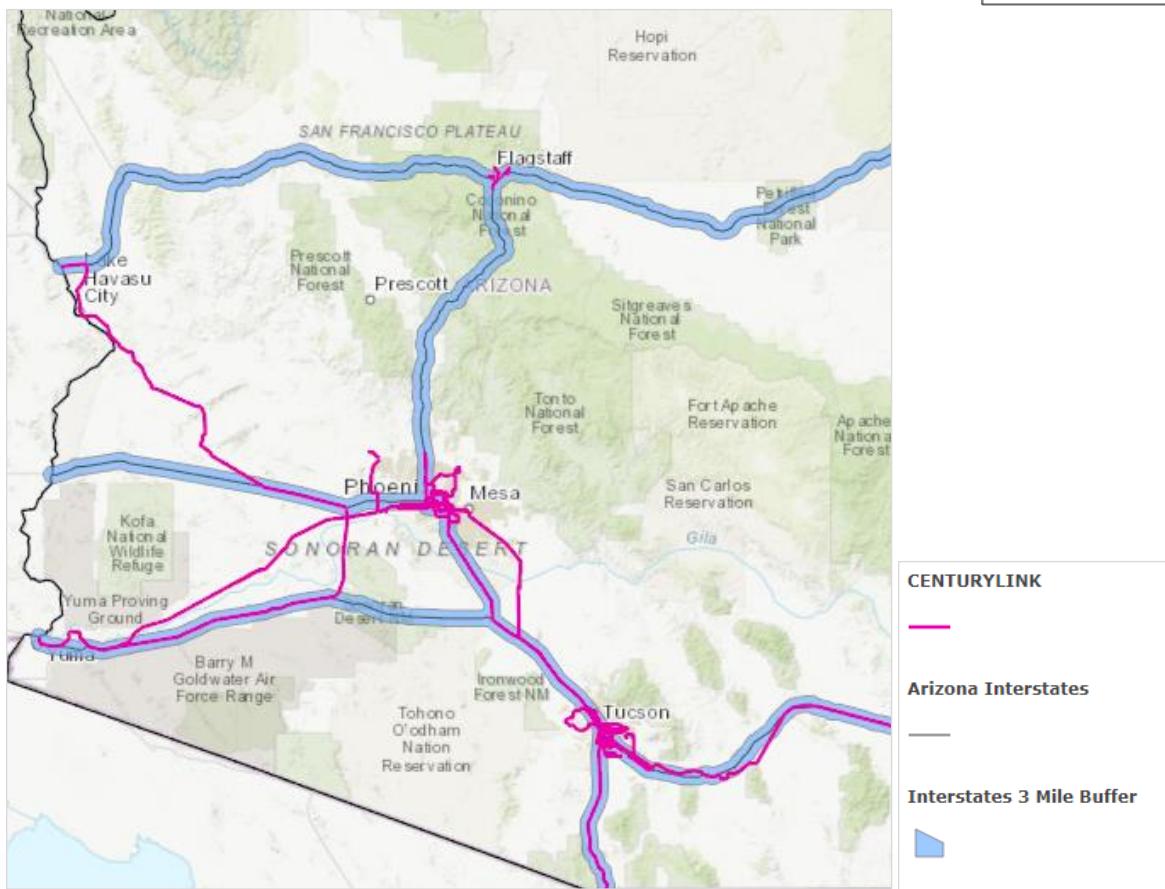


Arizona Broadband Service Provider Footprint and Mileage

Figure 11 - Lumen

LUMEN®
(formerly CenturyLink)

Fiber Network
1,417.3 miles



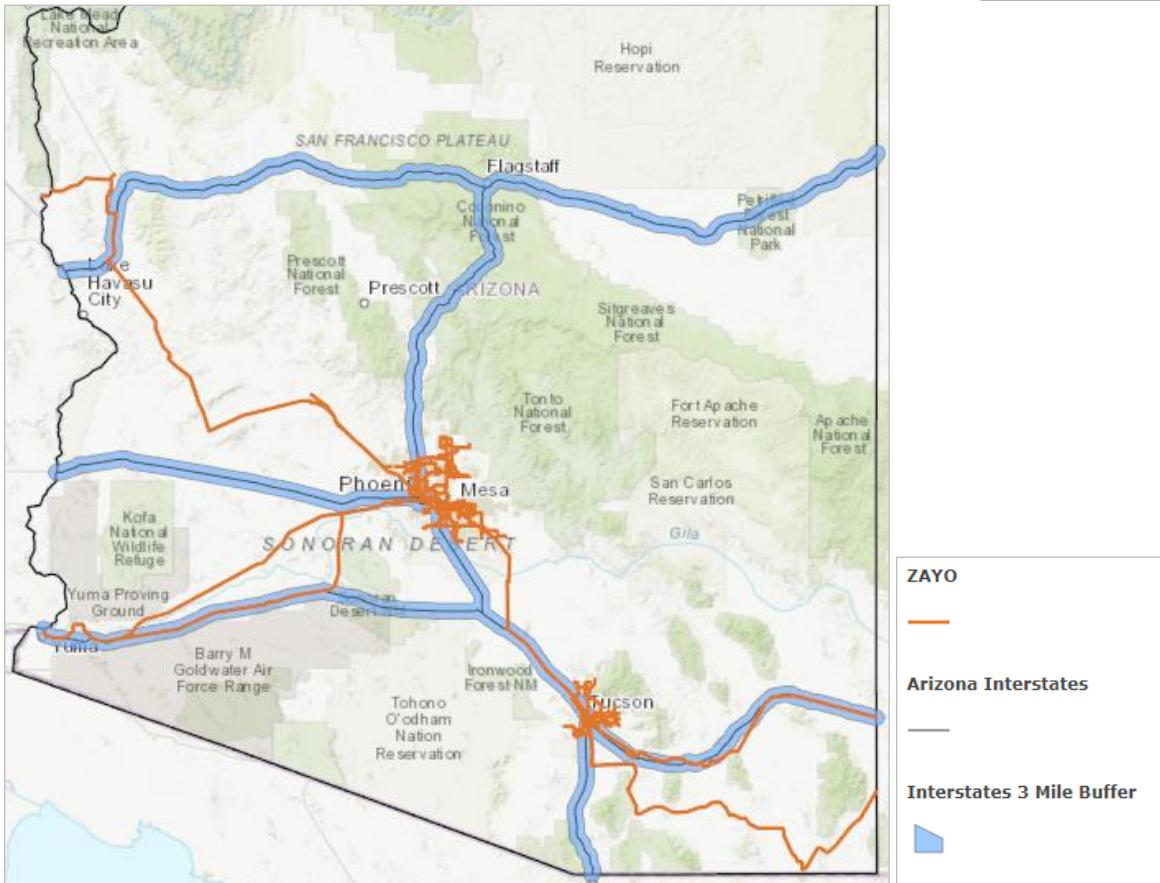
Source: ESRI, FCC, ACS Data

Figure 12 - Zayo



Fiber Network

1,947.9 miles



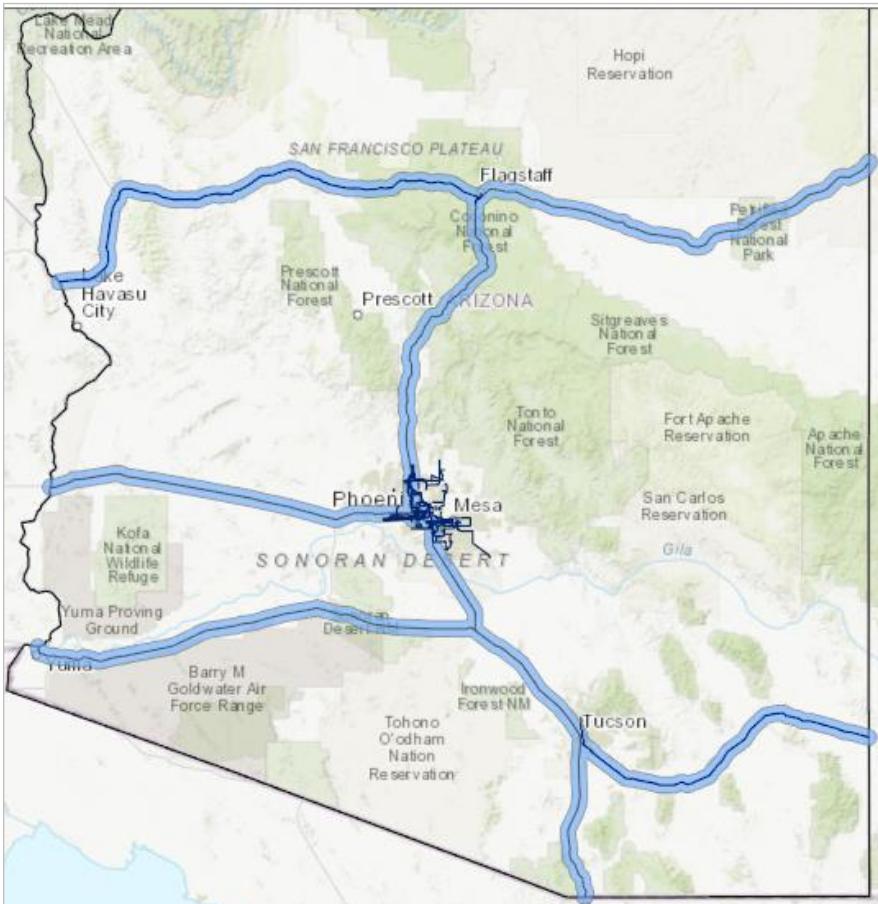
Source: ESRI, FCC, ACS Data

Figure 13 – AT&T



Fiber Network

1,029.2 miles



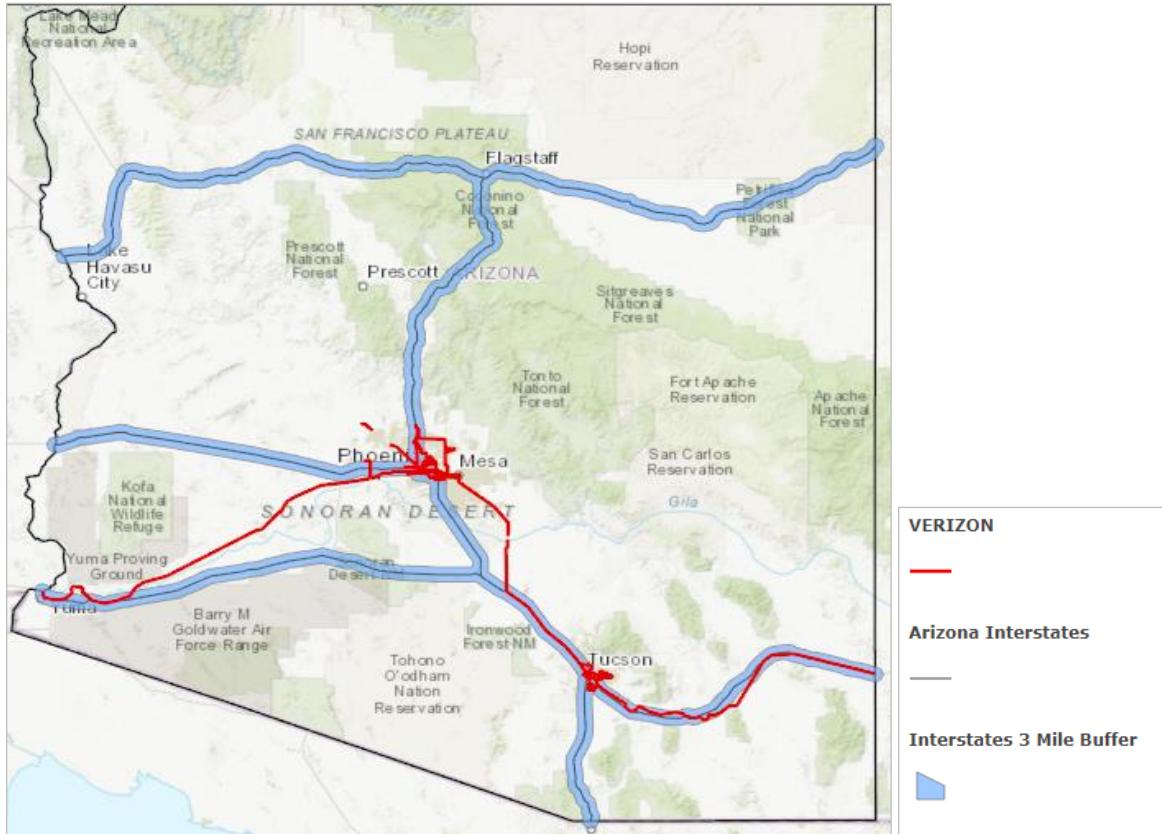
Source: ESRI, FCC, ACS Data

Figure 14 - Verizon

verizon[✓]

