North County Broadband Strategic Plan

March 2023

Table of Contents

List of Figures

List of Tables

Executive Summary

In October of 2022 the Cities of Atascadero and Paso Robles (collectively "North County") embarked on a regional effort to assess the broadband condition of their respective communities driven by a view that broadband is becoming the fourth utility. Determined to set a course for a broadband future, the Cities selected TeleworX to develop this North County Broadband Strategic Plan ("the Plan").

With State and Federal broadband funding at historic levels, the Cities took a regional approach (e.g., Atascadero and Paso Robles working together) to accelerate planning in the quest for enhanced broadband infrastructure solutions.

Through community outreach, stakeholder engagement, data analysis, development and assessment of network, business, and operating models, a comprehensive Plan was developed including:

- A comprehensive broadband needs and market analysis
- Internet Service Provider (ISP) engagement and Request for Information (RFI) assessment
- Network design to inform broadband operating model alternatives
- Assessment and recommendations for a broadband course of action for the Cities, including public-private partnerships (PPPs)

While the methodology and analysis for this Plan is regional, recommendations are City specific.

The analysis of the broadband market in North County indicates that Paso Robles and Atascadero are reasonably well served according to the standards set by the Federal Communications Commission (FCC) and the California Public Utilities Commission (CPUC). Only 1.3% of households in Paso Robles and 3.8% in Atascadero are considered "unserved". In contrast, the results of the Needs Assessment Survey indicate significant dissatisfaction with current ISP service offerings with respect to cost (73% dissatisfied), speed (25% dissatisfied), and reliability (35% dissatisfied). In short, the broadband status quo fails to meet the expectations of the Cities and their residents.

The Cities possess attractive demographics including high income levels and population density which are the key drivers in broadband deployment. Atascadero has a population density of more than 1,100 per square mile and Paso Robles has a density of more than 1,600 per square mile. For context, citywide fiber networks have been or are being built in cities across the US with densities in the 1,000 households per square mile[1] range. The combination of high-income levels and density create "broadband positive" conditions for the Cities that can support robust, modern broadband networks.

Broadband positive conditions juxtaposed against the imperative of 100% broadband availability, which is the goal of the California Broadband for All initiative, led to an important upgrade of City objectives during the development of this Plan. The strategic framework evolved from addressing unserved and underserved areas to seeking and ensuring a path towards 100% availability of fiber-to-the-home (FTTH) broadband services capable of 1000 Mbps (1 gigabit per second) symmetrical speeds[2]. This upgrade in

---

[1] Kansas City, KS, Rancho Cordova City, CA, Ventura City, CA

[2] Symmetrical speeds have equivalent downstream and upstream speeds and are becoming increasingly important for video conferencing, AR/VR and other upload intensive applications such as gaming.

the Cities' objectives is further supported by ambitious economic development plans that require best-in-class broadband infrastructure and services. Becoming "gigabit symmetrical Cities" is a highly desired feature needed to compete in the economic development arena.

Two other important factors that shape this strategic plan include an "expectation leveling" for broadband funding and the need to engage with the ISPs in a "light form" private- public partnership (PPP):

1) **Broadband Funding**: Municipal funding through grants is available today and additional funding is forthcoming through the much discussed $65 billion Infrastructure Investments and Jobs Act (IIJA). That said, municipal funding from state and federal sources will be oversubscribed and largely targeted to rural unincorporated areas and the more disadvantaged communities across California and the US. There is a lane for North County to apply for and receive funding but not enough and not with sufficient probability to serve as the basis for this strategic plan.

2) **Light Form Private-Public Partnership (PPP)**: Engagement with the ISP community through an initial Request for Information (RFI) and a subsequent request for concept proposals confirmed the ability and willingness of ISPs to collaborate with the Cities provided there is a level of support and other financial inducements.

This process points to broadband business models that favor a light-form PPP which do not require significant financial investment by the Cities in the form of bonds or other financial measures.

Recommendations and Next Steps

The basis for the Strategic Plan is engagement with the ISP community, principally the incumbent ISPs already present in North County. Significant effort has been taken to signal to the ISPs that the Cities of Atascadero and Paso Robles are ready and willing participants in ISP-led solutions that move the Cities closer to their objective of 100% availability of gigabit service. Importantly, the Plan complements expanded access with digital inclusion programs to achieve digital equity goals. Specific tasks and next steps are organized into an 18-month plan with three workstreams that are summarized below:

1. *Broadband Infrastructure.* Continue discussion of the ISP Concept Proposal(s) with incumbents or with out-of-area ISPs under the model of a light-form public-private partnership with the target to enter into and conclude negotiations leading to the ISP-led deployment of 1 Gbps broadband infrastructure across the Cities. In parallel, assess potential applications to Infrastructure Grants.

2. *Broadband Policies.* Maintain an active monitoring of FCC and CPUC broadband maps and data as a best practice for the Cities. In addition, improve the permitting processes and supporting tools to streamline broadband permits. Implement "broadband friendly" policies such as Dig Once, micro trenching, and conduit installation.

3. *Digital Inclusion.* Engage and coordinate with regional partners including libraries, school districts, higher education, community-based organizations (CBOs), and the Broadband Consortium of the Pacific Coast (BCPC) to support existing programs, apply for a CASF Adoption Funding Account grant to fund devices for digital inclusion programs, and support enrollment to the FCC Affordable Connectivity Program (ACP).

The development of the Plan has positioned the Cities to initiate discussions and negotiations with ISPs to implement a last-mile network capable of providing 100% access to gigabit symmetrical services, enabling the community to grasp the benefits of robust and affordable high-speed broadband access,

including attraction of investments, workforce development, improved healthcare, and increased productivity. Furthermore, the infrastructure side is complemented with digital inclusion programs to advance digital equity goals, ensuring alignment with the California Broadband for All Initiative.

The graphic below provides an overview of the North County Broadband Strategic Plan:
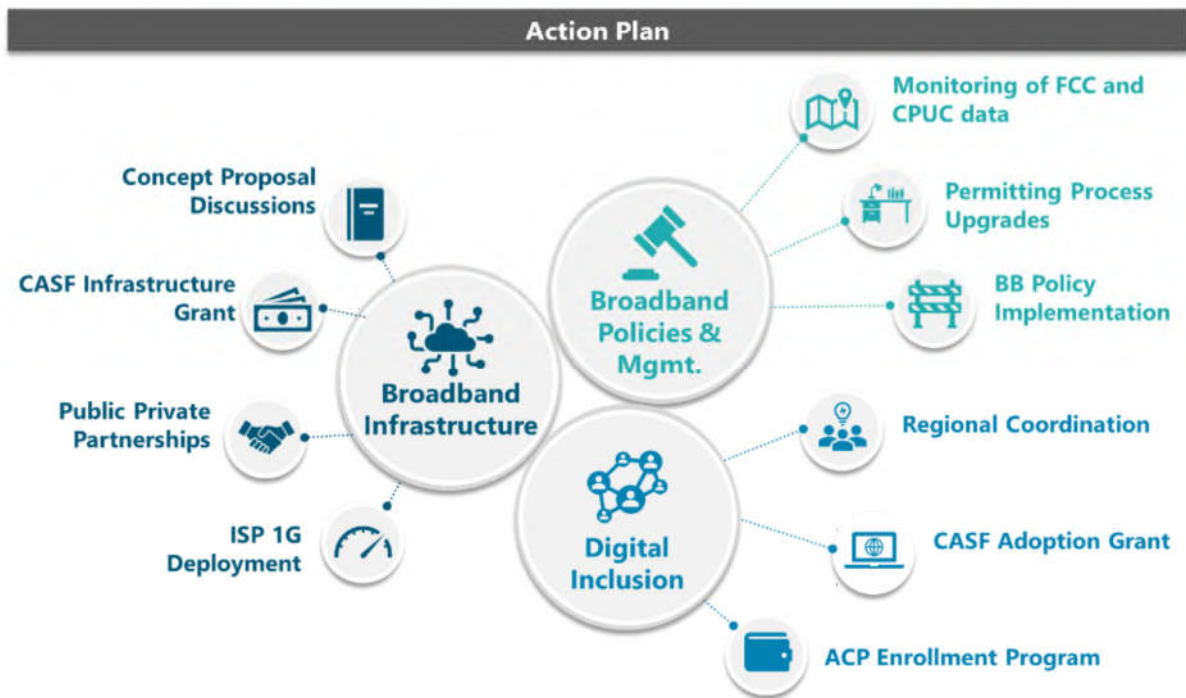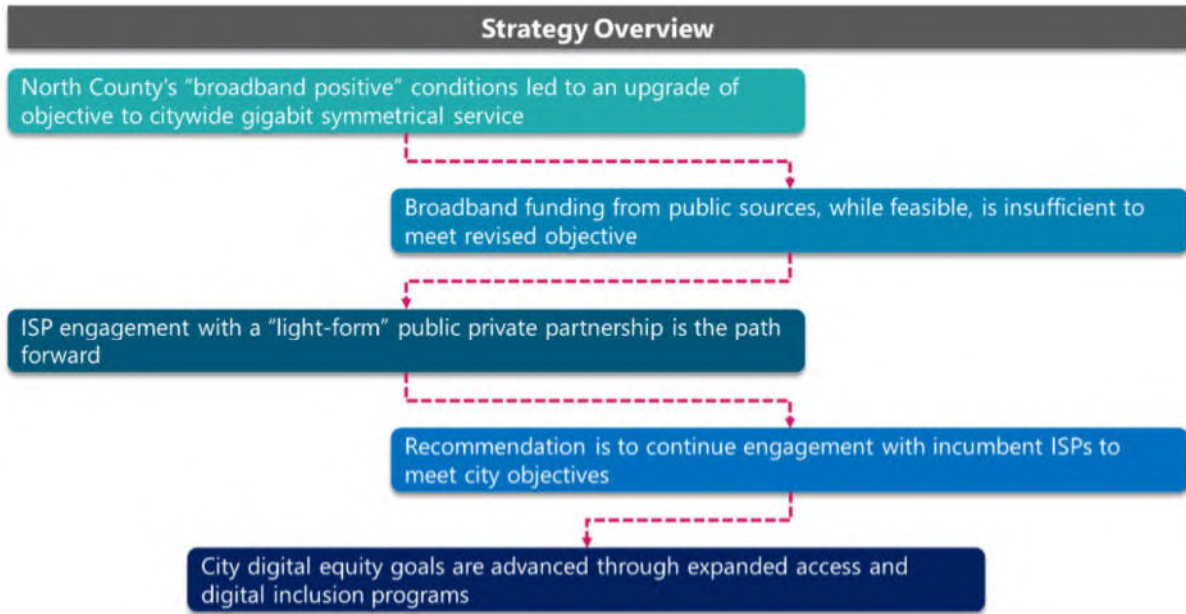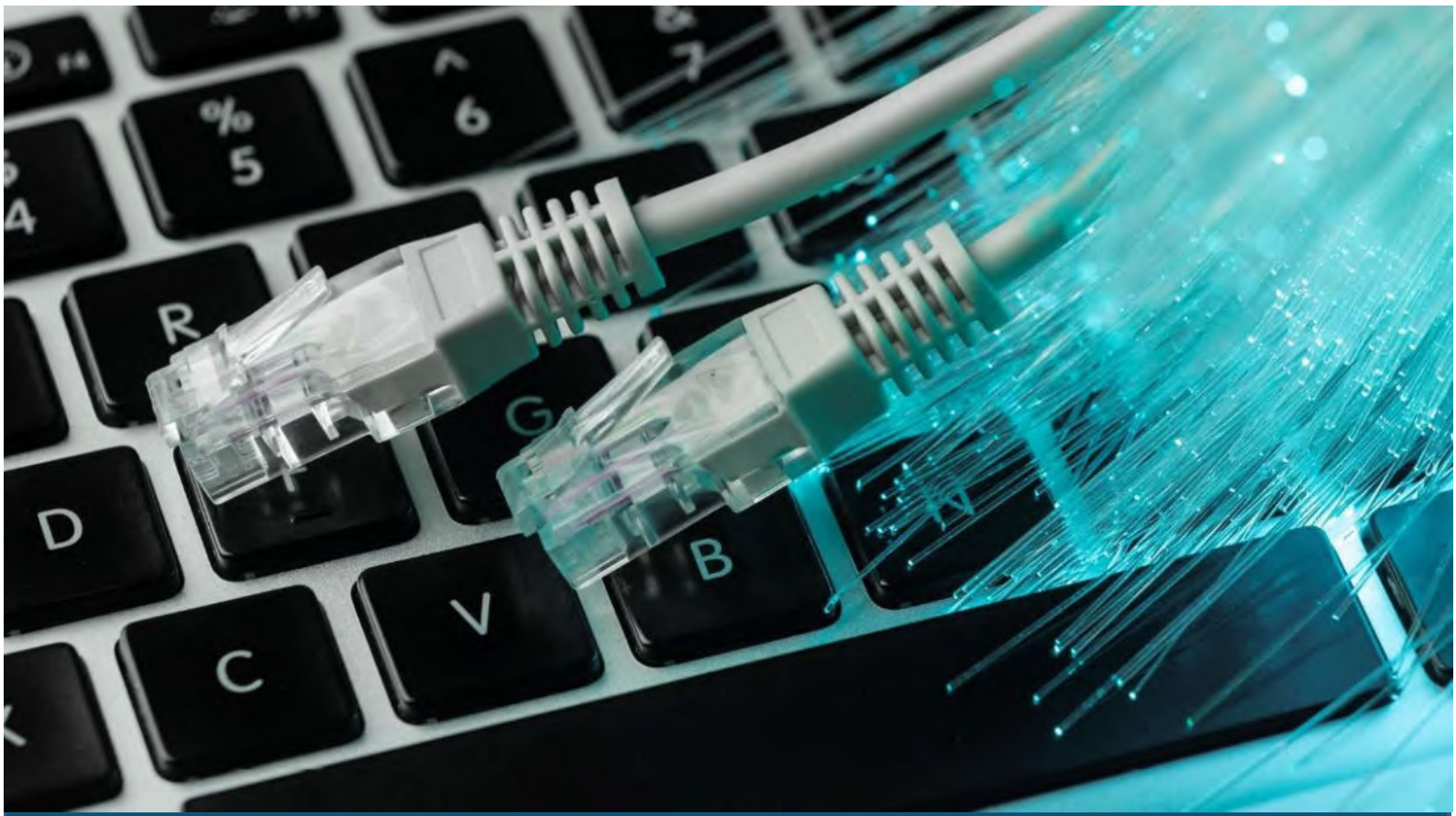
1 Introduction