Fiber Network

755.7 miles



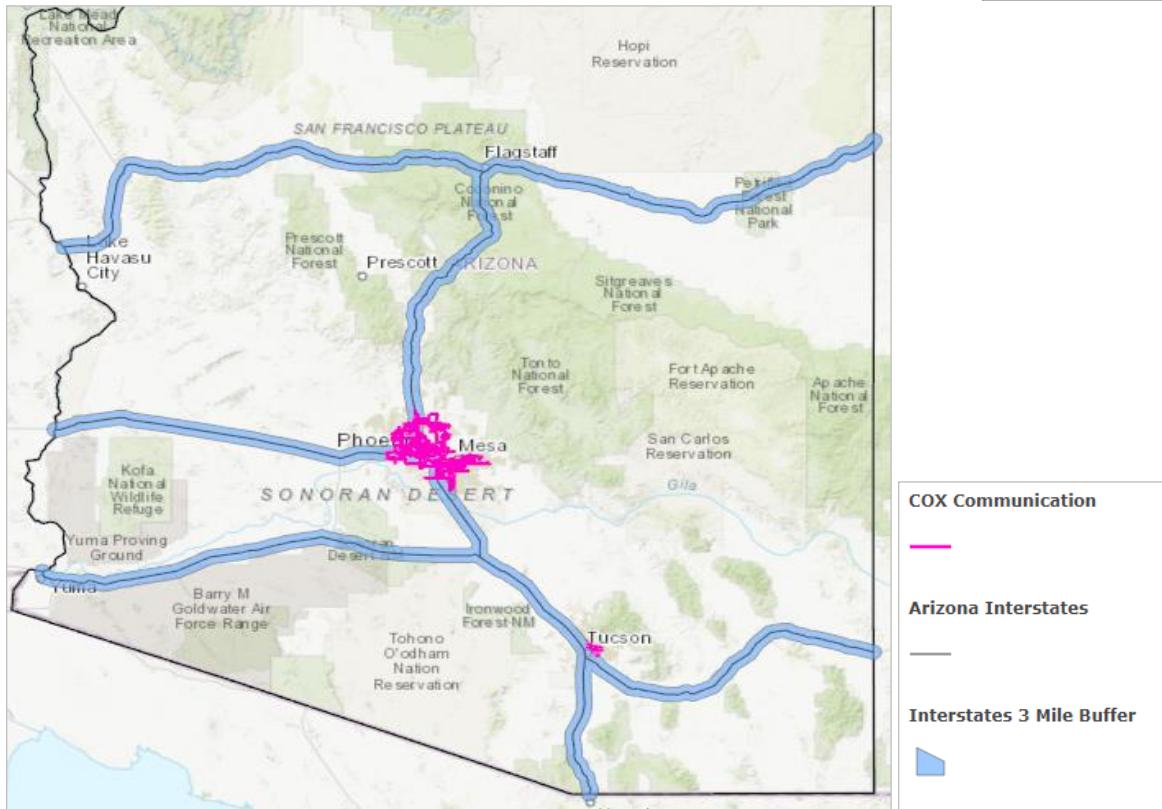
Source: ESRI, FCC, ACS Data

Figure 15 - Cox

COX®

Fiber Network

858.5 miles



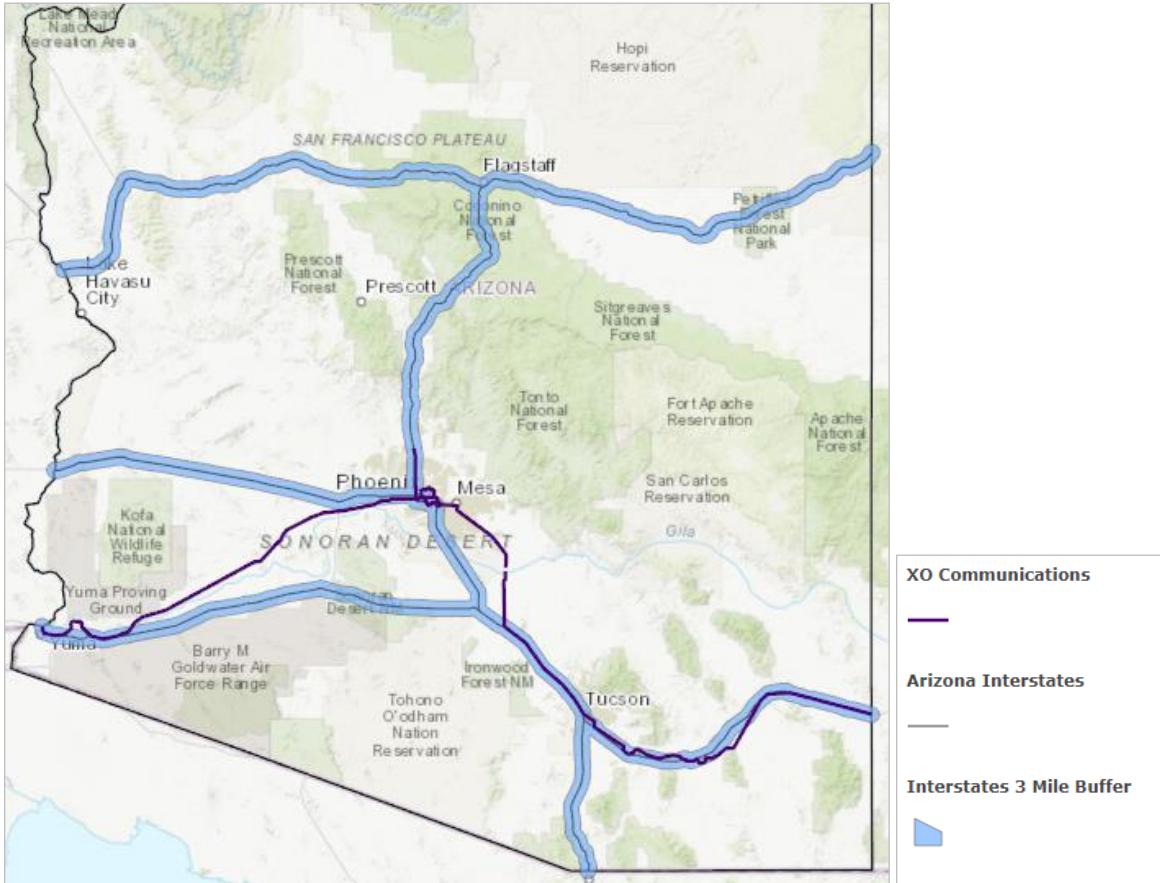
Source: ESRI, FCC, ACS Data

Figure 16 - XO Communications



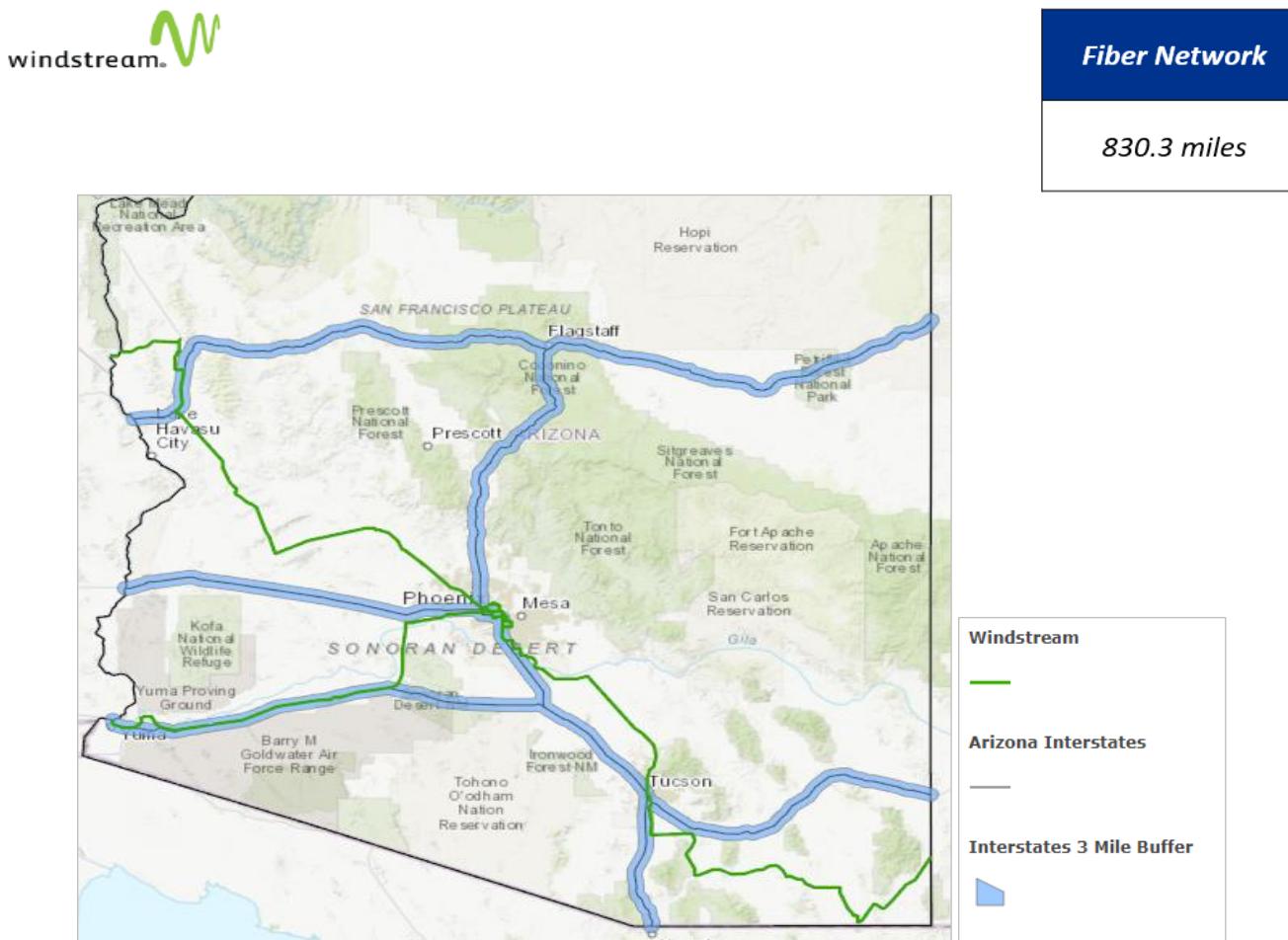
Fiber Network

488.8 miles



Source: ESRI, FCC, ACS Data

Figure 17 - Windstream



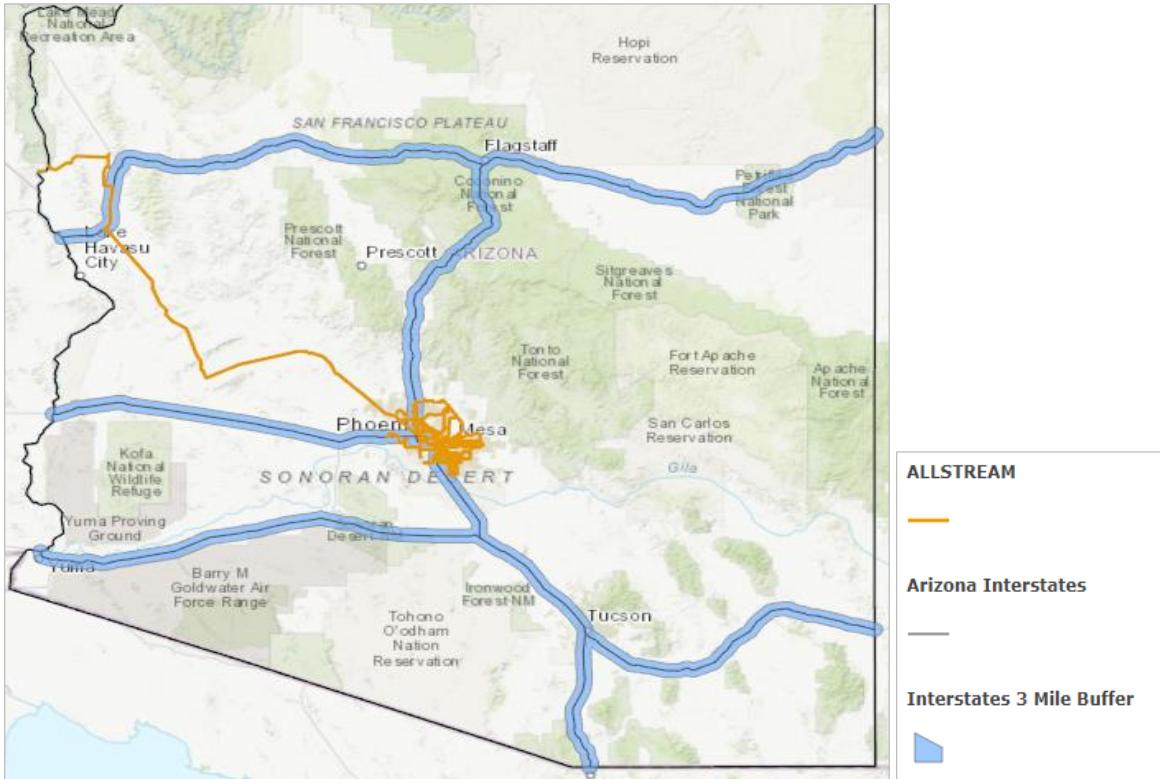
Source: ESRI, FCC, ACS Data

Figure 18 – Allstream



Fiber Network

834.2 miles



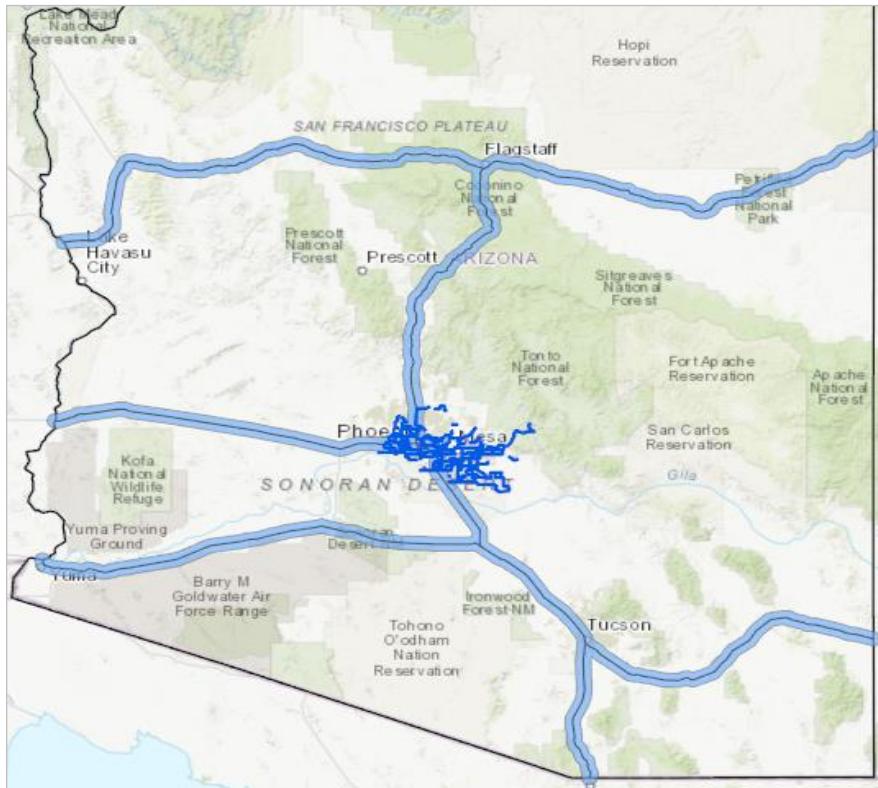
Source: ESRI, FCC, ACS Data

Figure 19 – SRP Telecom



Fiber Network

681.3 miles



SRP Telecom

Arizona Interstates

Interstates 3 Mile Buffer

Source: ESRI, FCC, ACS Data

Figure 20 - Syringa Networks



Fiber Network

196.1 miles



Source: ESRI, FCC, ACS Data

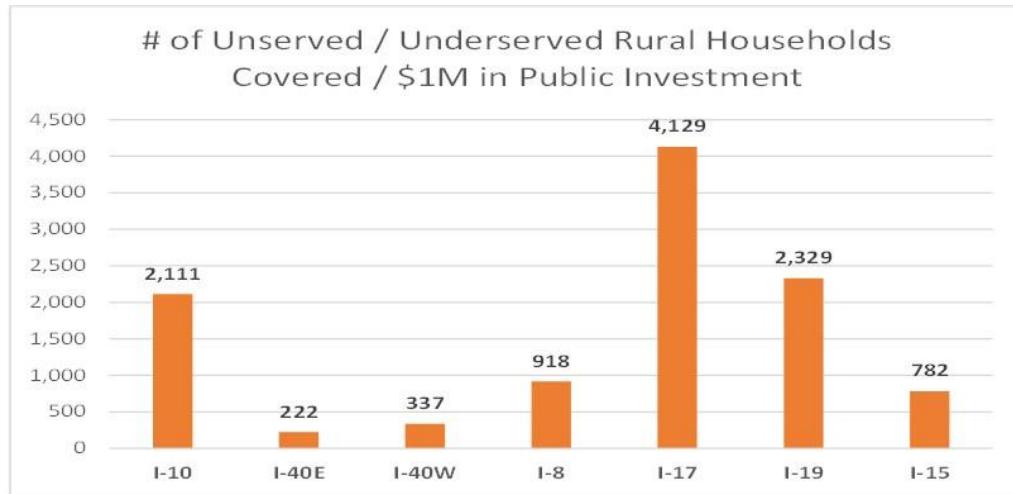
Appendix B: Prioritization Analysis Results – Interstate Highways

Interstate Network Analysis

The full analysis and results of the interstate network prioritization analysis are presented below.

Interstate Network Evaluation Criteria

Evaluation Criteria #1: Unserved and Underserved Households Covered (within five-mile radius) per \$ Public Investment



Sources: ACS 2019

Corridor	Counties Covered	Unserved / Underserved HHs	Unserved or Underserved Households Covered / \$ million Investment
10	La Paz, Maricopa, Pinal, Pima, Cochise	165,637	2,111
40 East	Coconino, Navajo, Apache	6,987	222
40 West	Mohave, Yavapai, Coconino	13,499	337
8	Yuma, Maricopa, Pinal	32,762	918
17	Maricopa, Yavapai, Coconino	119,149	4,129
19	Santa Cruz, Pima	29,156	2,329
15	Mohave	4,489	782
TOTAL		371,678	N/A

▪ # of Unserved / Underserved Households are based on a five (5) mile radius along the interstate highway

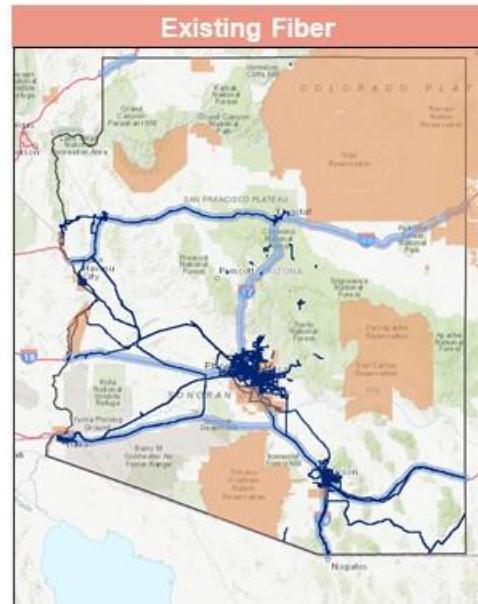
Evaluation Criteria #2: Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households

Evaluation Criteria #2: Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households

Observations:

The purpose of this metric is to measure lack of excess broadband capacity to serve the current market inferred based on the following:

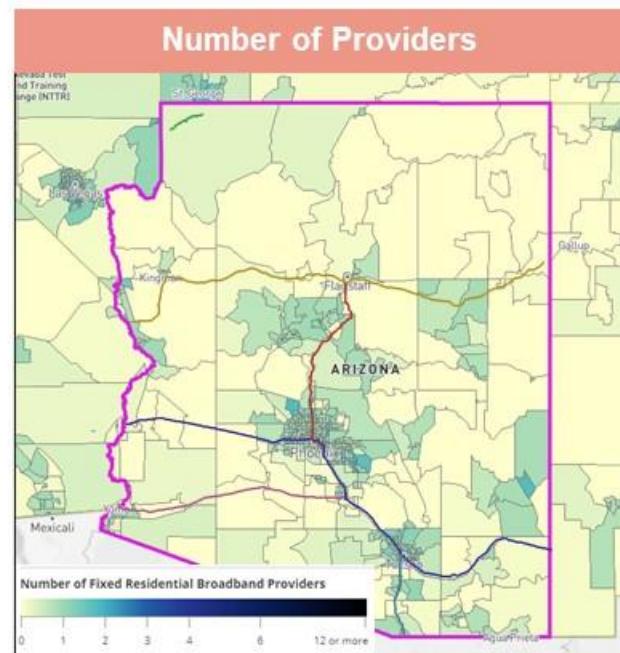
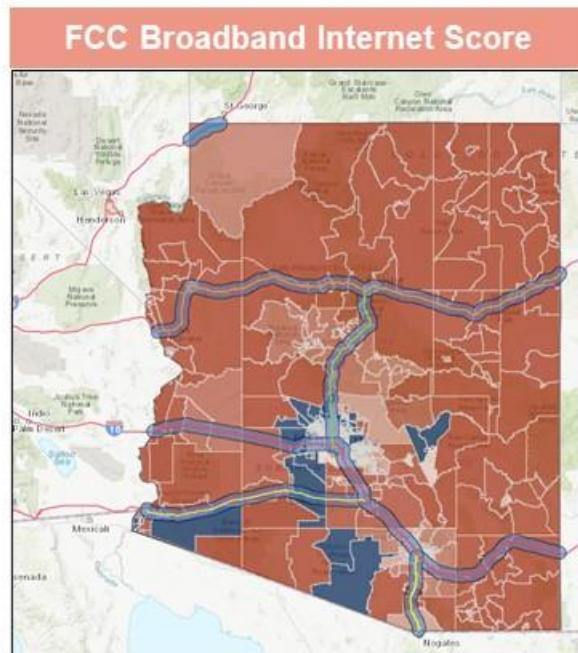
- Fiber presence on the long-haul routes on the interstate highways
- Overall broadband speed metric as measured by the broadband score across the corridor
- Number of service providers in the addressable market/counties served by the corridor



Notes: Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways
Sources: ACS 2019 data



Evaluation Criteria # 2 – Existing Fiber Presence / # of Providers / Speed (2/2)



- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed
- This composite score is calculated by aggregating the speeds of DSL, Cable, Broadband in the particular area adjusted by the mix of customers having these services

Evaluation Criteria #3: Population Centers Covered / Points of Presence Addressed

Evaluation Criteria # 3 – Population Centers Covered / Points of Presence

Corridor	# of Population Centers Covered
I-10	16
I-40	5
I-8	4
I-17	2
I-19	3
I-15	*

- * No major population center(s) along I-15

Source: US Census Bureau [City and Town Population Totals: 2010-2019](#) ([census.gov](#))

Evaluation Criteria #4: Public Sector Agencies' and Tribal Nations' Interest in the Project

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Evaluation Criteria # 4 – Public Sector Agencies' and Tribal Nations' Interest in the Project

Public Sector Strategic Priority / Interest in the Project

Corridor	Priority	Observations
I-10	●	<ul style="list-style-type: none">ADOT and Sun Corridor Network identified I-10 as a priority corridor to support their connectivity needs / operational requirements
I-40 West	●	<ul style="list-style-type: none">ADOT and Sun Corridor Network have an interest in developing I-40 West corridor to meet their operational requirements
I-40 East	●	<ul style="list-style-type: none">ADOT and Sun Corridor Network have an interest in developing I-40 East corridor to meet their operational requirementsNavajo Nation indicated that I-40 East corridor is a priority
I-8	●	<ul style="list-style-type: none">I-8 corridor has some level interest by the private sector
I-17	●	<ul style="list-style-type: none">I-17 corridor is in the development phase as part of the Smart Highways initiatives
I-19	●	<ul style="list-style-type: none">I-19 corridor is in the development phase as part of the Smart Highways initiatives

Source: Stakeholder Consultations

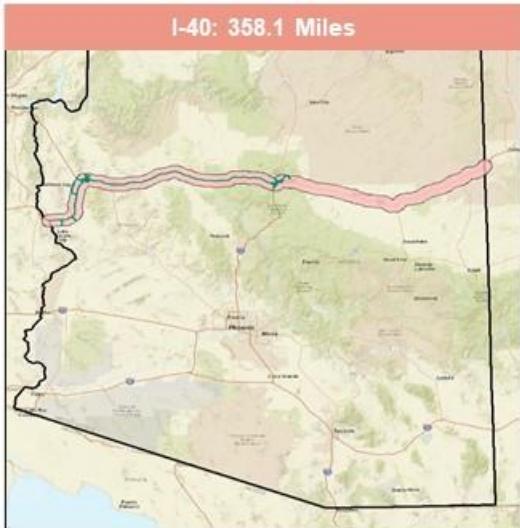
Interstate Network Prioritization Analysis

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Interstate 40 West – Existing Fiber Presence / Providers