The Cities of Atascadero and Paso Robles have joined efforts to accelerate the deployment of broadband infrastructure and services to provide higher quality, more affordable, and more inclusive internet coverage for businesses and residents while increasing disaster preparedness, encouraging industry competition, reducing the digital divide, and preparing our Cities for a Smart City vision for the future.

As part of this effort, the Cities of Paso Robles and Atascadero, collectively "North County" have formalized a Memorandum of Understanding (MoU) agreement to partner on the North San Luis Obispo County Broadband Strategic Plan.

The North County Broadband Strategic Plan was launched with the main objective of developing an actionable plan to accelerate the deployment of high-speed broadband infrastructure to provide our communities with broadband services that meet current and future bandwidth demands focusing on unserved and underserved areas while contributing to digital equity in the region in alignment with the *California Broadband for All* initiative.

The objective was upgraded during the Strategic Plan development process to deployment of 1 Gbps symmetrical service across the Cities from the more general objective of broadband services in alignment with the California Broadband for All initiative which has as its goal 100 Megabit/s (Mbps) downstream and 20 Mbps upstream. This upgrade in the objective for the Strategic Plan occurred after a positive assessment of City demographics and City, coupled with the fact that if the solution is FTTH then by any reasonable measure it should be 1 Gbps symmetrical service. The ultimate goal for this plan based on the objective upgrade is to provide FTTH access to 100% of the serviceable location across the Cities rather than the narrower unserved, underserved, and priority areas[3].

The Plan is supported by a comprehensive analysis of the existing City infrastructure, current ISPs and their offerings, and the location and extent of unserved and underserved communities which are still key to shaping the plan and assess funding options. This analysis informs the network design scenarios and strategies to trigger broadband infrastructure deployment in priority areas and ideally throughout the Cities with the resulting benefits of economic development, digital inclusion, and improved quality of life of our residents.

The development of this Strategic Plan has been funded via a Local Agency Technical Assistance (LATA) grant[4], a program operated by the California Public Utilities Commission (CPUC) to facilitate development of broadband network deployment projects in areas of need.

TeleworX LLC, a Virginia based telecommunications consulting firm with national and international experience in the development of broadband strategies and networks was selected to develop this Plan in response to Request for Proposal (RFP)/ Request for quotation (RFQ) Number CD-2022-01 requested by the Cities of Atascadero and Paso Robles.

1.1 What is Broadband?

The FCC prevailing definition of broadband, established in 2015, is internet access that provides users with the ability to transmit data at a minimum download speed of 25 Megabits per second (Mbps) and a minimum upload speed of 3 Mbps. The FCC, and other federal and state agencies, use this definition as a threshold to determine areas that have or don't have acceptable broadband service and to set national broadband deployment goals and funding priorities.

The California Broadband for All[5] initiative, developed by the California Broadband Council under the auspices of the California Department of Technology is a "roadmap to accelerate the deployment and adoption." Released in 2020 and reviewed annually, it establishes a goal for statewide broadband at 100/20 Mbps.

In July of 2021, Senate Bill SB-156[6] was signed by Governor Newsom, and among other items, it changed the CPUC's definition of "served" to greater than or equal to 25 Mbps download and 3 Mbps upload, in alignment with the FCC definitions. Speeds falling below that standard are deemed "Unserved". "Priority Unserved" refers to speeds below 10 Mbps downstream and/or 1 Mbps upstream. The definition of "Underserved" is also introduced in this document to address the state goal of speeds > 100/20 Mbps

---

[3] Priority areas refer to those areas where low-income and socially disadvantaged communities are located plus areas that are key for economic development as defined by the Cities.

[4] Local Agency Technical Assistance Grant Program (ca.gov)

[5] Broadband for All Cover Letter and Action Plan 2020 (ca.gov)

[6] Bill Text - SB-156 Communications: broadband.

and that the Last Mile Federal Funding Account[7] considers eligible not only unserved areas but also "households and businesses with an identified need for additional broadband infrastructure investment". Therefore, this document considers speeds equal to or higher than 25/3 Mbps but lower than 100 / 20 Mbps as "Underserved". Figure 1 summarizes these definitions.
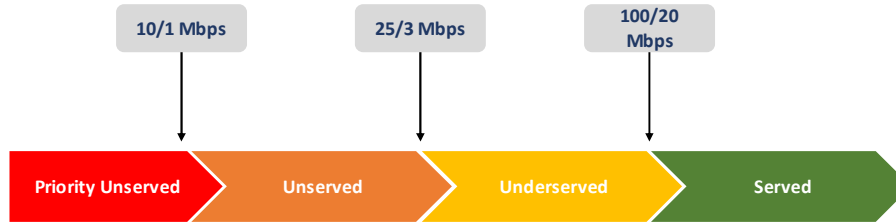
Figure 1. Broadband Service Speeds Definitions

On July 15, 2022 the FCC launched a "Notice of Inquiry" that proposes to increase the national broadband standard to 100 Mbps for download and 20 Mbps for upload. Moreover, the Notice of Inquiry proposes to set a separate national goal of 1 Gigabit per second (Gbps)/500 Mbps for the future.

Broadband is a moving and escalating standard. The upward direction of broadband standards is a key factor in the decision to upgrade the objective for North County Broadband Strategic Plan to 1 Gbps symmetrical service.

1.2 Why Broadband, Why now?

It is apparent that our lives are becoming increasingly digital and interconnected, leading to the need for high-speed broadband in many daily activities. Broadband access and adoption have far-reaching impacts, including work, health, education, banking, eCommerce, and many others. It also advances economic development by enabling online job searches, job creation, and access to the digital economy. Furthermore, broadband can enhance government services by improving online access to the administration and thus bringing government and public services closer to the citizens.

What is Broadband?

Broadband definitions are an expression of speed measured in bits per second. Broadband is a moving and escalating standard.

Another crucial aspect of broadband is public safety, as it can aid in disaster and emergency response by ensuring early and frequent communication during emergency events. In addition, broadband can contribute to sustainability by facilitating the use of smart efficient technologies that include remote sensors, optimization of energy consumption and road traffic management, among others. Broadband technologies are a facilitator of the concept of Smart City, which uses broadband capacity to bring all these capabilities together.

---

[7] Federal Funding Account Program Rules and Guidelines

Broadband improves quality of life by providing access to entertainment through streaming services, online games, and social media interactions. As the world continues to shift toward a hybrid physical and virtual environment, high-speed broadband will become increasingly necessary for individuals and communities to thrive in multiple aspects of daily life.

- A study by Stanford University[8] found that remote work leads to a 13% increase in productivity.

- A report by Global Workplace Analytics[9] estimated that companies can save up to $11,000 per year per employee by allowing them to work remotely, reducing office space requirements, lowering utility costs, and decreasing absenteeism.

- A study conducted through searching different medical databases identified the important role of telehealth services in preventing, diagnosing, treating, and controlling diseases during COVID-19 outbreak[10].

- An article from Salesforce showed that E-government can help modernize administration procedures, improve economies, and promote transparency in the process[11].

- An article from Granicus, a provider for government online solutions, states that online communication can increase citizen participation rates by providing flexible access to participate and democratize community voices, bringing new opinions and options to the light of day[12].

- A report from Pew Research[13] showed that 70% of Americans over the age of 65 now use the internet, and many of them use it for online shopping, eliminating the physical barriers that may prevent them from visiting stores.

The Digital Divide

The digital divide refers to the gap between those who have access to high-speed broadband services and those who don't. The lack of broadband access has significant consequences for individuals and communities, including educational and economic disadvantages, limited access to healthcare and social and political isolation. It is therefore crucial to address this issue to achieve digital equity, "a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy"[14].

The motivation for large scale federal and state funding initiatives is to close the digital divide. The most important initiatives are summarized below:

---

[8] Does Working from Home Work? Evidence from a Chinese Experiment | Stanford Graduate School of Business

[9] Telework Savings Potential - Global Workplace Analytics

[10] The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence - PMC (nih.gov)

[11] Advantages and Obstacles of Making the Transition to E-Government - Salesforce.com

[12] 8 Advantages of Online Communication | Granicus

[13] Share of tech users among Americans 65 and older grew in past decade | Pew Research Center

[14] The Digital Equity Act of 2021

1. *The American Rescue Plan Act of 2021*[15] includes funding for broadband infrastructure deployment and affordable adoption, particularly in rural and low-income areas. The American Rescue Plan Act created the Emergency Connectivity Fund[16], providing $7.171 billion to reimburse schools and libraries for providing free broadband service (and connected devices) to students and patrons at their homes.

2. *The California Broadband for All Action Plan*[17] which led to SB 156, aims to provide high-speed broadband access to all Californians by 2030 through a comprehensive approach that includes increasing infrastructure investment, streamlining permitting processes, and promoting public-private partnerships.

3. *The SB-156 initiatives*[18] focus on identifying and addressing broadband service gaps through the deployment of broadband infrastructures in unserved and underserved areas of the state, typically formed by rural and low-income communities. As part of the state's 2021 Budget, SB 156 (Chapter 112, Statutes of 2021) allocated a $6 billion multi-year investment to this effort.

4. *The Federal Infrastructure Investment and Jobs Act (IIJA)*[19] provides $65 billion in investment funding for high-speed broadband infrastructure projects.

5. *The Broadband Equity, Access & Deployment (BEAD) program*[20] a major component of the IIJA, provides $42.45 billion in funding to support broadband infrastructure deployment and adoption, particularly in underserved and disadvantaged communities.