Existing Fiber within I-40 West Interstate Highway



Top Providers^a

Company	Footprint	Fiber Mileage (within 5-mile buffer)
AT&T	National Wireless Carrier	208
suddenlink	National Cable Company	117
LUMEN [®] (formerly CenturyLink)	National Fiber Company	42
zayo	National Fiber Wholesaler	41
windstream.	National Fiber Company	41
allstream.	National Fiber Company	40
XTS	Regional Player	22
Legacy NPG (Now Suddenlink)	National Cable Company	21

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways

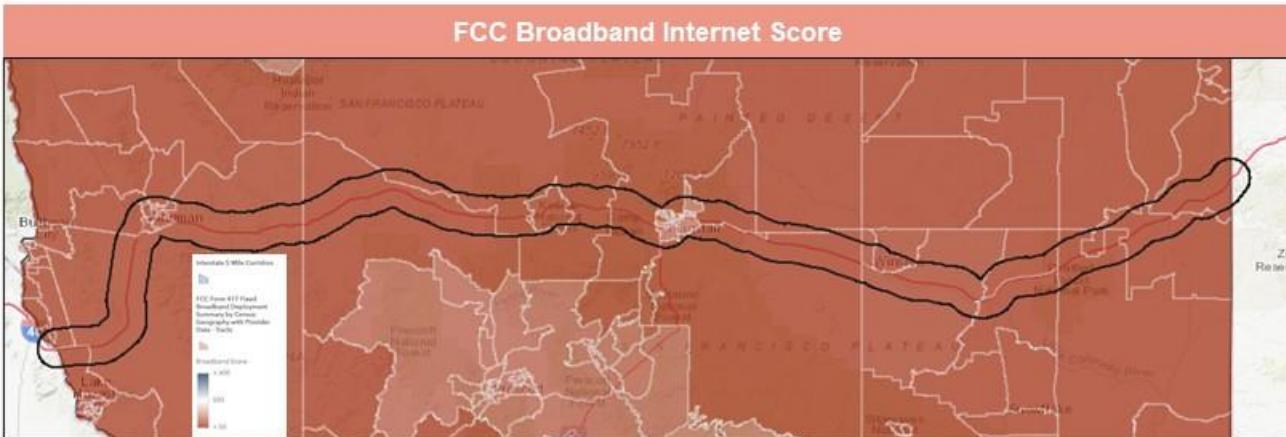
Sources: ACS 2019 data

- Feedback from stakeholder consultations indicated that the private sector have a strong interest in developing this corridor
- Access to ROW will drive the private sector investment ;

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Interstate 40 West – Broadband Speed

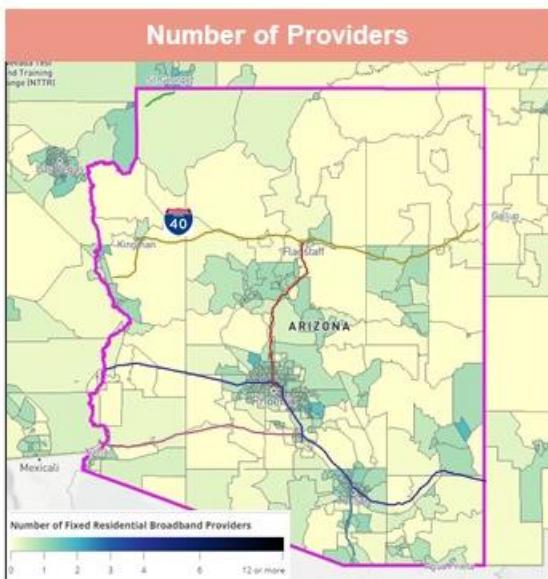


- I-40 West Corridor has low internets speeds for most part, except for around Flagstaff City region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



Interstate 40 West – # of Service Providers

**Observations:**

- Over 90% of the population in counties touching I-40 West have one provider or less affecting both access and affordability

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Mohave County	27.8 %	68.8 %	96.6 %	200,613
Yavapai County	20.9 %	68.5 %	89.4 %	203,846
Coconino County	48.9 %	40.0 %	88.9 %	125,607

Sources: ESRI, FCC, ACS 2019



Interstate 40 West – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	3.0	<ul style="list-style-type: none"> Low – Moderate underserved households served/public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	27.0	<ul style="list-style-type: none"> AT&T and Sudden Link have existing fiber presence from Flagstaff City to west of the Stateline Almost entire corridor has an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	8.0	<ul style="list-style-type: none"> Three population centers are covered by the interstate highway – approximately 40,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	13.0	<ul style="list-style-type: none"> ADOT, and Sun Corridor Network have interest in developing this corridor Interest from the private sector due to attractiveness of long-haul traffic
TOTAL		51.0 points	

Source: ACA Analysis



Interstate 40 East – Existing Fiber Presence / Providers

Existing Fiber within I-40 East Interstate Highway



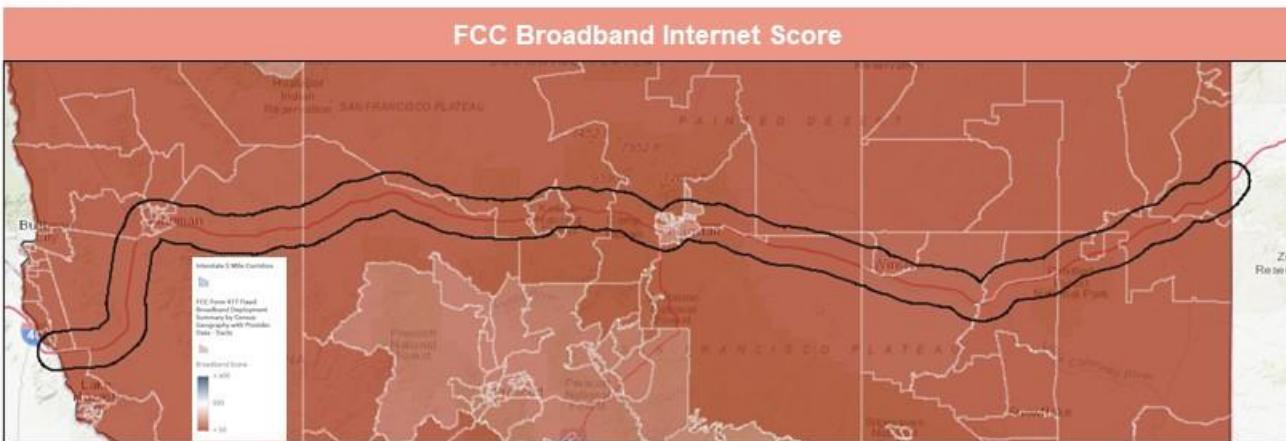
Observations:

- No Fiber presence east of Flagstaff within 5-mile radius of Interstate I-40 East
- Feedback from stakeholder consultations indicated that the private sector have a strong interest in developing this corridor
- Access to ROW will drive the private sector investment

Sources: ACS 2019 data



Interstate 40 East – Broadband Speed

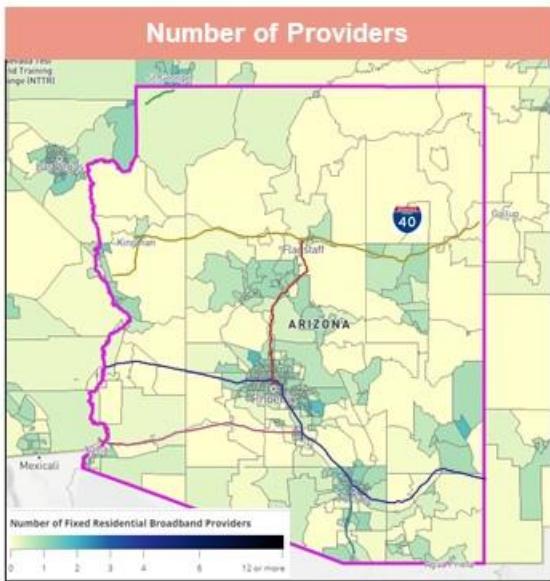


- I-40 East Corridor has low internets speeds for most part, except for around Flagstaff City region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



Interstate 40 East – # of Service Providers

**Observations:**

- Apache County does not have a service provider
- Over 90% of the population in counties touching I-40 East have one provider or less affecting both access and affordability

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Coconino County	48.9 %	40.0 %	88.9 %	125,607
Navajo County	54.9 %	44.3 %	99.2 %	108,429
Apache County	99.8 %	0.3 %	100.0 %	71,511

Sources: ESRI, FCC, ACS 2019



Interstate 40 East – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	2.0	<ul style="list-style-type: none"> Very low population density – approximately 7,000 underserved households can be served/public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	30.0	<ul style="list-style-type: none"> No major service providers have existing fiber presence from Flagstaff City to east of the Stateline within 5-mile radius of I-40 East Almost entire corridor has an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	4.0	<ul style="list-style-type: none"> Two population centers are covered by the interstate highway – approximately 18,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	14.0	<ul style="list-style-type: none"> Navajo Nation, ADOT, and Sun Corridor Network have interest in developing this corridor Substantial interest from the private sector due to attractiveness of long-haul traffic
TOTAL		50.0 points	

Source: ACA Analysis



Interstate 17 – Existing Fiber Presence / Providers

Existing Fiber within I-17 Interstate Highway

Top Providers^a

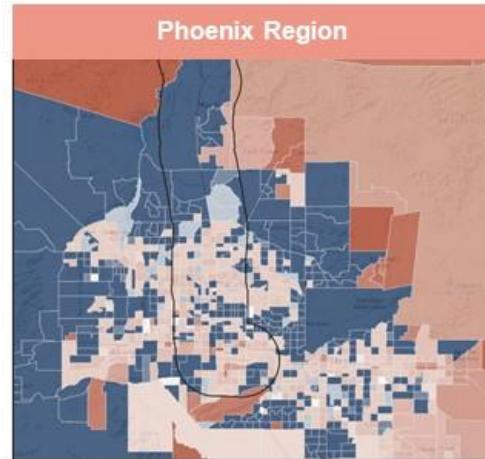
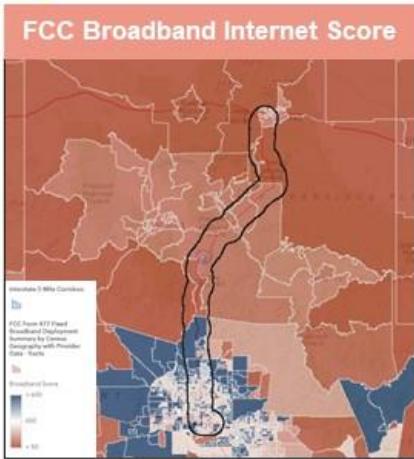
Company	Footprint	Fiber Mileage (within 5-mile buffer)
COX	National Fiber Company	387
AT&T	National Wireless Company	377
zayo	National Fiber Wholesaler	267
allstream	National Fiber Company	203
LUMEN (formerly CenturyLink)	National Fiber Company	202
SRP Telecom	Regional Fiber Company	174
verizon	National Wireless Company	174
windstream	National Fiber Company	70
centurylink	National Fiber Company	65
Tru-Com	Regional Fiber Company	62

- Feedback from stakeholder consultations indicated major interest from the private sector to develop this corridor
- Corridor is in the development phase by ADOT and Sun Corridor Network

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways
Sources: ACS 2019 data



Interstate 17 – Broadband Speed

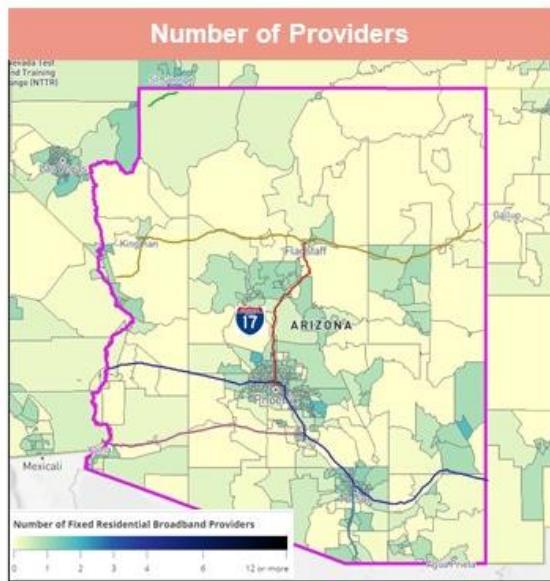


- I-17 Corridor has low internet speeds for most part, except for around Phoenix region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



Interstate 17 – # of Service Providers

**Observations:**

- Cox, AT&T and Zayo have existing fiber presence in the corridor
- Yavapai and Coconino counties have one or less provider
- Some service providers are focusing on the commercial demand
- Open access network can attract additional service providers due to moderate population density

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Maricopa County	1.0 %	8.1 %	9.2 %	396,086
Yavapai County	20.9 %	68.5 %	89.4 %	203,846
Coconino County	48.9 %	40.0 %	88.9 %	111,908

Sources: ESRI, FCC, ACS 2019



Interstate 17 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	40.0	<ul style="list-style-type: none"> High unserved/underserved covered by public investment \$
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	20.0	<ul style="list-style-type: none"> COX, AT&T, and Zayo have existing fiber presence around Phoenix, Mesa, and Flagstaff areas Large portion of the corridor North of Phoenix has an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	5.0	<ul style="list-style-type: none"> Two population centers are covered by the interstate highway – approximately 495,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	13.0	<ul style="list-style-type: none"> ADOT and Sun Corridor Network are in the process of developing this corridor – part of the Smart Highways initiative
TOTAL		78.0 points	

Source: ACA Analysis



Interstate 19 – Existing Fiber Presence / Providers

Existing Fiber within I-19 Interstate Highway



- Feedback from stakeholder consultations indicated good interest from the private sector to develop the corridor
- Corridor is in the development phase by ADOT and Sun Corridor Network

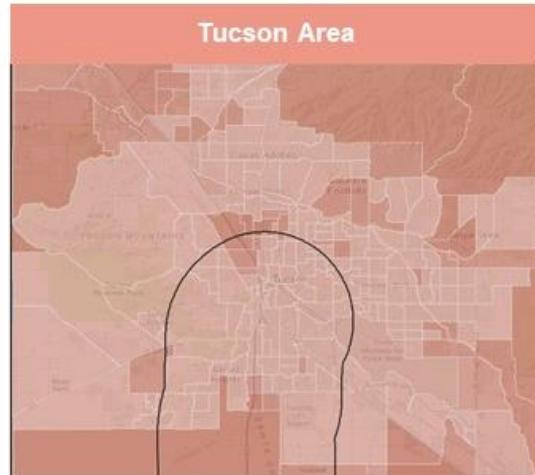
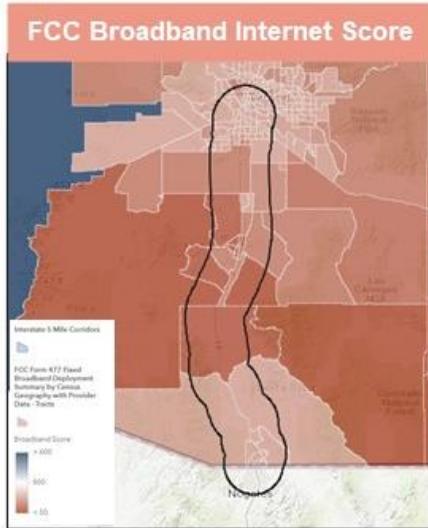
Top Providers^a

Company	Footprint	Fiber Mileage (within 5-mile buffer)
LUMEN [®] (formerly CenturyLink)	National Fiber Company	184
zayo [®]	National Fiber Wholesaler	146
Valley [®] Broadband	Regional Fiber Company	69
verizon [®]	National Wireless Company	47
windstream. [®]	National Fiber Company	27
CONTELLA [®] NETWORKS	National Fiber Company	27
AT&T	National Wireless Company	16
COX	National Fiber Company	10
XC communications	National Fiber Company	10

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways
Sources: ACS 2019 data



Interstate 19 – Broadband Speed

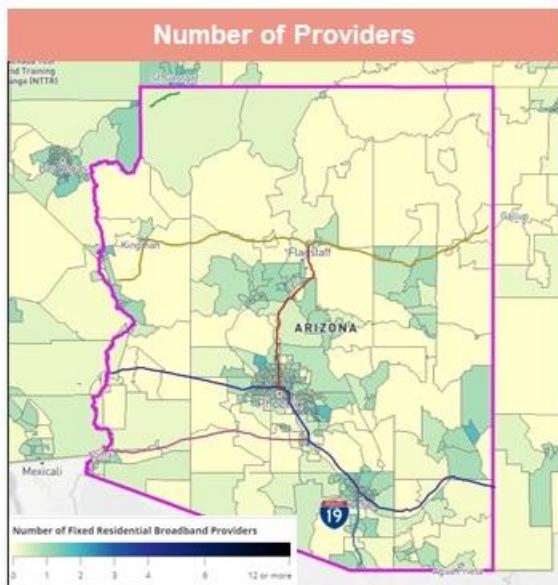


Sources: ESRI, FCC, ACS 2019

- I-19 Corridor has low internet speeds for most part, except for around Tucson area which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed



Interstate 19 – # of Service Providers

**Observations:**

- Lumen, Zayo and Valley have existing fiber presence in the corridor
- Some service providers are focusing on the commercial demand
- Open access network can attract additional service providers due to moderate population density

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Santa Cruz County	13.1 %	31.0 %	44.1 %	20,498
Pima County	4.3 %	16.5 %	20.8 %	89,891

Sources: ESRI, FCC, ACS 2019



Interstate 19 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	23.0	<ul style="list-style-type: none"> ▪ High unserved/underserved covered by public investment \$
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	20.0	<ul style="list-style-type: none"> ▪ Lumen, Zayo, and Valley have existing fiber presence in this corridor ▪ Large portion of the corridor around Tucson area have an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	6.0	<ul style="list-style-type: none"> ▪ Three population centers are covered by the interstate highway – approximately 142,000 households are residing within 5-mile radius ▪ Corridor provides an opportunity for strategic break-outs to communities along the interstate
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	13.0	<ul style="list-style-type: none"> ▪ ADOT and Sun Corridor Network are in the process of developing this corridor – part of the Smart Highways initiative ▪ Third highest # of unserved / underserved households among Arizona interstate highways
TOTAL		62.0 points	

Source: ACA Analysis



Interstate 10 – Existing Fiber Presence / Providers

Existing Fiber within Interstate 10 Highway



- Feedback from stakeholder consultations indicated that existing fiber and capacity is concentrated around Phoenix and Tucson
- Capacity primarily utilized for long haul/transit traffic and metro traffic
- Limited capacity and appetite to support backhaul to serve residential and community demand on the western region and rural areas

Top Providers^a

Company	Footprint	Fiber Mileage (within 5-mile buffer)
LUMEN [®] (formerly CenturyLink)	National Fiber Company	752
zayo	National Fiber Wholesaler	680
AT&T	National Wireless Company	549
COX	National Fiber Company	464
verizon [®]	National Wireless Company	462
allstream.	National Fiber Company	290
XC communications	National Fiber Company	284
SRP [®] Telecom	Regional Fiber Company	283
windstream.	National Fiber Company	186
ALLUVION COMMUNICATIONS	Regional Fiber Company	132

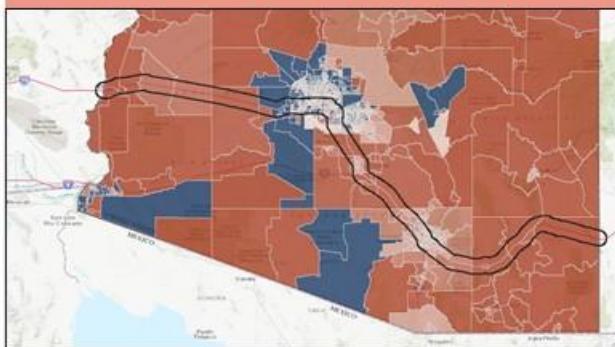
Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways

Sources: ACS 2019 data

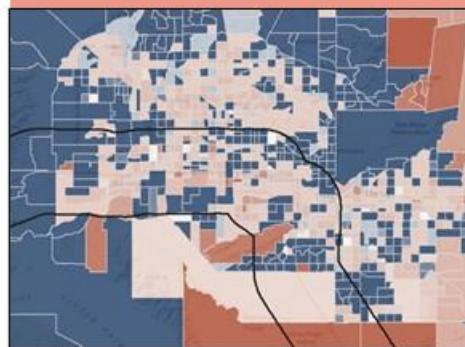


Interstate 10 – Broadband Speed

FCC Broadband Internet Score



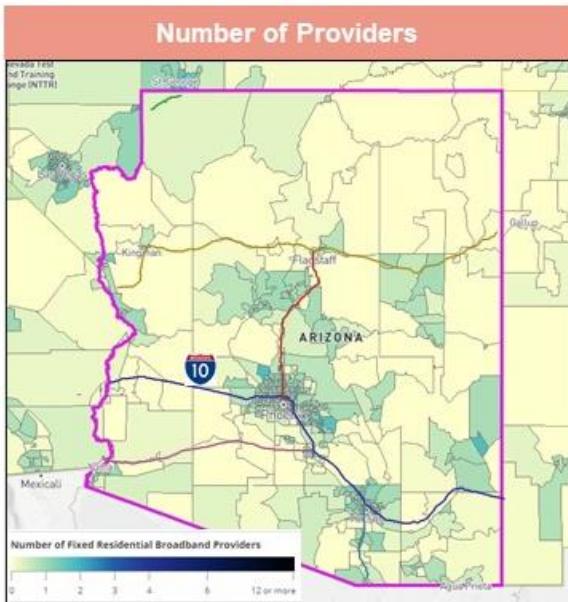
Phoenix Region



- I-10 Corridor has low internet speeds for most part, except for around Phoenix region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019

Interstate 10 – # of Service Providers



Observations:

- Beyond metro Phoenix and Tucson areas, rural and suburban portions of the Counties served by I-10 primarily have one provider or less
 - This affects access to broadband as well as overall affordability in these regions
 - Intermittent long-haul and middle-mile network do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Cochise County	31.9 %	66.1 %	98.0 %	123,211
La Paz County	61.6 %	38.4 %	100.0 %	20,787
Maricopa County	1.0 %	8.1 %	9.2 %	396,086
Pima County	4.3 %	16.5 %	20.8 %	213,351
Pinal County	9.9 %	27.1 %	37.0 %	156,888

Sources: ESRI, FCC, ACS 2019

Interstate 10 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	21.0	<ul style="list-style-type: none"> After I-17 and I-19, most attractive corridor for households served per \$ of public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	15.0	<ul style="list-style-type: none"> Lumen, Zayo, AT&T and Cox have existing presence; however, corridor has the highest unserved / underserved households Existing fiber presence is concentrated around Phoenix, Mesa, and Tucson areas Large portion of the corridor has an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	10.0	<ul style="list-style-type: none"> Sixteen population centers are covered by the interstate highway – approximately 800,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	10.0	<ul style="list-style-type: none"> Priority corridor for ADOT and Sun Corridor Network Stakeholder consultation indicated keen interest by public agencies to develop this corridor for their operational needs
TOTAL		56.0 points	

Source: ACA Analysis



Interstate 8 – Existing Fiber Presence / Providers

Existing Fiber within I-8 Interstate Highway



Top Providers^a

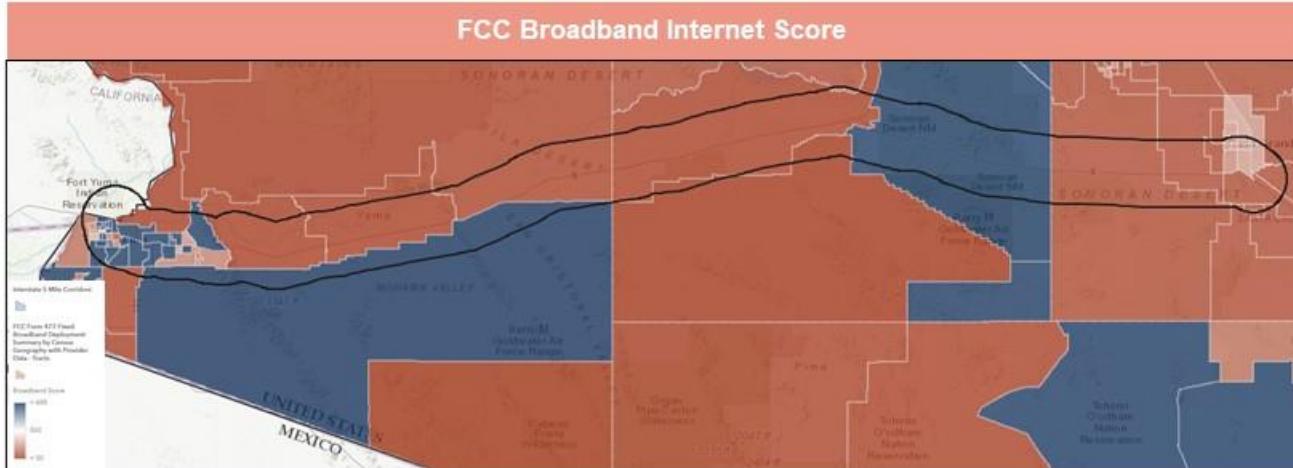
Company	Footprint	Fiber Mileage (within 5-mile buffer)
LUMEN [®] (formerly CenturyLink)	National Fiber Company	146
zayo [®]	National Fiber Wholesaler	134
Syringa [®]	National Fiber Company	123
windstream. [®]	National Fiber Company	121
UPN [®]	National Fiber Company	78
verizon [®]	National Wireless Company	44
XC communications [®]	National Fiber Company	44
TDS [®]	National Fiber Company	10
cogent [®]	National Fiber Company	3