The North County Broadband Strategic Plan establishes a strategy to improve and accelerate the state of broadband while closing the digital divide and preparing the communities for a broadband future.

1.3 Broadband Technologies and concepts

1.3.1 Broadband Concept and Architecture

Broadband refers to telecommunications technologies that provide high-speed internet connections to end users including households, businesses, and anchor institutions.

Broadband connectivity provides users with access to advanced digital services such as telehealth, E-Learning, remote working, videoconferencing, interactive gaming, and pervasive video monitoring. The FCC has defined the minimum download speeds required for adequate performance of typical online activities[21], which are displayed in Table 1.

---

[15] American Rescue Plan | The White House

[16] Emergency Connectivity Fund | Federal Communications Commission (fcc.gov)

[17] Action Plan | California Broadband Council

[18] State of California Middle-Mile Broadband Initiative

[19] Infrastructure Investment and Jobs Act - IIJA

[20] Broadband Equity, Access, and Deployment (BEAD) Program | BroadbandUSA (doc.gov)

[21] Broadband Speed Guide | Federal Communications Commission (fcc.gov)

Table 1. FCC's Broadband Speed Guide

Activity	Minimum download speeds (Mbps)
General Browsing and Email	1
Voice over Internet Protocol (VoIP) Calls	Less than 0.5
E-learning	5 - 25
Telecommuting	5 - 25
File Downloading	10
Social Media	1
Streaming High Definition (HD) Video	5 - 8
Streaming Ultra HD 4K Video	25
Standard Personal Video Call (e.g., Skype)	1
HD Personal Video Call (e.g., Skype)	1.5
HD Video Teleconferencing	6

It is noteworthy that the available connection bandwidth for a broadband connection is distributed among all services that are simultaneously being utilized. Therefore, a broadband connection must have sufficient bandwidth to accommodate a range of services at the same time.

ISPs are the companies that provide broadband connectivity to the global Internet network. To acquire the services of an ISP, a physical link must be established between the customer premise and the ISP's Point-of-Presence (PoP).

The broadband network is subdivided into distinct segments, each of which manages a larger number of connections and data volumes. These segments are referred to as the "last mile/access network", "middle mile", and "backbone" or "first mile". Figure 2 displays these network segments.
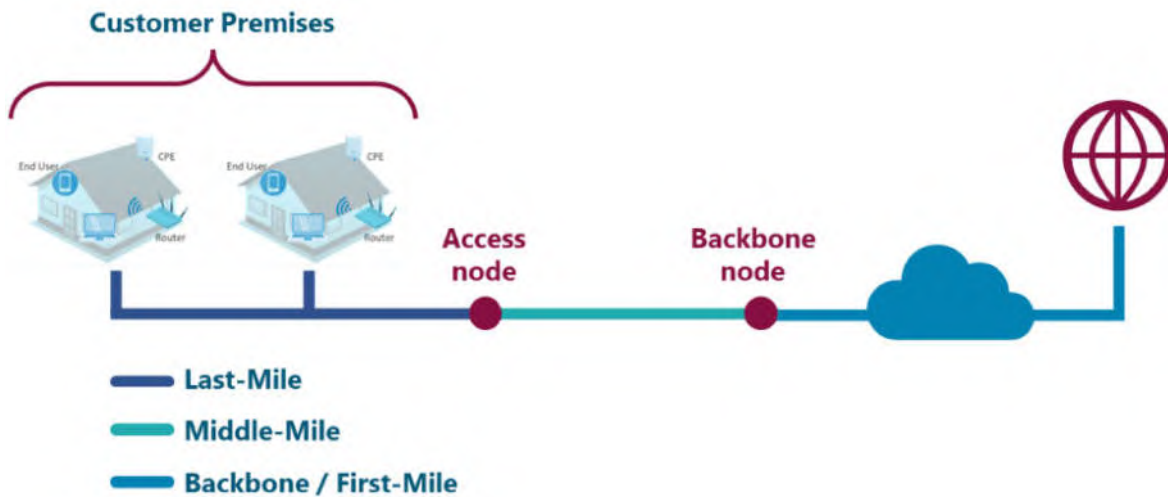
Figure 2. High-level broadband network architecture.

Customer Premises

A "customer premise" refers to a specific location where users access and utilize the internet. This may include residential homes, businesses, enterprises, or community anchor institutions. Premises are also referred to as "broadband serviceable locations".

The internet connection provided by the ISP is terminated at a device known as the Customer Premises Equipment (CPE). The CPE facilitates local connections for users to access the internet, usually with a network cable or Wi-Fi connection.

Last Mile

The last mile segment of the network is situated in closest proximity to the customer and is responsible for establishing connections between individual customer premises and an access node. Each access node consolidates connections from numerous customer premises.

In comparison to other segments of the network, the last mile segment offers the lowest bandwidth. Nonetheless, it has sufficient capacity to accommodate the bandwidth requirements of a specific number of customers. The cost of the last mile segment can be quite significant and is subject to variations based on the density of households in the area.

The selection of a particular technology for the implementation of the last mile segment will depend on several factors, including bandwidth requirements, economic considerations, and geodemographic conditions. Some of the currently available technologies for implementation of this segment include:

- Digital Subscriber Line (DSL)
- Data Over Cable Service Interface Specifications (DOCSIS)
- Fiber-to-the-Home (FTTH)
- Fixed Wireless Access (FWA)
- Satellite

Middle Mile

The Middle Mile segment of the network encompasses the connections established between each access node and an aggregation node. The primary function of each aggregation node is to group the connections of multiple neighborhoods or small towns. It serves as an intermediate layer between the last mile segment which connects customer premises to access nodes and the backbone segment which carries traffic between aggregation nodes and the internet.

Typically, fiber optic technology is used to implement the middle mile segment due to its high bandwidth capacity. However, there are cases where deploying fiber infrastructure is not a viable option and wireless microwave links may be utilized as a more cost-effective alternative. For example, this may be the case when an access node is in a remote area or when the cost of fiber construction is prohibitively expensive due to the nature of the terrain.

Backbone

The backbone segment refers to a high-capacity network that provides interconnections between various ISP's PoPs and to local and remote data centers. The primary function of the backbone is to aggregate traffic from several large geographic regions, such as medium to large cities or major towns. As a result, the backbone links require a much higher bandwidth capacity than middle mile links since they transport a massive amount of data.

Given the bandwidth requirements of the backbone segment, it can only be effectively implemented using fiber optic technology, which provides the necessary high-speed data transmission capacity. The backbone segment plays a crucial role in the broadband infrastructure as it enables efficient transport of data over long distances, facilitating the interconnection between global internet networks.

1.3.2 Broadband Technologies

Although fiber optic technologies are widely used in the middle mile and backbone segments of broadband networks, a variety of broadband technologies are available for implementation in the last mile / access network segment. Thus, it is crucial to evaluate each technology and its characteristics, such as reliability, cost, reach, and bandwidth. The following section describes the most relevant technologies.

Digital Subscriber Line

Digital Subscriber Line (DSL) technology provides broadband services over existing telephone copper lines. A DSL modem serves as the CPE and the access node is implemented through a DSL Access Multiplexer (DSLAM) which is typically located at the local telephony exchange building.

DSL speeds are dependent on the distance between the customer location and the access node, with speeds ranging from a few hundred Mbps at distances less than 300 feet to 20-30 Mbps at distances greater than 0.5 miles. Longer distances, beyond several miles, may impede the use of this technology in the last mile section of the network.

Broadband networks that use existing copper wires usually require low investment as they reuse existing infrastructure. However, these infrastructures are old and prone to failure, especially in long cable runs.

Figure 3 below depicts the high-level architecture for DSL technology.
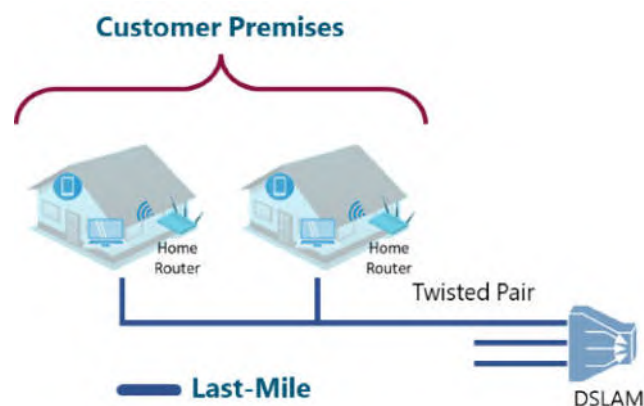
Figure 3. DSL high-level architecture

Data Over Cable Service Interface Specifications

Data Over Cable Service Interface Specifications (DOCSIS) technology allows cable providers to offer high-speed internet service to their customers over their existing coaxial cable infrastructure, which was originally designed for delivering cable TV signals. With DOCSIS, cable providers can leverage the existing network infrastructure to deliver internet speeds that can rival those of traditional DSL or some fiber-optic connections.

In the DOCSIS architecture the CPE is referred to as cable modem, and the access node as the Cable Modem Termination System (CMTS).

As in the case of twisted pairs, coaxial cables have a low cost and deployment effort since most of the cabling infrastructure is already in place and minimum upgrades (like user equipment and intermediate amplifiers) are required.

DOCSIS enables data speeds up to 1 Gbps and more with a maximum distance of 5 miles and good cable conditions. With this technology, the coaxial cable is shared with various subscribers, and so is the bandwidth, which is distributed between the subscribers making simultaneous use of the network. Figure 4 shows the associated architecture.
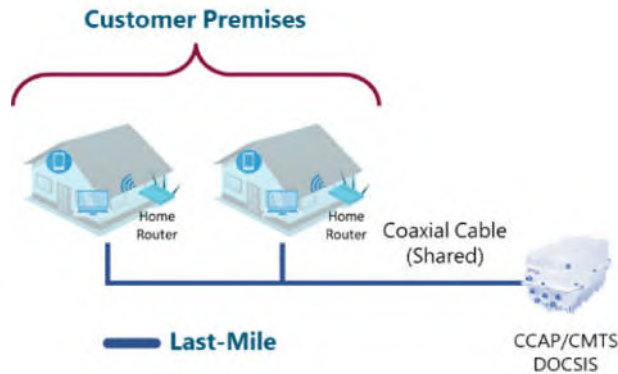
Figure 4. DOCSIS high-level architecture

Fiber-to-the Home

Fiber to the Home (FTTH) is a type of access network that employs fiber optic cables to connect many individual subscribers to the access node. Typically, FTTH is implemented through a passive optical network (PON) where the fiber cable emerging from the access node is "split" to reach multiple subscribers who will share the available bandwidth. The CPE in this architecture is referred to as an Optical Network Terminal (ONT), while the access node is known as an Optical Line Terminal (OLT).

Fiber optic cables are very thin cables (the size of a human hair) made of glass that transport data in the form of light pulses, which are immune to electric or magnetic interference. Fiber optic systems enable bandwidths from hundreds of Mbps to hundreds or even thousands of Gbps and transmission over long distances. Importantly, distance and speed will depend on the transmission technology being used, that can be upgraded without modifying the fiber infrastructure. Thus, fiber installed today can achieve higher bandwidths by upgrading the equipment, ensuring a future-proof network.

One popular FTTH standards is XGS- Passive Optical Network (PON). XGS-PON is a 10-Gigabit-capable symmetric optical network that can deliver downstream and upstream line rates of 9.95328 Gbit/s per OLT optical port, shared by up to 64, 128, or 256 subscribers through fiber "splits". Additionally, an XGS-PON network supports a physical distance of up to 12.4 miles between OLT at the access node and ONTs at customer locations.

The costs associated with fiber networks are typically the highest when they require the construction of new infrastructure. Although the initial cost might seem high, the deployment of fiber provides robust future-proof networks with high reliability and extremely high bandwidth.

Deployments of FTTH can achieve symmetrical connections at the customer premises of up to 1000 Mbps downlink and 1000 Mbps uplink. Moreover, FTTH can be deployed by leveraging existing civil infrastructures such as electric poles and utility holes, which significantly reduces the capital expenditure (CAPEX).

The high-level architecture of a FTTH access network is presented in Figure 5 below.
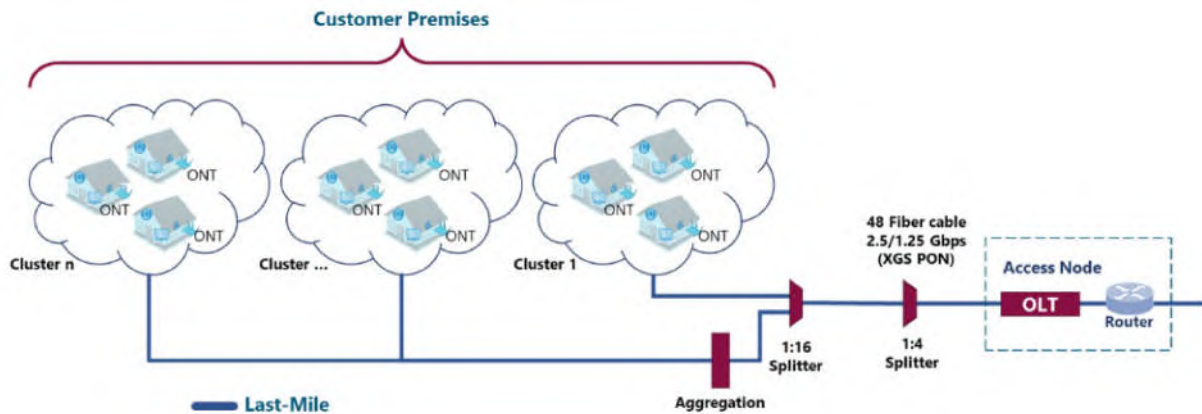
Figure 5. FTTH high-level architecture.

Fixed Wireless Access

Fixed Wireless Access (FWA) technology distributes broadband services to customer premises via wireless signals. Various techniques can be utilized to implement FWA, including Time-Division Multiple Access (TDMA), and more recently, 4G and 5G technologies. FWA services are typically provided by ISP or Mobile Network Operators (MNOs).

More recently, the FCC has reallocated the use of 3.5GHz spectrum known as Citizens Broadband Radio Service (CBRS) spectrum for use by private and public entities under various licensing regimes. This is an increasingly viable solution for rural communities.

In FWA, wireless signals are transmitted from antennas positioned atop high towers or buildings and received using CPEs located outside the customer's building.

The bandwidth capacity of FWA depends on the wireless technology being used. For instance, 4G technology can meet 25 Mbps/3 Mbps per subscriber, while 5G technology can provide services of 100 Mbps/20 Mbps or higher. Wireless propagation can be affected by weather conditions, which can interfere or attenuate the signal.

FWA is commonly considered a suitable alternative to FTTH when fiber deployment is too costly or when there are geographic constraints such as challenging terrain.

Figure 6 illustrates the high-level architecture for FWA technology.
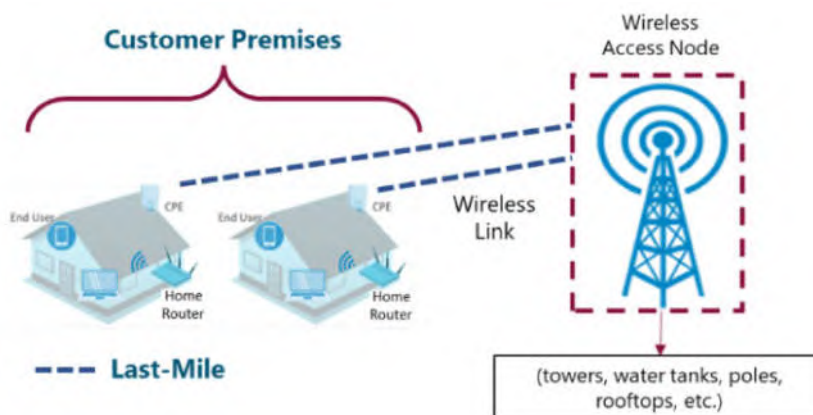
Figure 6. FWA high-level architecture

Satellite

Satellite broadband is an alternative wireless technology that enables high-speed bi-directional internet connections through communications satellites. The quality, speed, and cost of satellite connections vary depending on the type of satellites and their orbits. Low Earth Orbit (LEO) satellites, situated between 200 and 2,000 kilometers above the earth, provide high speeds at reasonable costs by using a constellation of satellites which is constantly changing in the sky. Geostationary satellites in contrast are positioned at altitudes of about 36,000 km which allows them to maintain the same position with respect to the Earth surface.

In satellite broadband, the CPE consists of a Very Small Aperture Terminal (VSAT) equipped with a flat (LEO) or parabolic (geostationary) antenna to establish a connection with the satellite, and a home router. The satellite relays the connection to the satellite hub, which links directly to a backbone node or ISP PoP.

Satellite links are sensitive to weather conditions, as it can affect the signal attenuation between the VSAT terminal and the satellites. This is especially important in the case of geostationary satellites due to the much longer link length.

Satellite systems are typically used in remote areas where neither fiber nor microwave links are viable, such as ranches, farms, or isolated homes. Costs associated with satellite services can be high, and the typical speeds offered are in the range of 25/3 Mbps for typical LEO systems.

The high-level network architecture for Satellite technology is captured in Figure 7.
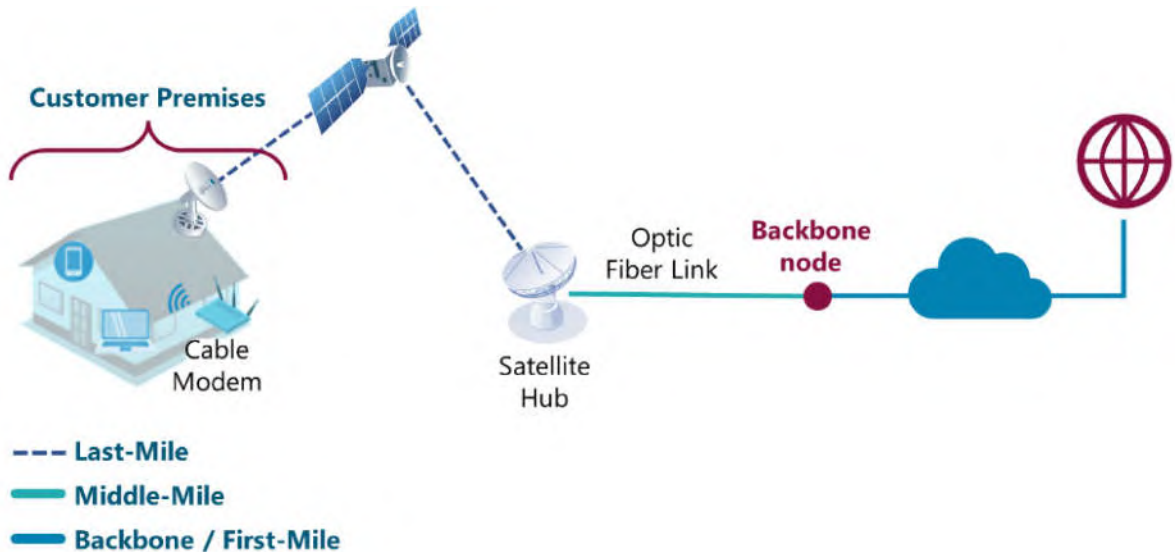
Figure 7. Satellite system high-level architecture

As a summary, Table 2 provides a comparison of the last-mile technologies described in this section.

Table 2. Last-Mile Technology Comparison

Last Mile Technology	Cost	Speeds	Reliability	Deployment Complexity
DSL	Low	• Low speeds • Decreases with the length of the copper line	High	Low
DOCSIS	Low	• Medium to high speeds • Decreases with the number simultaneous users	High	Low
FTTH	High	• Extremely high speeds/bandwidth • Easily upgraded to achieve faster speeds	High	High
FWA	Medium-high	• High speeds. • Signal strength decreases with distance, reducing data speed	High	Medium
Satellite	High (operating cost)	• Medium speeds • Regular user experience due to high signal delay	Low to medium	Low (considering satellites are in place)

1.4 Project Scope & Approach

The scope of the North County Broadband Strategic Plan focuses on developing an actionable plan that outlines the steps needed to achieve equitable access to broadband services for all residents, regardless of their income or geographic location. The project scope also includes the identification of strategic partners and the analysis of suitable connectivity scenarios and operating models along with the associated economic impact.

This scope of work was augmented to conduct a Request for Information (RFI) with the ISP community, submit a crowdsource challenge to the FCC Broadband Data Collection, and to engage with ISPs to encourage submission of concept proposals to address the revised objective of 100% availability of gigabit symmetrical service.

The scope of work was delivered over the course of six months from October 2022 to March 2023 according to the methodology depicted in Figure 8.
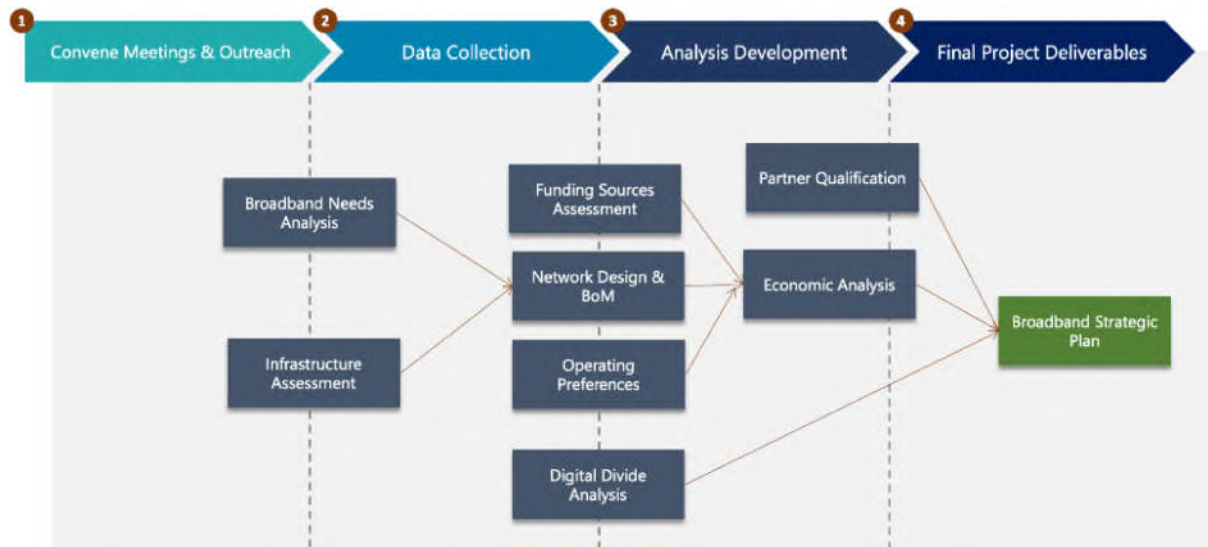
Figure 8. Project Methodology.

As shown, there are four workstreams, which are aligned with the North County Broadband Strategic Plan RFP. The first workstream involves convening meetings and conducting outreach, followed by the second workstream which focuses on comprehensive data collection phase. This phase was critical in gaining a complete understanding of North County's broadband availability and adoption, as well as technical, economic, and social constraints that required analysis to effectively bridge the connectivity gap. Using the collected data, the third workstream, Analysis Development, assesses technical options while considering funding and public private partnership (PPP) opportunities. These efforts lead to the final set of recommendations described in Section 6 Broadband Strategy & Action Plan.

The task areas for each workstream are summarized below:

Workstream 1 – Convene Meetings & Outreach

The initial workstream includes the project kick-off and reaching out to the relevant stakeholders to initiate the data collection and project scoping. Tasks in this workstream include:

- **Broadband Needs Analysis**. Inputs were gathered via a public forum for each City, a regional needs assessment survey, and public data research. This information was organized and analyzed, including comprehensive Geographic Information System (GIS) analysis to determine priority areas.