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways
Sources: ACS 2019 data

- Feedback from stakeholder consultations indicated interest from the private sector to develop the western section of the corridor given the connection to Tucson through 1-10
- No continuous fiber presence across the corridor with moderate private sector interest for development



Interstate 8 – Broadband Speed

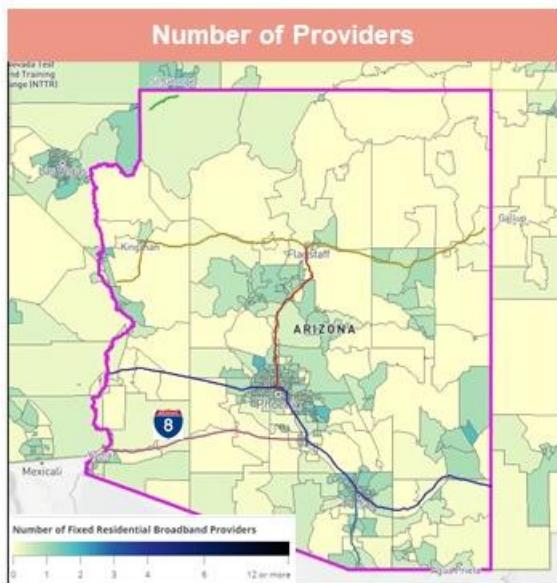


- I-8 Corridor has low internet speeds for most part, except for around Yuma area which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



Interstate 8 – # of Service Providers

**Observations:**

- Beyond the Phoenix area, limited access and competition exists for broadband service

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Yuma County	11.5 %	85.2 %	96.7 %	202,451
Maricopa County	1.0 %	8.1 %	9.2 %	396,086
Pinal County	9.9 %	27.1 %	37.0 %	160,220

Sources: ESRI, FCC, ACS 2019



Interstate 8 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	9.0	<ul style="list-style-type: none"> Low number of underserved households covered per \$ of public investment Low population density and # of unserved / underserved households
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	20.0	<ul style="list-style-type: none"> Lumen, Zayo, Syringa, and Windstream have moderate level of fiber presence Overall, this corridor has better average internet speed as compared to other corridors
3	Population Centers Covered / Points of Presence Addressed	5.0	<ul style="list-style-type: none"> Four population centers are covered by the interstate highway – approximately 78,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	7.0	<ul style="list-style-type: none"> ADOT and Sun Corridor Network have interest to develop the western portion of this corridor for their operational needs Existing service providers have interest in expanding their presence
TOTAL		41.0 points	

Source: ACA Analysis

Interstate Network Prioritization Results

#	Evaluation Criteria	I-40 West	I-40 East	I-17	I-19	I-10	I-8
1	Unserved/Underserved Households Covered per \$ Public Investment	3	2	40	23	21	9
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	27	30	20	20	15	20
3	Population Centers Covered / Points of Presence Addressed	8	4	5	6	10	5
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	13	14	13	13	10	7
TOTAL		51 points	50 points	78 points	62 points	56 points	41 points

Source: ACA Analysis



Appendix C: Prioritization Analysis Results – Select State Routes

State Routes Analysis

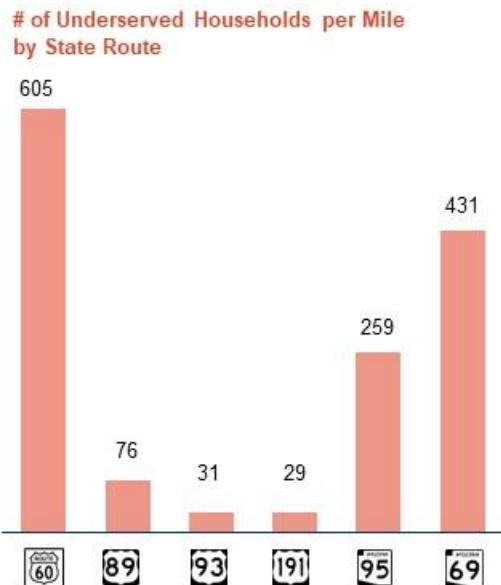
The full analysis and results of the State Routes Prioritization Analysis are presented below.

State Routes Evaluation Criteria

Evaluation Criteria #1: Unserved and Underserved Households Covered per \$ Public Investment

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Evaluation Criteria # 1 – Unserved / Underserved Households Covered per \$ of Public Investment



Corridor	Counties Covered	Unserved/ Underserved HHs	Unserved or Underserved Households Covered/\$1 million Investment
89	SR-89 Coconino County	10,642	380
60	US-60 La Paz, Maricopa, Pinal, Gila, Navajo, Apache	278,015	3,022
191	US-191 Apache, Greenlee, Graham, Cochise	13,384	154
93	SR-93 Maricopa, Mohave, Yavapai	7,898	144
95	SR-95 Maricopa, Mohave, Yavapai	30,064	1,307
69	SR-69 Yavapai	14,676	2,096
TOTAL		354,679	N/A

- # of Unserved/Underserved Households are based on a five (5) mile radius along the state route
- # of Unserved/Underserved Households for US-60 corridor have an overlap with I-10 highway

Evaluation Criteria #2: Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households



Evaluation Criteria # 2: Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved/Underserved Households

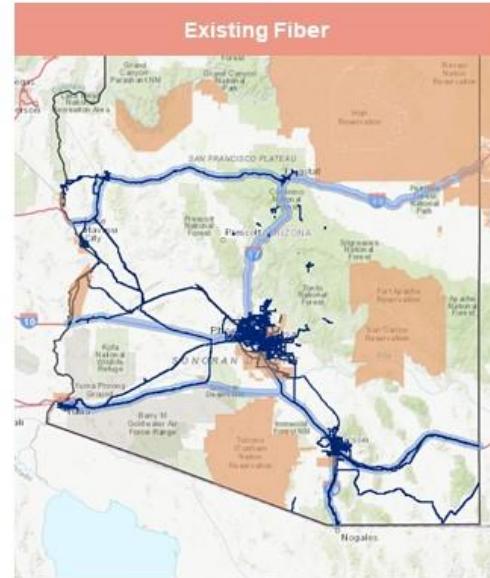
Observations:

The purpose of this metric is to measure lack of excess broadband capacity to serve the current market inferred based on the following:

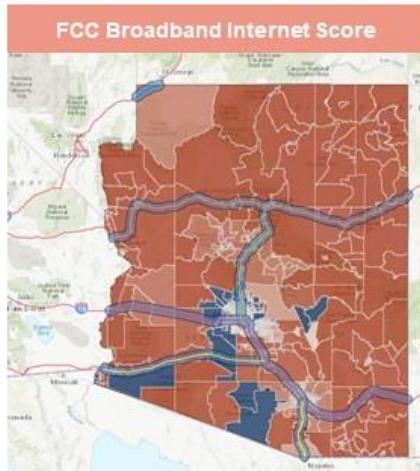
- Fiber presence on the state routes
- Overall broadband speed metric as measured by the broadband score across the corridor
- Number of service providers in the addressable market/counties served by the corridor

Notes: Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of state routes

Sources: ACS 2019 data



Evaluation Criteria # 2 – Existing Fiber Presence/# of Providers/Speed (2/2)



- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed
- This composite score is calculated by aggregating the speeds of DSL, Cable, Broadband in the particular area adjusted by the mix of customers having these services



Source: ESRI, FCC, ACA and ACA Analysis

Evaluation Criteria #3: Population Centers Covered / Points of Presence Addressed

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Evaluation Criteria # 3 – Population Centers Covered/Points of Presence

City	Population (2019)	State Routes					Corridor	# of Population Centers Covered
		SR- 89	US-60	US-191	SR-93/ SR-95	SR-69		
Apache County	71 ,887		★	★			89	1
Cochise County	125,922			★				
Coconino County	143,476	★					ROUTE 60	6
Gila County	54,018		★				191	4
Graham County	38,837			★			93	3
Greenlee County	9,498			★			95	2
La Paz County	21,108	★					Arizona 69	1
Maricopa County	4,485,414	★			★			
Mohave County	212,181			★				
Navajo County	110,924	★						
Pinal County	462,789	★						
Yavapai County	235,099				★	★		

Source: US Census Bureau [City and Town Population Totals: 2010-2019 \(census.gov\)](#)

Evaluation Criteria #4: Public Sector Agencies' and Tribal Nations' Interest in the Project

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Evaluation Criteria # 4 – Public Sector Agencies' & Tribal Nations' Interest in the Project

Public Sector Strategic Priority / Interest in the Project

Corridor	Priority	Observations
89	●	<ul style="list-style-type: none"> ▪ Public sector agencies and Tribal Nations are interested in a segment from Flagstaff to Utah border as this is a high value segment, particularly for Navajo Nation and Coconino county
60	●	<ul style="list-style-type: none"> ▪ Public sector agencies and Tribal Nations are interested in developing a segment from Phoenix to New Mexico Stateline ▪ Prioritize Phoenix to Show Low City and from the US-77 to I-40, if the I-40 is developed
191	●	<ul style="list-style-type: none"> ▪ Public Sector agencies and Tribal Nations are interested to develop a segment from Mexico border to Sanders or Red Mesa to develop fiber loop capabilities to the other existing fiber builds ▪ Corridor will help connect a number of unconnected communities, and it will be difficult to get a commercial interest to build it alone
93	●	<ul style="list-style-type: none"> ▪ Wickenburg to Kingman segment has the most interest for rural connectivity ▪ Kingman to Nevada segment an interest from public agencies in terms of adding value to an I-40 corridor as a pathway to Las Vegas data center market
95	●	<ul style="list-style-type: none"> ▪ Important north south thoroughfare for residents in the cities and towns of that area – public sector agencies are interested in developing this corridor as will create a loop between I-8, I-10, & I-40, and the corridor has a large # of unserved households
69	●	<ul style="list-style-type: none"> ▪ Public agencies and local government are interested in developing this short corridor as it provides maximum impact in terms of # of underserved households covered per \$1 million in public investment

Source: Stakeholder Consultations

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Evaluation Criteria # 4 – Public Sector Agencies' & Tribal Nations' Interest in the Project

Public Sector Strategic Priority / Interest in the Project

Corridor	Priority	Observations
89	●	<ul style="list-style-type: none"> ▪ Public sector agencies and Tribal Nations are interested in a segment from Flagstaff to Utah border as this is a high value segment, particularly for Navajo Nation and Coconino county
60	●	<ul style="list-style-type: none"> ▪ Public sector agencies and Tribal Nations are interested in developing a segment from Phoenix to New Mexico Stateline ▪ Prioritize Phoenix to Show Low City and from the US-77 to I-40, if the I-40 is developed
191	●	<ul style="list-style-type: none"> ▪ Public Sector agencies and Tribal Nations are interested to develop a segment from Mexico border to Sanders or Red Mesa to develop fiber loop capabilities to the other existing fiber builds ▪ Corridor will help connect a number of unconnected communities, and it will be difficult to get a commercial interest to build it alone
93	●	<ul style="list-style-type: none"> ▪ Wickenburg to Kingman segment has the most interest for rural connectivity ▪ Kingman to Nevada segment an interest from public agencies in terms of adding value to an I-40 corridor as a pathway to Las Vegas data center market
95	●	<ul style="list-style-type: none"> ▪ Important north south thoroughfare for residents in the cities and towns of that area – public sector agencies are interested in developing this corridor as will create a loop between I-8, I-10, & I-40, and the corridor has a large # of unserved households
69	●	<ul style="list-style-type: none"> ▪ Public agencies and local government are interested in developing this short corridor as it provides maximum impact in terms of # of underserved households covered per \$1 million in public investment

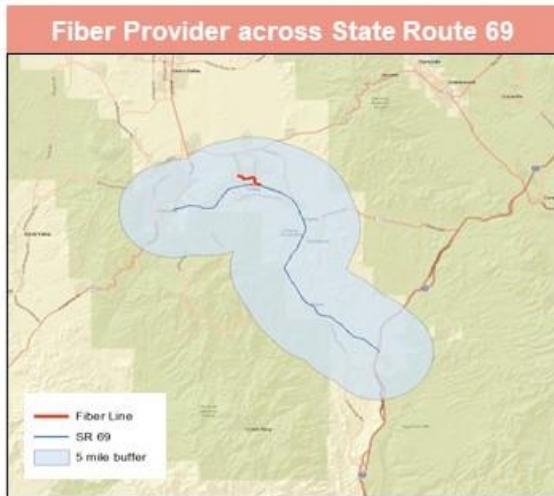
Source: Stakeholder Consultations

State Routes Prioritization Analysis

ARIZONA [REDACTED]