- **Infrastructure Assessment**. This includes research from publicly available data sources (e.g., Paso Robles GIS Portal, Energy Information Administration (EIA), California Department of Transportation (Caltrans)) the development of data collection checklists for the Cities and the subsequent collection of infrastructure data via workshops with key City staff and utilities. Collected data were integrated into the GIS Plan to support the analysis and the development of network design scenarios. City policies, permitting and other regulations for Broadband were also assessed and consolidated into a Broadband Readiness Assessment.

Separately, the development, issuance and management of an ISP RFI process was incorporated into this workstream to assess ISP interest and capability to deploy broadband services across the Cities.

Workstream 2 – Data Collection

The Data Collection Workstream receives the results of the needs and infrastructure assessment. The activities in this workstream include a thorough assessment of funding sources, development of a network design, identification of operating preferences, and an analysis of the digital divide:

- **Funding Sources Assessment**. Federal and state broadband funding programs were researched, followed by a preliminary evaluation of eligibility for Atascadero and Paso Robles. Extending further, an assessment of the probability of successful outcomes associated with the various programs was performed to guide the Cities on where to invest grant writing efforts.

- **Network Design**. A baseline city-wide FTTH design was developed and optimized leveraging existing infrastructure. Then, the network design was adapted based on the proposed connectivity scenarios.

- **Operating Preferences**. Each City's preferences were captured through workshops with City staff where operating model options were discussed along with potential City contributions. Separate discussions were conducted with Finance Directors to determine available funds and alternative funding options.

- **Digital Divide Analysis**. This activity included panel discussions in each community, desktop research, needs assessment analysis and interviews with various stakeholders to identify digital equity barriers and potential programs to address these barriers, based on the methodology for the State Digital Equity Plan.

Workstream 3 – Analysis Development

The Analysis Development workstream includes two key activities, a preliminary assessment of potential ISP partners and economic analysis, informed by the output of previous activities:

- **Partner Qualification**. A preliminary assessment of potential ISP partners was conducted based on desktop research. This analysis was further informed by the RFI process and subsequent discussions with interested ISPs.

- **Economic Analysis**. For the economic impact analysis, existing broadband studies within the region (and out of region) were reviewed, synthesizing the findings, and extrapolating for North County.

Workstream 4 – Final Project Deliverables

Project findings and recommendation are compiled and synthesized to construct the final Project deliverable:

- **Broadband Strategic Plan**. Findings and recommendations were consolidated into a cohesive plan, including a roadmap with prioritized initiatives and action items.

2 Broadband Community Profile

2.1 Socioeconomic and demographic profile
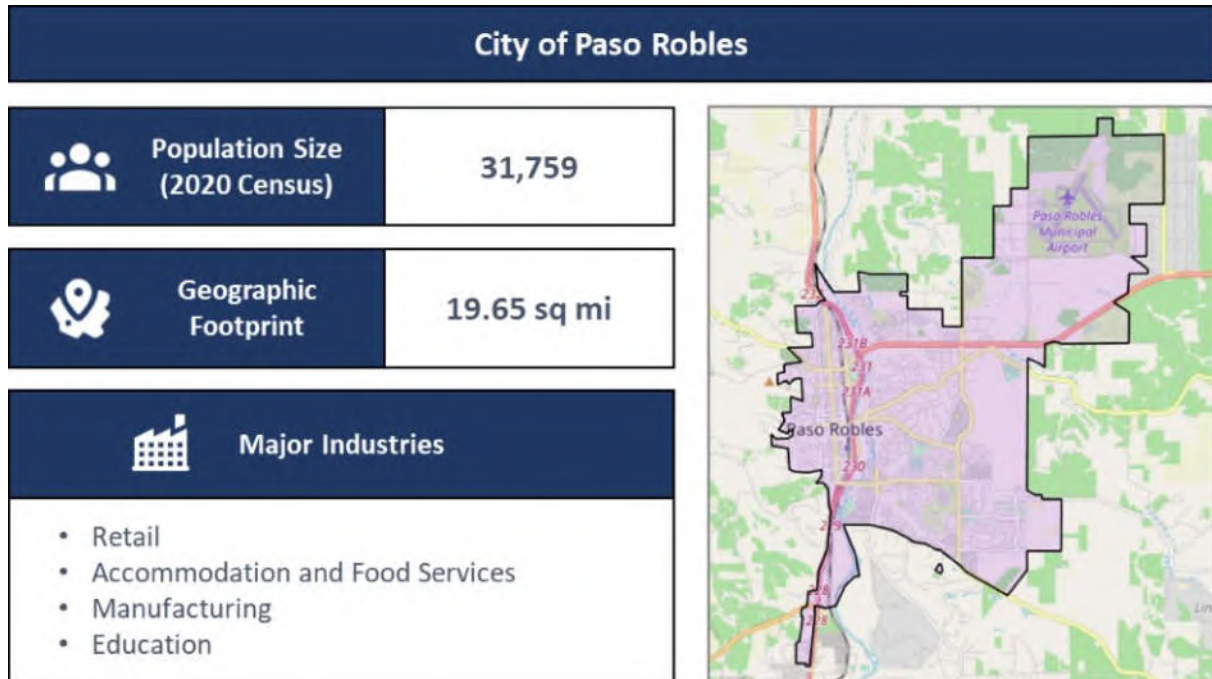
The community of Paso Robles in Northern San Luis Obispo (SLO) County has a multi-generational history in agriculture. Paso Robles is located on the Rancho El Paso de Robles Mexican land grant that was purchased in 1857. The City was incorporated in 1889, just a few years after Southern Pacific Railroad came through. Known for its mineral hot springs, still accessible to this day, it continues to be a popular tourist destination. The City benefits from the revenue generated by tourism and destination travel due to the surrounding wine region and ancillary industries including wine sales, restaurant and hotel services and the sale of farm equipment and supplies. Over the past several years, the City is actively engaged in expanding and diversifying their economy with a focus on the development of a Space Innovation and Technology Park in partnership with California Polytechnic State University, SLO, and Cuesta Community College North Campus. Work efforts are underway to secure a Federal Aviation Administration (FAA) licensed Spaceport along with their existing Airport license[22].

Unique to Paso Robles is that a sizable portion of the downtown core of the City, shown in Figure 9 has the Federal designation as a Qualified Opportunity Zone (QOZ), making it more attractive for new investments[23].

---

[22] Paso Robles Community Profile (accessed March 2023)

[23] The purpose of identifying these zones was to spur economic development and job growth by providing a tax benefit to investors. The length of time that the investor holds onto the investment determines the tax benefits they receive.

Figure 9. Paso Robles Qualified Opportunity Zone.

The median age of the community was 37 years old with 17.5% of the population over 65 years old, according to the 2021 Census data. While the community is predominantly white, 55.2%, followed by Hispanic or Latino at 35.6%, the rest fall within a smaller demographic of two or more races and less than 2% are American Indian or Alaska Native[24]. Data provided by Paso Robles Unified School District reports that of their 6,341 students, 20.11% are considered English Language Learners (ELL), the breakdown is as follows:

- Spanish – 93%

- Mixteco – 5.25%

- Arabic – almost 1%

The remainder of the ELL students speak Mandarin/Chinese, French, Khmer/Cambodian, Russian and Vietnamese with a small grouping of 'other'.

The education breakdown for Paso Robles is presented in Figure 10. As shown, 37.91% of the population have an associate degree or higher; and 65.08% have completed some college or higher[25].

---

[24] U.S. Census Community Snapshot (accessed March 2023)

[25] Paso Robles Community Profile (accessed March 2023)
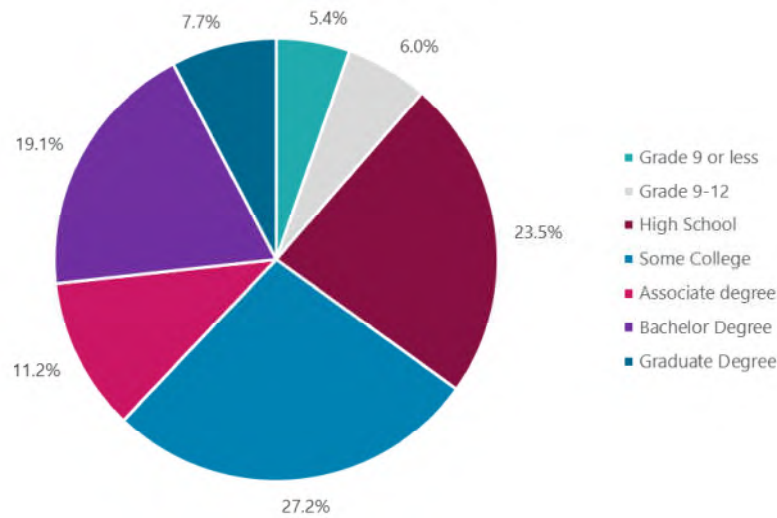
Figure 10. Paso Robles Level of Education.

The median income in 2021 dollars, calculations analyzed between 2017-2021, was $75,569 with approximately 9% of the population considered to be in poverty[26]. Over 60% of the 6,341 students enrolled in the Paso Robles Unified School District qualify for the National School Lunch Program (NSLP)[27]. While the student population may not live entirely within the City limits, the data suggests that the Federal designation of poverty may not accurately reflect households that fall below median income. According to the data, 60% of Paso Robles residents are homeowners and 40% rent.

The Paso Robles Housing Authority (PRHA) currently operates 301 Multi Family Affordable Housing Units within their Oak Park complex with an average of 3.5 individuals in each unit. Approximately 32% are K-12 and 11% are seniors, 55 years of age and up. The Chet Dotter site is a 40-unit 100% senior population. The households are 85% Hispanic or Latino and are considered low income, as they fall 60% or more below median income of $65,640. Area Median Income (AMI) by household for SLO is established by the California Tax Credit Committee (CTCAC) and was $109,400 in 2022[28].

People's Self-Help Housing (PSHH) manages multiple properties including farmworker housing, family housing, housing for seniors, and individuals living with disabilities. The total number of units is 197.

In 2022, Paso Robles was home to 1,890 businesses with the leading industries by jobs as follows: retail, accommodation and food services, manufacturing, and education. Over 67% of these businesses have 4 or less employees and only 0.74% with 100+ employees. Many of the retail, and accommodation and food services jobs are low wage jobs and do not cover living expenses. Those working in these industries must have multiple incomes within a household or will likely need to live in subsidized housing. While most employers are small business owners, over 3,000 of the total jobs include Executive Manager and Administrators and Office and Administrative support which impacts the work distribution to skew predominantly white collar[29].