State Route 69 – Existing Fiber Presence / Providers



Top Providers^a

Company	Footprint	Fiber Mileage (within 5-mile buffer)
Conterra	3.7 miles	

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of state route

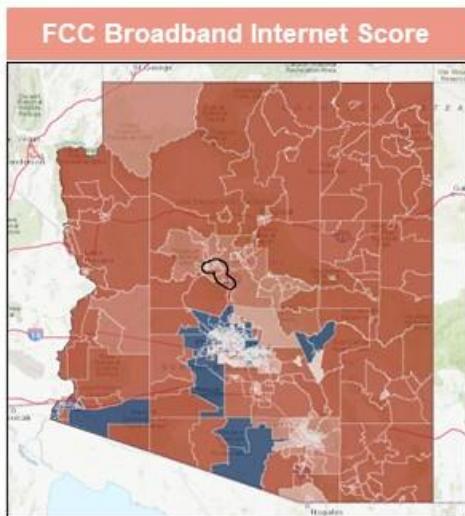
Sources: ACS 2019 data

- Almost no fiber existing presence

ARIZONA [REDACTED]



State Route 69 – Broadband Speed



- State route 69 has very limited fiber presence
- Low internet speeds where the existing fiber is available
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



State Route 69 – # of Service Providers

**Observations:**

- Yavapai County has primarily one or less provider
- Intermittent middle-mile network do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Yavapai County	21.0 %	68.5 %	89.0 %	203,846

Sources: ESRI, FCC, ACS 2019



State Route 69 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	20.0	<ul style="list-style-type: none"> ▪ Very high concentration of unserved/underserved households ▪ Highest underserved households covered / \$ of public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	30.0	<ul style="list-style-type: none"> ▪ Conterra has existing fiber presence ▪ Very limited fiber presence
3	Population Centers Covered / Points of Presence Addressed	5.0	<ul style="list-style-type: none"> ▪ Approximately 47,600 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	15.0	<ul style="list-style-type: none"> ▪ Stakeholder consultations indicated good interest from the public sector agencies to develop this corridor
TOTAL		70.0 points	

Source: ACA Analysis



State Route 60 – Existing Fiber Presence / Providers

Fiber Providers across State Route 60



Top Providers^a

Company	Footprint	Fiber Mileage (within 5-mile buffer)
COX	National Cable Company	476
zayo	National Fiber Wholesaler	470
allstream	National Fiber Company	433
AT&T	National Wireless Carrier	380
SFR Telecom	Regional Fiber Company	355
LUMEN (formerly CenturyLink)	National Fiber Company	223
windstream.	National Fiber Company	190
verizon	National Wireless Company	188
Tru Com	Regional Fiber Company	74
XC communications	National Fiber Company	72

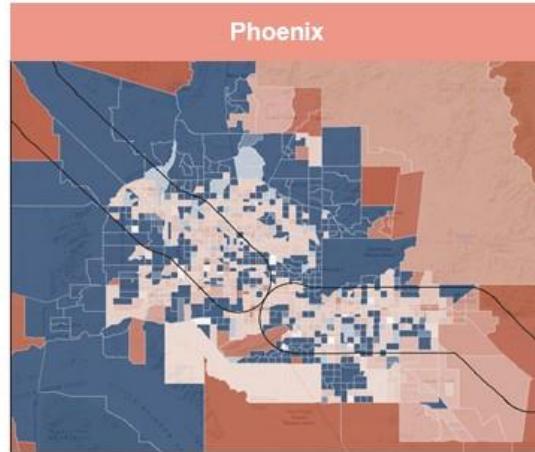
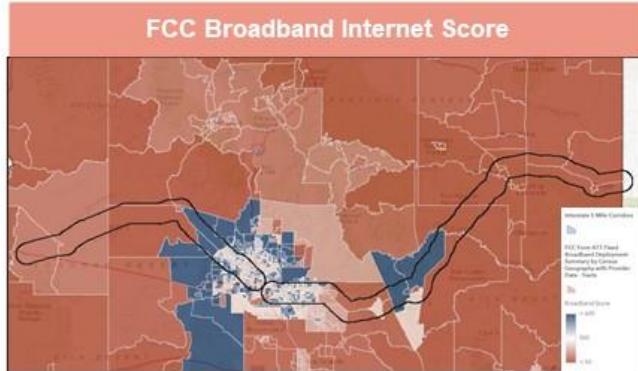
Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of state route

Sources: ACS 2019 data

- No Fiber presence east of Phoenix; A large majority of the corridor have one or less provider
- Feedback from stakeholder consultations indicated that the public sector agencies have a strong interest in developing this corridor
- Access to ROW will drive the private sector investment



State Route 60 – Broadband Speed



- State Route 60 has low internet speeds for most part, except for around Phoenix region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



State Route 60 – # of Service Providers



Observations:

- Beyond Phoenix area, rural and suburban portions of the La Paz, Apache, Gila, Navajo Counties primarily have one provider or less
- This affects access to broadband as well as overall affordability in these regions
- Intermittent middle-mile network around Phoenix do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
La Paz County	62.0 %	38.4 %	100.0 %	20,878
Maricopa County	1.0 %	8.1 %	9.0 %	396,086
Pinal County	10.0 %	27.1 %	37.0 %	156,888
Gila County	31.0 %	61.3 %	92.0 %	49,375
Navajo County	55.0 %	44.3 %	99.3 %	108,429
Apache County	99.7 %	0.3 %	100.0 %	71,511

Sources: ESRI, FCC, ACS 2019



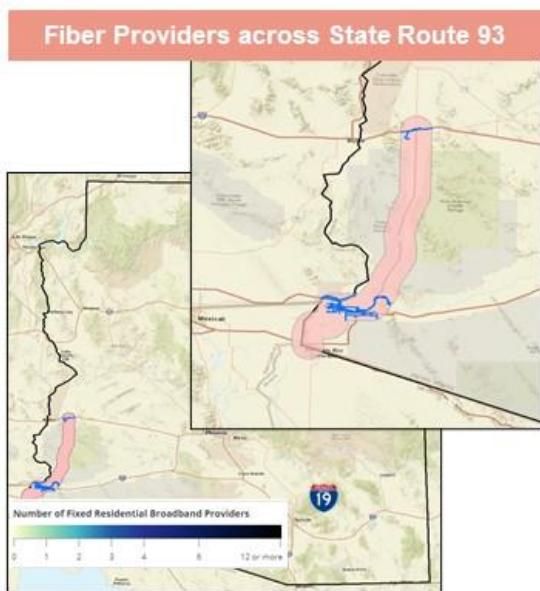
State Route 60 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	30.0	<ul style="list-style-type: none"> Highest underserved households served / \$ public investment 90% of the state route corridors unserved households are located within 5 mile radius of the state route 60
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	10.0	<ul style="list-style-type: none"> Cox, Zayo, and Allstream have existing fiber presence West and east portions of the state route 60 have an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	12.0	<ul style="list-style-type: none"> Six population centers are covered by the state route – approximately 846k households are residing within 5-mile radius of the corridor
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	12.0	<ul style="list-style-type: none"> Stakeholder consultation identified good interest for Phoenix to New Mexico Stateline Segments from Phoenix to Show Low City and US-77 to I-40 were identified as priority corridors Tribal Nation and Sun Corridor Network have interest in developing this corridor
TOTAL		64.0 points	

Source: ACA Analysis

95

State Route 95 – Existing Fiber Presence / Providers



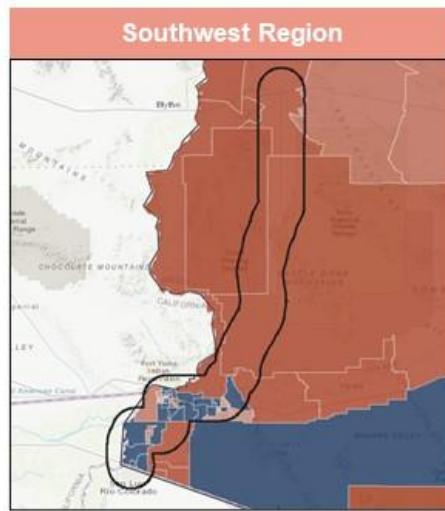
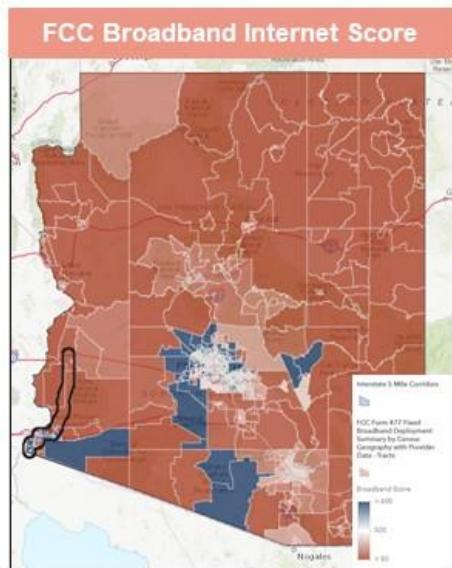
Company	Footprint	Fiber Mileage (within 5-mile buffer)
UPN	National Fiber Company	78
LUMEN (formerly CenturyLink)	National Fiber Company	33
Syringa	National Fiber Company	32
verizon	National Wireless Company	31
xc communications	National Fiber Company	31
zayo	National Fiber Wholesaler	31
windstream	National Fiber Company	30
TDS	National Fiber Company	21
cogent	National Fiber Company	15
AT&T	National Wireless Company	12

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of state route
Sources: ACS 2019 data

- Limited fiber presence around south and north areas of the corridor

95

State Route 95 – Broadband Speed



- State route 95 has low internet speeds for the entire corridor, except for around Fort Yuma Indian Reservation area which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



State Route 95 – # of Service Providers



Observations:

- La Paz and Mohave counties have primarily one or less providers
- Intermittent middle-mile network do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
La Paz County	62.0 %	38.4 %	100.0 %	20,878
Mohave County	28.0 %	68.8 %	97.0 %	200,613

Sources: ESRI, FCC, ACS 2019



State Route 95 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	15.0	<ul style="list-style-type: none"> Very high unserved/underserved covered / \$ of public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	25.0	<ul style="list-style-type: none"> UPN and Lumen have existing fiber presence Almost entire corridor has an average internet speed of less than 50/10 Mbps, except for the southwest area
3	Population Centers Covered / Points of Presence Addressed	8.0	<ul style="list-style-type: none"> Two population centers are covered by the state route – approximately 70,700 households are residing within 5-mile radius Corridor could serve as a loop between I-8, I-10, & I-40
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	12.0	<ul style="list-style-type: none"> Stakeholder consultations indicated good interest from the public sector agencies to develop this corridor
TOTAL		60.0 points	

Source: ACA Analysis



State Route 89 – Existing Fiber Presence/Providers

Fiber Providers across US-89



- Feedback from stakeholder consultations indicated that existing fiber and capacity is concentrated around Flagstaff area
- Capacity primarily utilized for long haul/transit traffic and metro traffic
- Limited capacity and appetite to support connectivity to serve residential demand north of Flagstaff

Top Providers^a

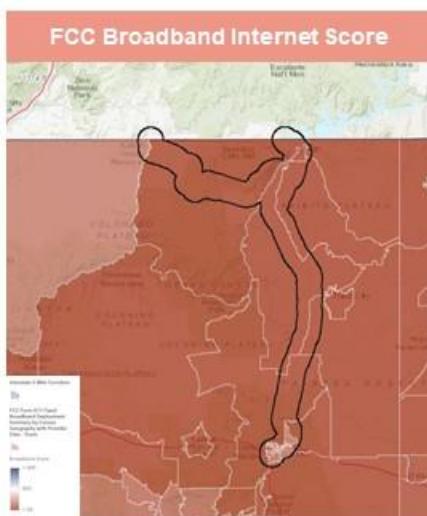
Company	Footprint	Fiber Mileage (within 5-mile buffer)
suddenlink	National Cable Company	60
LUMEN (formerly CenturyLink)	National fiber Company	27
Xfinity (Now Suddenlink)	Regional Cable Company	22
Legacy NPG	National Cable Company	21
AT&T	National Wireless Company	19
UPN	National Fiber Company	3

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of state routes

Sources: ACS 2019 data



State Route 89 – Broadband Speed



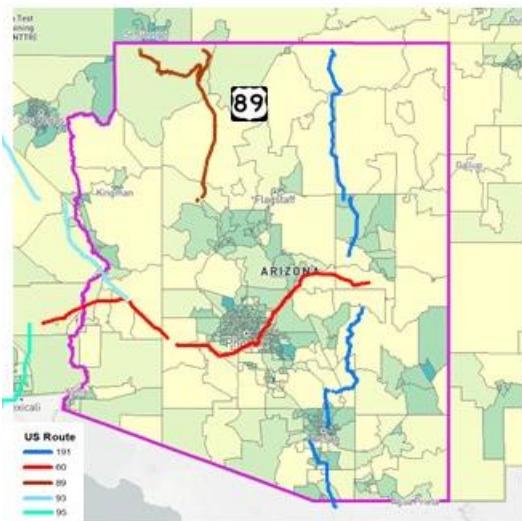
Sources: ESRI, FCC, ACS 2019

- US-89 has low internet speeds for most part, except for around Flagstaff region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed



State Route 89 – # of Service Providers

Number of Providers



Observations:

- Beyond Flagstaff area, rural and suburban portions of the Coconino County primarily have one provider or less
- This affects access to broadband as well as overall affordability in these regions
- Intermittent middle-mile network around Flagstaff do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Coconino County	49.0 %	40.0 %	89.0 %	125,607

Sources: ESRI, FCC, ACS 2019



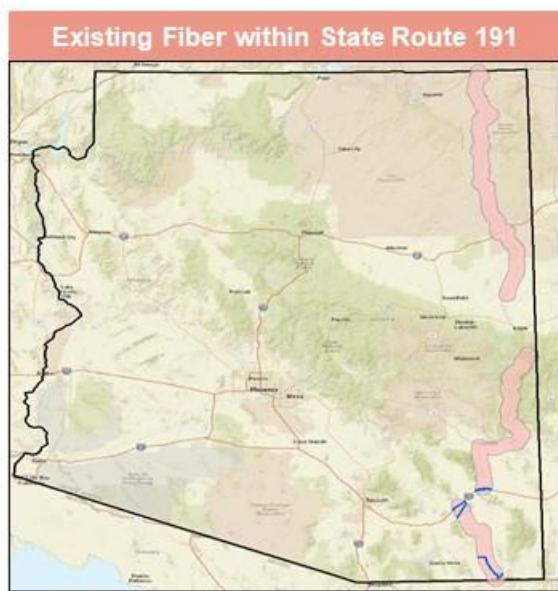
State Route 89 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	4.0	<ul style="list-style-type: none"> 30% of households along US-89 state route are unserved / underserved Most attractive state route in terms of households served per \$ of public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	30.0	<ul style="list-style-type: none"> Suddenlink and Lumen have existing presence; however, corridor has more than 10k unserved / underserved households Existing fiber presence is concentrated around Flagstaff area Large portion of the state route US-89 has an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	5.0	<ul style="list-style-type: none"> One population center (Flagstaff) is covered by the state route US-89 – approximately 34,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	12.0	<ul style="list-style-type: none"> Flagstaff to Utah Stateline is estimated to be a high value segment, particularly for Navajo Nation and Coconino County Stakeholder consultation indicated keen interest by public agencies to develop this corridor for their operational needs
TOTAL		51.0 points	

Source: ACA Analysis



State Route 191 – Existing Fiber Presence / Providers



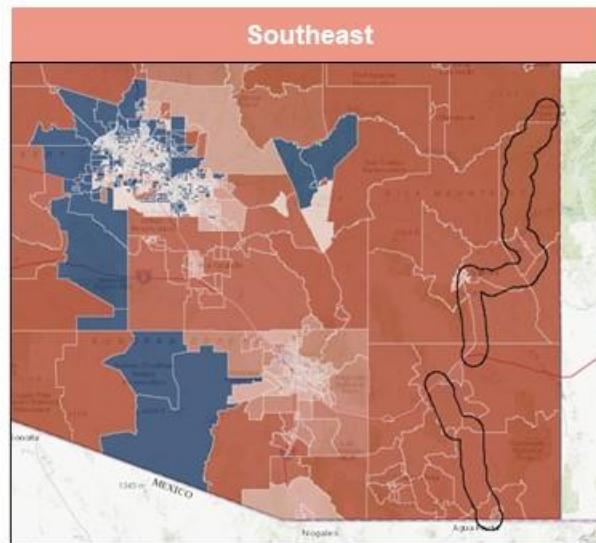
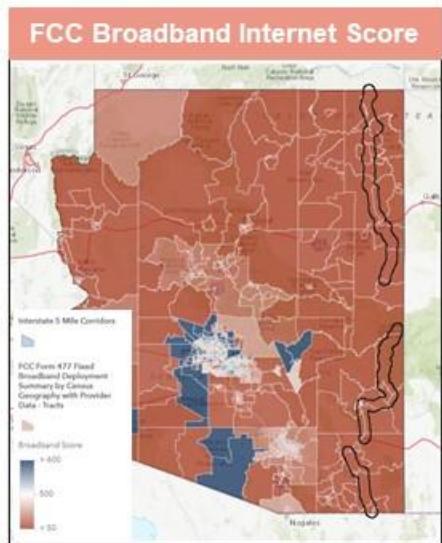
Company	Footprint	Fiber Mileage (within 5-mile buffer)
zayo	National Fiber Wholesaler	53
Valley	Regional Fiber Company	30
windstream.	National Fiber Company	29
(former LUMEN) Century Link	National Fiber Company	23
verizon	National Wireless Company	23
xc communications	National Fiber Company	23
AT&T	National Wireless Company	21

Notes: (a) Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of state route
Sources: ACS 2019 data

- Feedback from stakeholder consultations indicated interest from the public sector agencies to develop segment from Mexico border to Sanders or Red Mesa
- No continuous fiber presence across the corridor with moderate private sector interest for development



State Route 191 – Broadband Speed



- State Route 191 has low internet speeds for the most part
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019

191 State Route 191 – # of Service Providers



Observations:

- Apache and Cochise counties have primarily one or less providers
- Intermittent middle-mile network do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Apache County	99.7 %	0.3 %	100.0 %	71,511
Greenlee County	47.0 %	18.7 %	66.0 %	6,271
Graham County	33.0 %	42.0 %	75.0 %	28,554
Cochise County	32.0 %	66.1 %	98.0 %	123,211

Sources: ESRI, FCC, ACS 2019

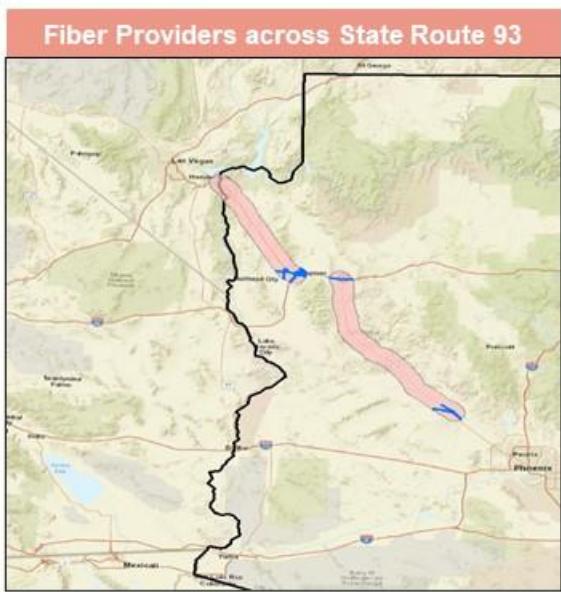
191 State Route 191 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	2.0	<ul style="list-style-type: none"> Low number of underserved households covered per \$ of public investment Low population density and # of unserved / underserved households
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	25.0	<ul style="list-style-type: none"> Zayo and Valley have small level of fiber presence along the corridor Overall, this corridor has less than optimal speed as compared to other corridors
3	Population Centers Covered / Points of Presence Addressed	10.0	<ul style="list-style-type: none"> Four population centers (Apache and Cochise counties) are covered by the corridor – approximately 25,000 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	12.0	<ul style="list-style-type: none"> Sun Corridor Network have interest to develop a segment from Mexico border to Sanders or Red Mesa
TOTAL		49.0 points	

Source: ACA Analysis



State Route 93 – Existing Fiber Presence / Providers

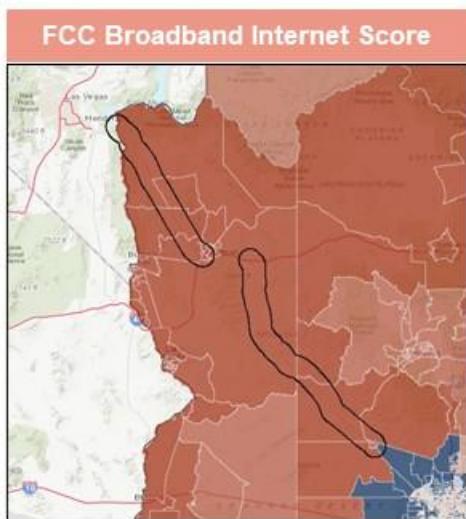


Company	Footprint	Fiber Mileage (within 5-mile buffer)
suddenlink	National Cable Company	43
zayo	National Fiber Wholesaler	42
windstream	National Fiber Company	30
allstream	National Fiber Company	27
AT&T	National Wireless Company	22
Rail America Row	????	7

- Existing fiber presence around an intersection of I-40 and state route 93 near Kingman
- Wickenburg to Kingman segment has potential interest from the private sector



State Route 93 – Broadband Speed



- State route 93 has low internet speeds for most part, except for around Kingman region which reflects speeds ranging 50 Mbps to 100 Mbps (upload) and 10 Mbps to 25 Mbps (download)
- A "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed

Sources: ESRI, FCC, ACS 2019



State Route 93 – # of Service Providers

**Observations:**

- Mohave and Yavapai counties have primarily one or less providers
- Intermittent middle-mile network do not serve rural residential demand due to underlying economics

	% of Population with No Providers	% of Population with Only One Provider	% of Population with One provider or less	Population with One Provider or Less
Mohave County	28.0 %	68.8 %	97.0 %	200,613
Maricopa County			Covered as part of state route US-60	
Yavapai County	21.0 %	68.5 %	89.0 %	203,846

Sources: ESRI, FCC, ACS 2019



State Route 93 – Corridor Evaluation Score

Nos.	Evaluation Criteria	Score	Remark(s)
1	Unserved/Underserved Households Covered per \$ Public Investment	2.0	<ul style="list-style-type: none"> Low unserved/underserved covered / \$ of public investment
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	25.0	<ul style="list-style-type: none"> Suddenlink and Zayo have existing fiber presence around Kingman area Almost entire corridor has an average internet speed of less than 50/10 Mbps
3	Population Centers Covered / Points of Presence Addressed	8.0	<ul style="list-style-type: none"> Three population centers are covered by the state route – approximately 20,400 households are residing within 5-mile radius
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	10.0	<ul style="list-style-type: none"> Stakeholder consultations identified two segments: Wickenburg to Kingman and Kingman to Nevada Stateline as corridors of interest for the public sector agencies
TOTAL		45.0 points	

Source: ACA Analysis

State Routes Prioritization Results

#	Evaluation Criteria	SR-69	US-60	SR-95	SR-89	US-191	SR-93
1	Unserved/Underserved Households Covered per \$ Public Investment	20	30	15	4	2	2
2	Lack of Existing Fiber Presence or Excess Capacity to Serve Unserved / Underserved Households	30	10	25	30	25	25
3	Population Centers Covered / Points of Presence Addressed	5	12	8	5	10	8
4	Public Sector Agencies' and Tribal Nations' Interest in the Project	15	12	12	12	12	10
TOTAL		70 points	64 points	60 points	51 points	49 points	45 points

Source: ACA Analysis

Acknowledgements

The Arizona Commerce Authority would like to acknowledge stakeholders who collaborated to identify strategic goals, initiatives and benchmarks that will assist the State of Arizona in meeting the public's high expectations for broadband services.

ACA facilitated various working sessions and consultation interviews with a group of community stakeholders selected by ACA. During these sessions, participants engaged in a series of conversations designed to validate and further define the themes from the focus group meetings.

We want to extend a special thank you to all of the state leadership, local subject matter experts and community partners that participated in the stakeholder consultation sessions, personal interviews, and planning process. Each person's contributions were vital to the development of this addition to the 2018 Strategic Plan.

About Arizona Commerce Authority

Background

The Arizona Commerce Authority coordinates broadband development activities in partnership with state and local government stakeholders and the private sector to streamline regulatory hurdles and maximizes strategic broadband funding for Arizona.

Reliable, high-speed internet has become an essential element of 21st-century life. It's as ubiquitous as electricity, water, and transportation. Increased connectivity impacts public health and safety, education, health care and transportation across both rural and metropolitan communities. The ACA works to expand the state's digital infrastructure statewide to improve the economy and quality of life of today's Arizonans.

Learn more about broadband using the resources provided on our website:

<https://www.azcommerce.com/broadband/>

Contact Us

The State Broadband Director facilitates the enhancement of broadband connectivity to Arizona's rural regions, streamlines regulatory hurdles and works with communities to maximize federal resources.

If you have questions, please contact us and we will help provide additional information or support.

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