---

[26] U.S. Census Community Snapshot (accessed March 2023)

[27] National School Lunch Program, who qualifies (accessed March 2023)

[28] California Tax Credit Committee (accessed March 2023)

[29] Paso Robles Community Profile (accessed March 2023)

City of Atascadero

👥	**Population Size** (2020 Census)	29,708
📍	**Geographic Footprint**	26.07 sq mi

Major Industries

- Retail
- Accommodation and Food
- Health Care and Social Services
- Education
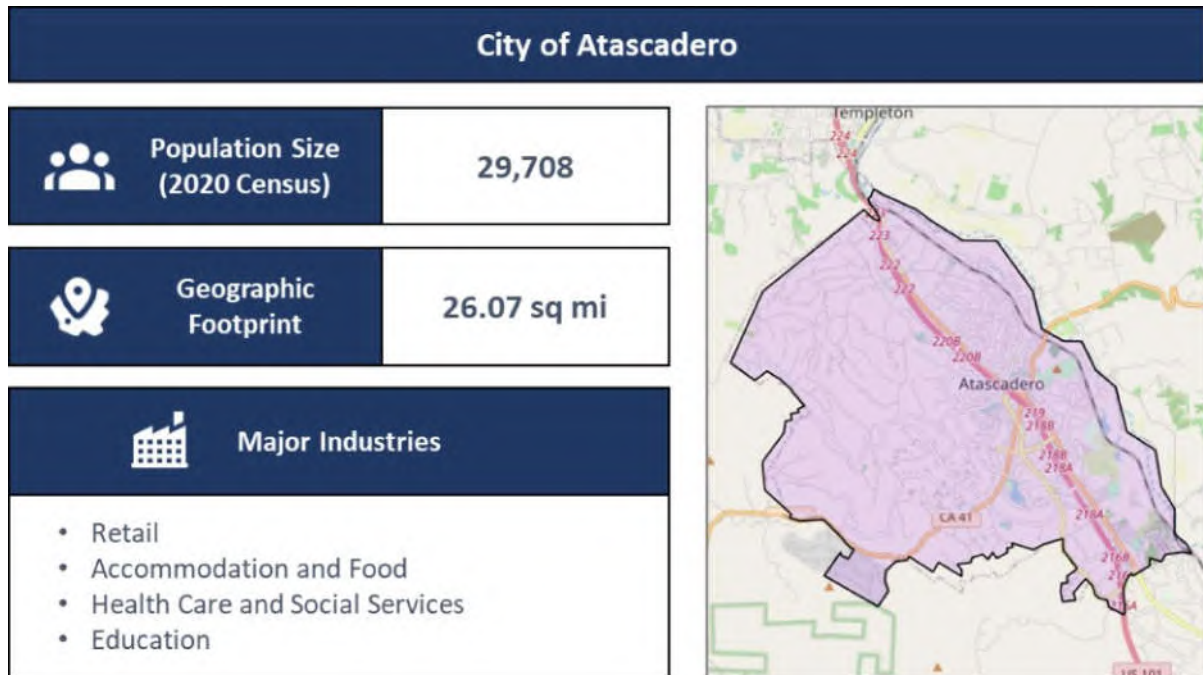
The community of Atascadero is in Northern SLO County and intersected by U.S. Highway 101 (the 101) and the California Highway 41 in the center of the main business corridor. The land encompassing Atascadero was founded in 1913 by EG Lewis and intended to be a utopian planned colony. The land was subdivided, and infrastructure installed to support an anticipated population of 30,000. In 1979 Atascadero was incorporated as a city. The surrounding area is primarily rural residential with some agriculture, predominantly cattle grazing. While much of Route 101 incorporates the historic El Camino Real throughout the length of the State, this is not the case for Atascadero. The El Camino is the main road running the length of the community and is critical for accessing businesses and residences all along the way. Atascadero has tended to be a bedroom community and therefore has historically struggled at developing a sales tax base that is vital for community development and planning. In the past decade, significant efforts have been made to encourage business development, increase housing units, and enhance opportunities for local and regional tourism to draw people into Atascadero and the downtown core.

The median age of the community in 2021 was 40 years old with 16.9% of the total population over 65. The City is predominantly white, 74.3%, followed by Hispanic or Latino at 18.3% and Asian, American Indian, and Alaska Native and African American, combined and accounting for 3.7% of the total population[30]. Data provided by Atascadero Unified School District (AUSD), 7.6% of their student population are ELL with Spanish as their primary language.

The education breakdown for Atascadero is presented in Figure 11. As shown, 41.01% of the population in Atascadero have an associate, bachelor, or graduate degree[31].

---

[30] U.S. Census Community Snapshot (accessed March 2023)

[31] https://reachcentralcoast.org/atascadero/ (accessed March 2023)
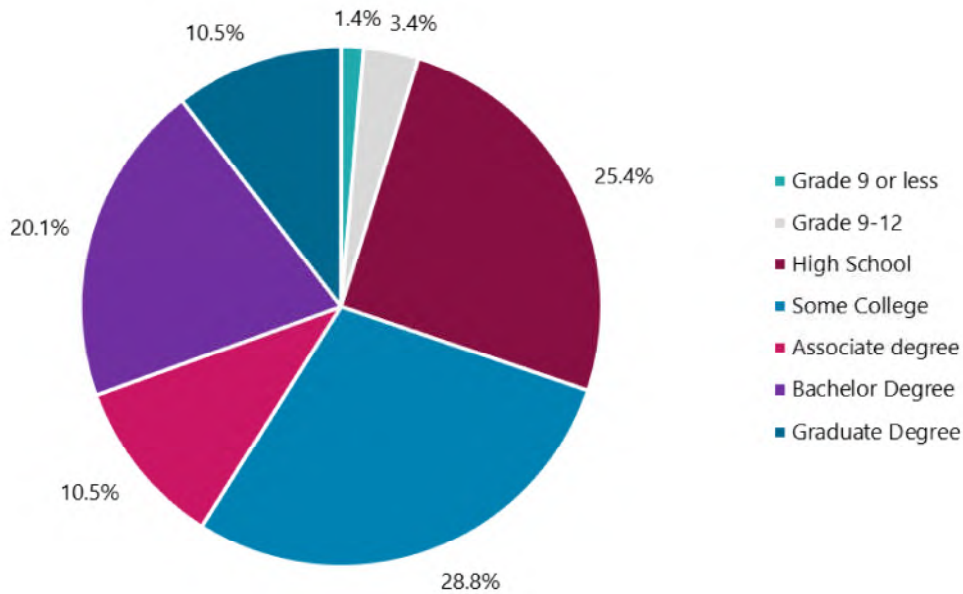
Figure 11. Atascadero Level of Education.

The median income in 2021 dollars, calculations analyzed between 2017-2021, was $82,777 with over 8% of the population considered to be in poverty[32]. In November 2022, AUSD reported that 48.99% or 2,104 of their students qualified for the NSLP. This number includes students who attend AUSD schools outside of the City limits. Data accessed reported that 65% of residents own their home and 35% rent. Within City limits, there are approximately 650 units that accommodate a variety of housing for low-income and of those, 19 are for seniors ages 55 and above and 93 are for seniors ages 62 and older[33].

In 2022, Atascadero was home to 1,421 businesses with the leading industries by jobs being healthcare and social services, retail, accommodation and food services, and education. Almost 70% of these businesses have 4 or less employees and only 0.56% with 100+ employees. The largest employer is the Atascadero State Hospital (ASH), a secure forensic hospital that houses felony defendants, severely mentally disable individuals, and other offenders with mental health issues requiring acute care. Some are prison transfers who require temporary mental health treatment and are there to stabilize before returning to other facilities. ASH reports that they have approximately 2,140 employees[34]. Largest job counts by occupation, from highest to lowest are office and administrative support, health diagnosing and treating practitioners, sales, executive managers and administrators, and food preparation and serving for a total of 5,712. While retail and accommodation and food are two of the four largest industries, white collar jobs account for 71% of total employees[35].

---

[32] U.S. Census Community Snapshot (accessed March 2023)

[33] Published by HASLO (accessed March 2023)

[34] Department of State Hospitals – Atascadero (accessed March 2023)

[35] https://reachcentralcoast.org/atascadero/ (accessed March 2023)

2.2 Broadband Availability

This section provides a detailed analysis and quantification of broadband service availability in North County based on data from the FCC, CPUC and end user speed tests. In addition, an analysis of ISPs operating in the area was conducted to understand service offering and technology.

The framework for assessing broadband service availability is the unserved and underserved definitions established in Section 1.1. This framework is critical as it aligns with FCC and CPUC and is directly tied to eligibility criterion in various federal and state broadband funding programs.

In Section 4.3, an overview of funding vehicles and the prospect for funding is conducted largely based on broadband availability data from this section.

2.2.1 FCC National Broadband Map

The FCC Broadband Data Collection and the FCC Serviceable Locations Fabric are important sources of information to determine locations lacking acceptable broadband service to inform the Strategic Plan and potentially to trigger the pursuit of federal or state funding. In this Section an overview of FCC Broadband data is provided with analysis of the ISPs operating in North County, the choice of ISPs by census block in North County and finally the critical views on broadband service availability.

Scope and content of the FCC Broadband Data

The new FCC Broadband Data Collection released in November 2022 and the FCC Serviceable Locations Fabric, are initiatives undertaken by the FCC to improve the accuracy and reliability of broadband data collection and mapping.

The FCC Broadband Data Collection program requires ISPs to report more detailed information about their service offerings and coverage areas, including information on the speeds, technologies, and pricing of their services at the serviceable location level based on the FCC Serviceable Locations Fabric which includes all the locations where broadband service is required across the country. There are approximately 120 million serviceable locations across the country in this FCC database.

A fast analysis of the data was conducted by TeleworX and a crowdsource challenge was submitted based on speed test data before the January 13th, 2023 deadline. This is part of an ongoing challenge process that is required to improve the accuracy of the dataset and to make sure North County is properly represented.

The FCC Broadband Data Collection dataset includes, for each serviceable location and ISP, information on the technology used to provide the service and the maximum advertised download and upload speeds. This information is used to create broadband availability maps that help policymakers and consumers make more informed decisions about broadband services.

North County obtained access to the FCC Broadband Data Collection dataset and the FCC Serviceable Location Fabric in December 2022 shortly after its release.

Service Providers in North County

Service providers are mandated to report their maximum advertised speeds to the FCC so that broadband service can be characterized. Table 3 shows the ISPs operating in North County and the

available broadband technologies and speeds according to the data reported to the FCC. Incumbent ISPs report a mix of wireline technologies, but FTTH technology offering gigabit symmetrical service is rare.

The smaller local ISPs deploy fixed wireless technologies to reach their subscribers. National MNOs also rely on fixed wireless services to reach their customers.

Table 3. ISP Service Offering in North County

All ISPs reported their ability to provide services in both Paso Robles and Atascadero			
Category	**ISP**	**Available Technologies**	**Type**
Incumbent Wireline Providers	AT&T	Copper | FTTP	Wireline
	Charter	Cable | FTTP	Wireline
	Digital West (Astound)	FTTP	Wireline
Regional / Local Providers	Outback Internet	Unlicensed FWA	Wireless
	Ranch WiFi	Unlicensed FWA	Wireless
	Surfnet Communications	Licensed FWA | Unlicensed FWA	Wireless
	TPx Communications	Copper	Wireline
	Wilson Creek Communications	Unlicensed FWA	Wireless
Mobile Network Operators	T-Mobile	Licensed FWA	Wireless
	AT&T	Unlicensed FWA	Wireless
	Verizon	Licensed FWA	Wireless

Note: ISPs above include all the ISPs that reported to the FCC that they provide fixed broadband services within the Cities of Atascadero and Paso Robles.

Further analysis of the FCC data indicates that wireline ISPs are the dominant broadband solution in North County. Analysis of speed test data and Needs Analysis surveys indicate Charter is the dominant wireline ISP.

Table 4 shows that wireless ISPs compared with wireline ISPs, provide service >100/20 to 12% less serviceable locations for Atascadero and 38% less for Paso Robles.

Table 4. Served locations per type of ISP

City	Total Serviceable Locations	Wireline	Wireless	Wireline + Wireless
Atascadero	10,276	9,681 | 94.2%	8,415 | 81.9%	10,065 | 97.9%
Paso Robles	10,710	10,616 | 99.1%	6,573 | 61.4%	10,687 | 99.8%

Service Provider Choice

Another significant metric obtained from the FCC data is the number of available service providers by Census block, since this is an indicator of the level of competition. An area with broadband serviceability but limited provider options typically result in higher prices and limited choices for end users[36] [37].

Results of the analysis presented in Table 5 and Figure 12 show that 20.5% of the population in Atascadero (36% of the Census blocks) and 33.6% of the population in Paso Robles (45% of the Census blocks) are served by only one wireline provider or no provider at all. The lack of effective broadband

---

[36] Broadband Prices are Soaring. Competition is the Answer | Benton Institute for Broadband & Society

[37] Competition in the Broadband Internet Market - Secretariat Economists (ei.com)

competition was also raised as an issue of concern in the Needs Assessment Survey by residents and businesses.

With limited options for internet service providers consumer choice is often limited to high prices and subpar service. To the extent there are two wireline ISPs in a census block with one ISP offering comparatively low speeds, a de facto monopoly exists at the census block level. Lack of competition also dampens ISP investment and innovation in North County[38].

Table 5. Available wireline ISPs per Census Block and served population.

Number of ISPs	Census Blocks		Population	
	Atascadero	Paso Robles	Atascadero	Paso Robles
0	60 |13.7%	170 | 19.5%	665 |2.2%	151 | 0.5%
1	98 |22.4%	219 | 25.1%	5,442 |18.3%	10,438 | 33.1%
2	276 |63.2%	479 | 54.9%	23,324 |78.2%	20,839 | 66.0%
3	3 |0.7%	4 | 0.5%	384 |1.3%	128 | 0.4%
Total	**437 |100%**	**872 | 100%**	**29,815 |100%**	**31,556 | 100%**

North County is predominantly a two-service provider area. After examining speed-test data, which has no instance of an AT&T subscriber, it appears that the Cities are de facto one service provider area. In the areas of the City where there is only one provider, it is almost always Charter.
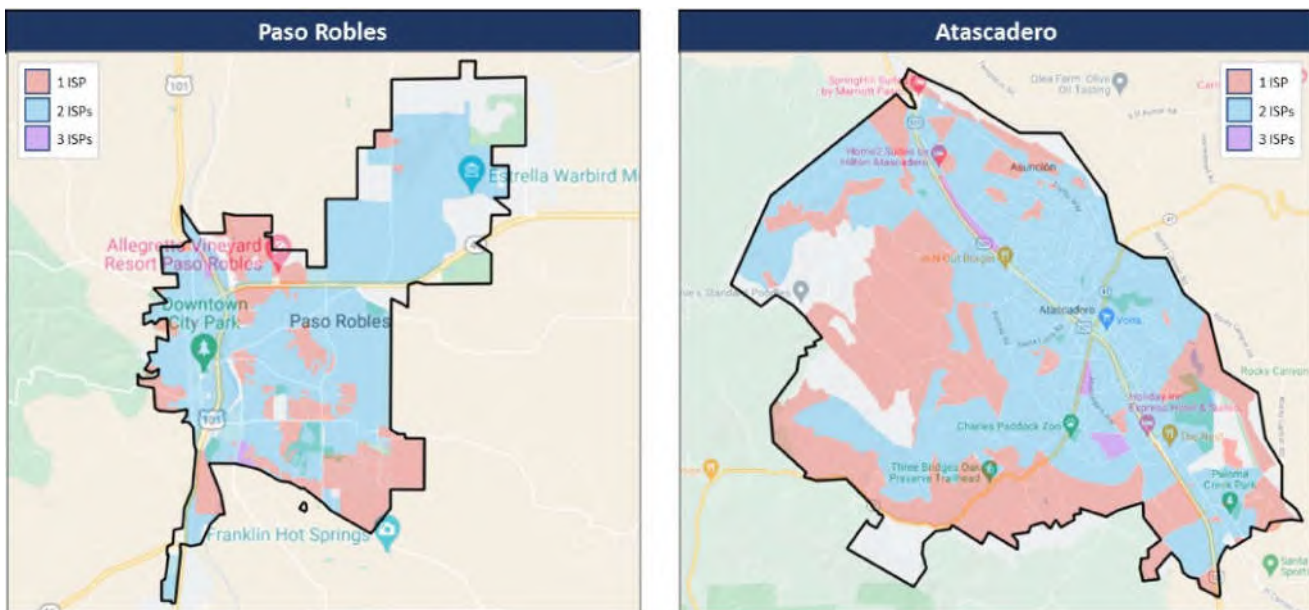
Note: Larger versions of these maps can be found in Appendix IV.

Figure 12. Number of wireline ISP options offering broadband service > 25/3 by Census Block

---

[38] 72% of the respondents to the Needs Assessment survey were Charter customers, followed by AT&T with 9%

FCC Broadband Service Availability

The examination of FCC broadband availability data in North County indicates that the percentage of unserved and underserved areas in the region is small, with 2.1% of serviceable locations in Atascadero and 0.2% in Paso Robles.

Table 6. Unserved Serviceable Locations considering wireline and wireless connectivity.

Atascadero has 11 times more unserved locations than Paso Robles			
City	Total Serviceable Locations	Unserved (<25/3)	Underserved (25/3 to 100/20)
Paso Robles	10,710	12 | 0.1%	11 | 0.1%
Atascadero	10,276	133 | 1.5%	58 | 0.6%

Analysis of this data reveals geographical distribution of the unserved locations which is a critical input into designing a solution. Solutions for the unserved are more practical and cost effective when they are clustered together.

Table 6 provides the counts and percentage of unserved and underserved according to the FCC data. Figure 13 shows at the Census Block level that unserved areas are mainly in the areas surrounding the Paso Robles airport and west Atascadero.

The low counts of underserved locations are related to the speeds being offered by the ISPs. Most ISPs that are capable of offering speeds higher than 25/3, also have an offering above 100/20 and this is the speed that is reported in the FCC dataset.
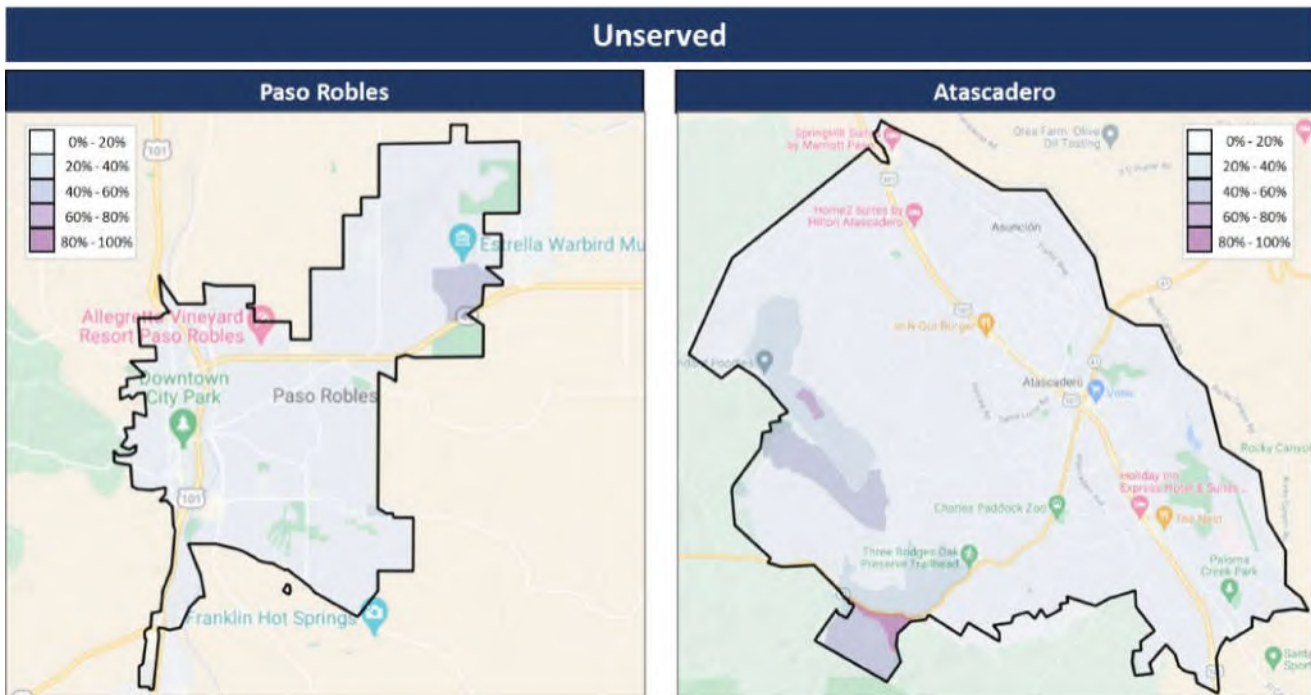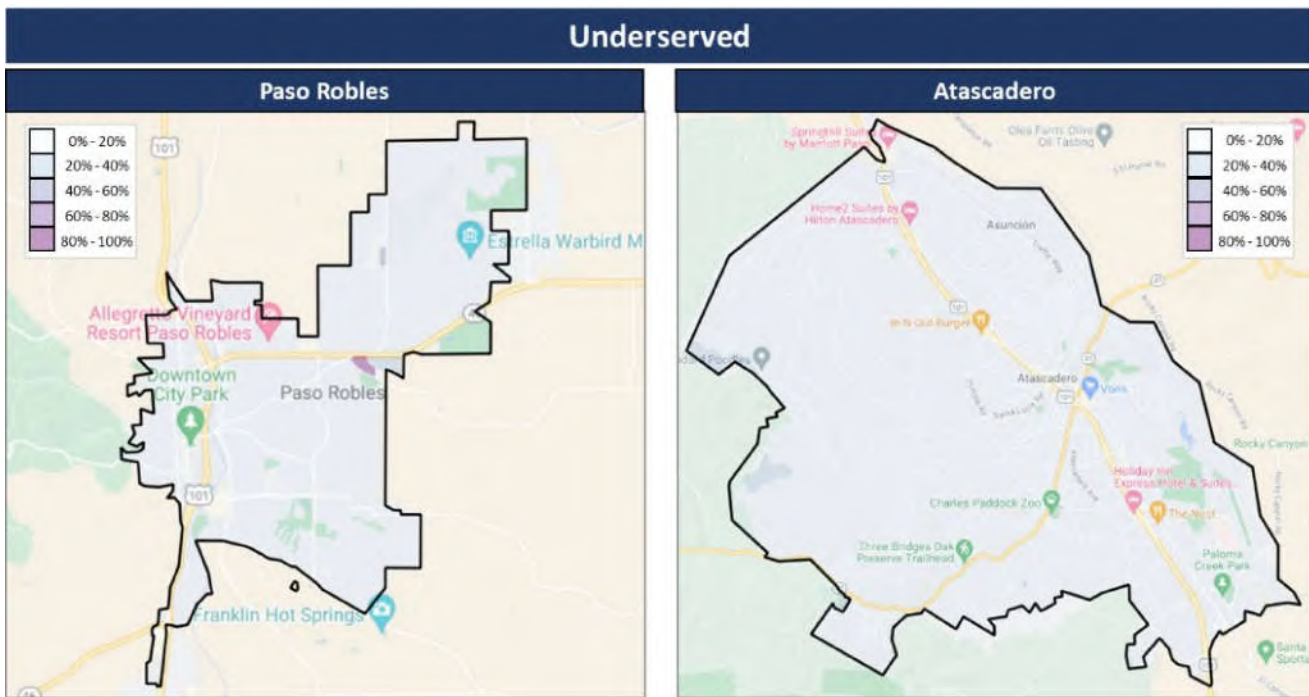
Note: Larger versions of these maps can be found in Appendix IV.

Figure 13. FCC Unserved / Underserved locations by census block

2.2.2 CPUC California Broadband Map

CPUC is responsible for overseeing the regulation of telecommunications services in the state of California. Like the FCC, the CPUC uses broadband data collected across California to develop its California Interactive Broadband Map.

The **California Interactive Broadband Map[39]** is a web-based tool that provides information on broadband availability and quality across the state at the census block level. The map provides data on broadband speeds, service providers, and coverage areas, as well as information on areas where broadband service is lacking or inadequate. This map also provides a first look at area eligibility for California Advanced Services Fund (CASF) applicants.

The information displayed in the Broadband Map is annually refreshed by the CPUC[40] and the new map is expected to be released on March 31, 2023[41].

Different layers in the interactive Broadband Map provide information on broadband adoption and deployment and inputs necessary for grant development. In addition, it captures the results of the Summer 2022 CalSPEED Mobile Drive Test results. Satellite connectivity is not collected in the California Interactive Broadband Map as it is not a grant-eligible technology for the CPUC managed initiatives.

---

[39] Broadband Mapping Program (ca.gov)

[40] This analysis uses the latest available data at time of writing the report – Release 4.0. December 2021.

[41] CASF March 22, 2023, Webinar

The number of households located in unserved census blocks was obtained by referring to the data provided on the "Wireline Consumer Served Status" layer of the California Interactive Broadband map. Table 7 presents the results. Note that CPUC data does not consider underserved connectivity; census blocks are characterized as either served or unserved, based on a 25/3 connectivity threshold.

Table 7. CPUC Unserved households

According to CPUC maps, Atascadero presents 3x more unserved households than Paso Robles		
City	Total Households	Unserved (<25/3)
Paso Robles	12,303	159 | 1.3%
Atascadero	12,244	470 | 3.8%

Figure 14 shows that most of Census blocks in North County have access to broadband internet with speeds of 25/3 Mbps or higher. However, there are still areas lacking adequate connectivity, particularly those located farther from the City center.
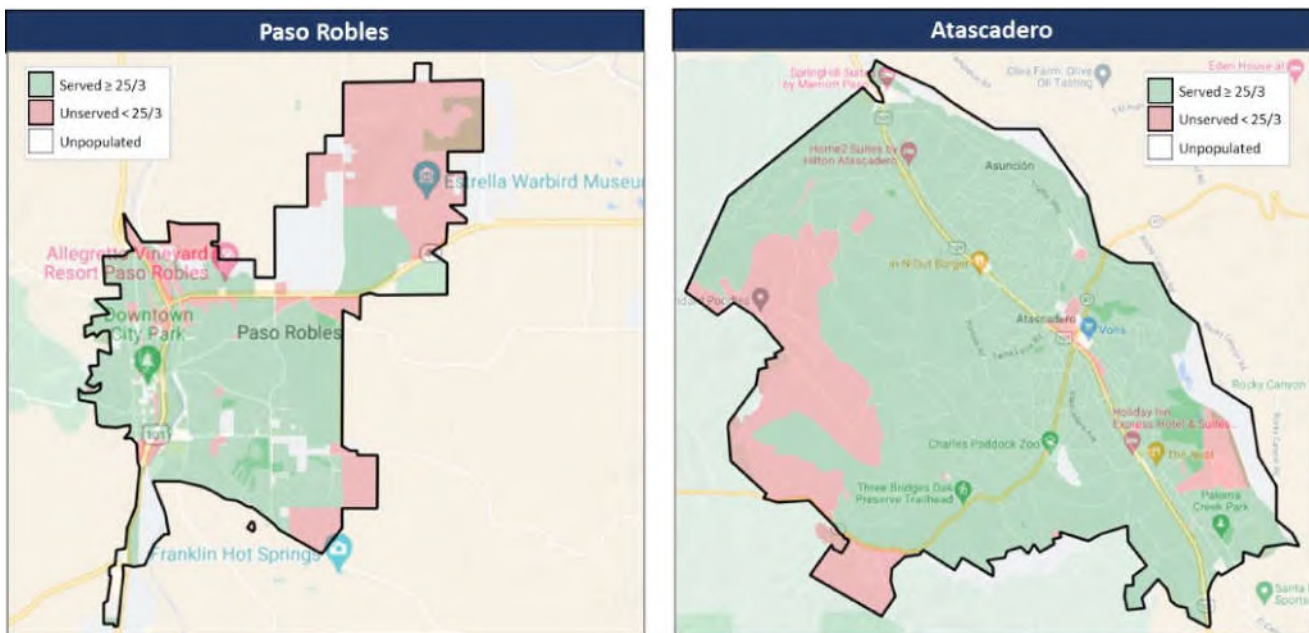
Note: Larger versions of these maps can be found in Appendix IV.

Figure 14. Distribution on server and underserved census blocks according to CPUC.

Similarities and Discrepancies between FCC and CPUC data

Figure 15 illustrates a significant overlap in the geographic distribution of unserved locations when comparing data from both the FCC and CPUC.
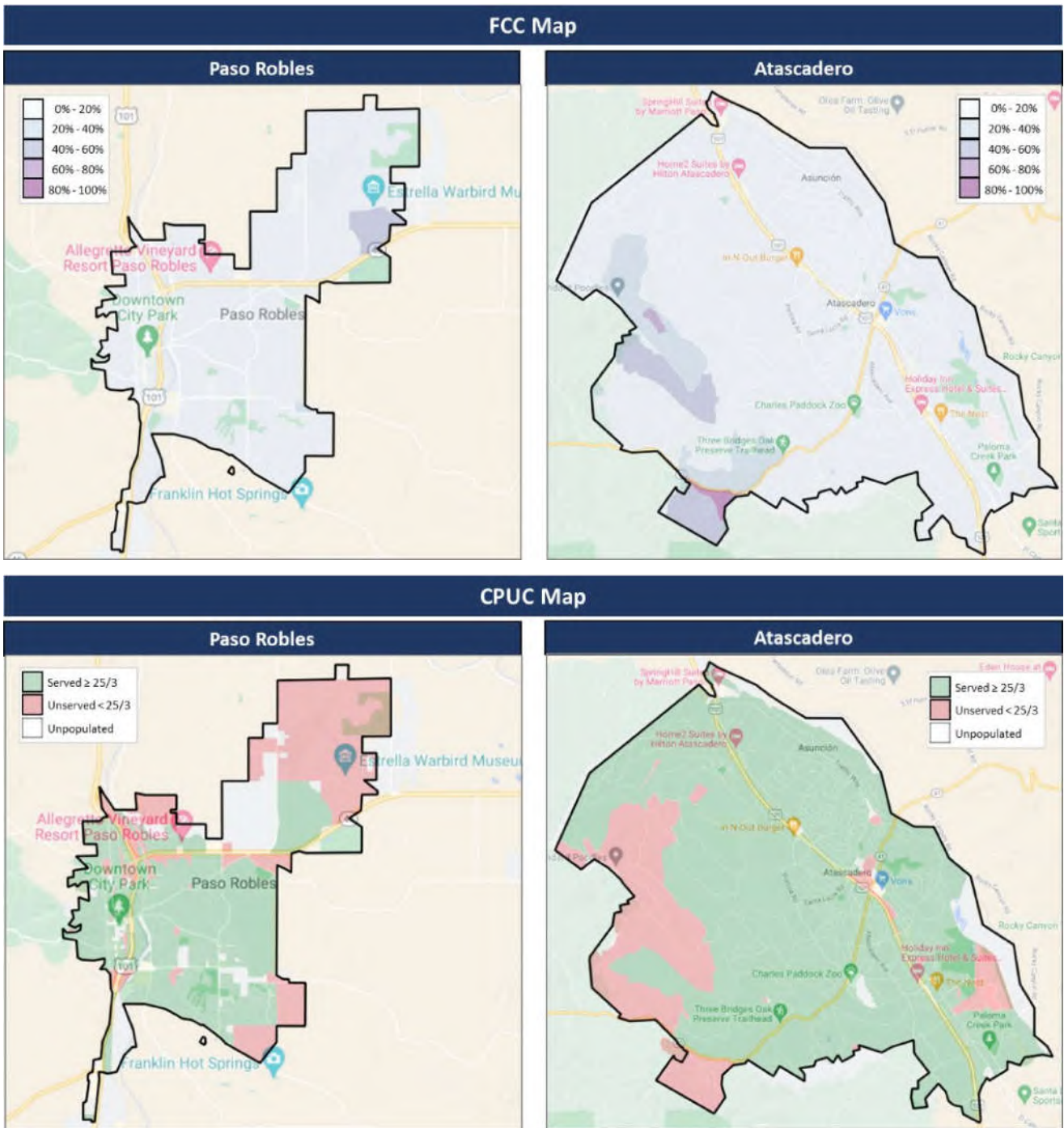
Figure 15. CPUC maps and FCC data comparison shows significant alignment in the identification of unserved locations.

CPUC maps and FCC data report similar results for unserved locations at the Census block level. Despite the general alignment of CPUC and FCC data, there is a notable inconsistency in the southwest region of Atascadero. CPUC records indicate that the area is served whereas FCC data suggests that most locations (103 out of 116, or 90%) in that area are unserved. This mismatch affects two census blocks and a total of 116 serviceable locations.

Additionally, CPUC data reports that five Census blocks to the west of Atascadero, which encompass 245 serviceable locations, are served. However, FCC data reveals that 40% of these serviceable locations (99) are unserved. These inconsistencies, illustrated in Figure 16, will require reconciliation as they may impact funding application requests.

Comparing the CPUC and FCC broadband availability maps raises discrepancies that need to be reconciled in the ongoing quest for accurate data. There are challenge processes at both the CPUC and FCC level that can and should be pursued, particularly to the extent they impact funding opportunities.
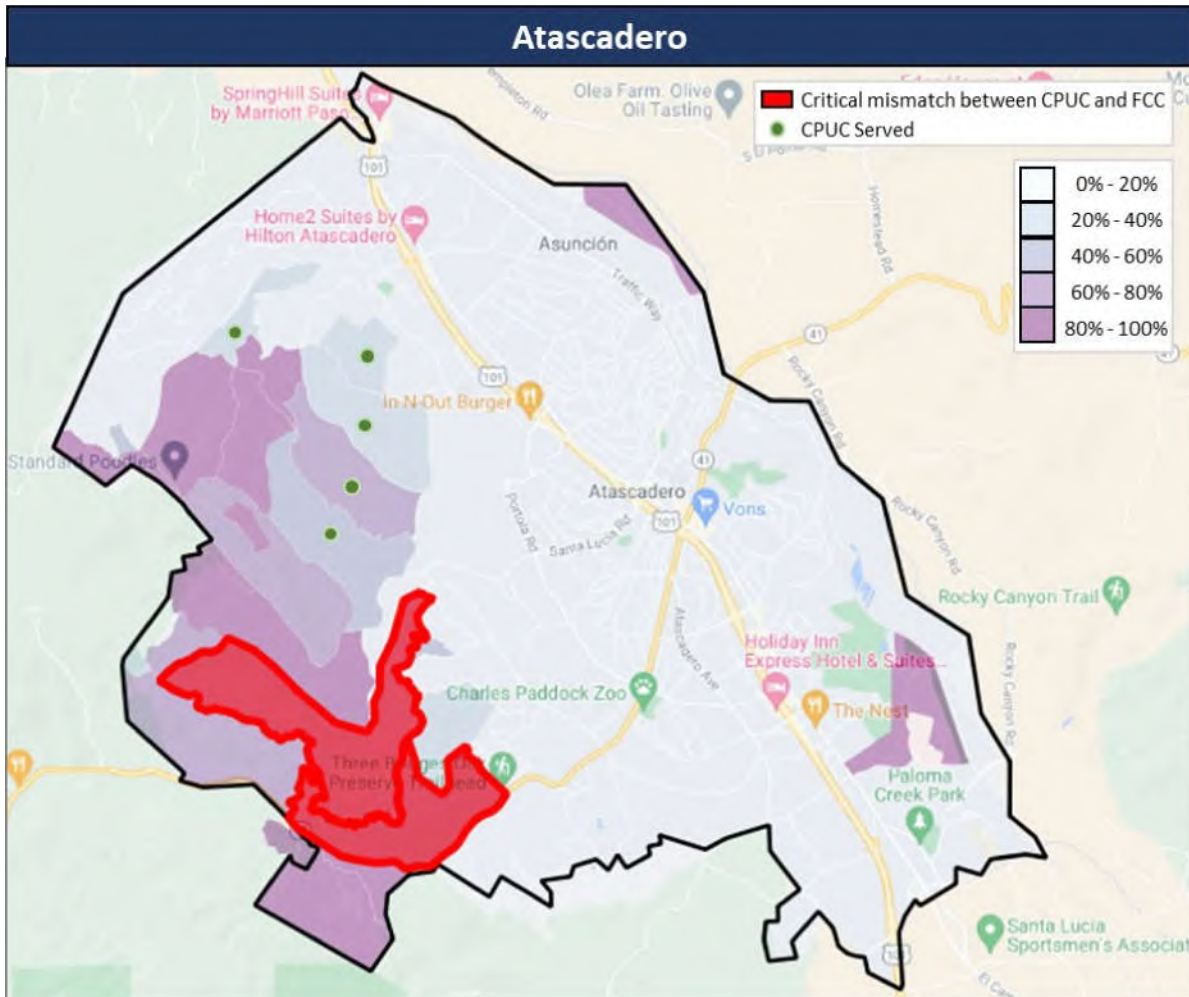
Figure 16. CPUC and FCC views discrepancies.

2.2.3 Speed Tests

Speed tests are an important tool for gaining insight into broadband service performance across the North County Cities. Between October 2022 and January 2023, a speed test program was active in North County, providing valuable information about the actual quality and performance of internet connections in the area.

In Atascadero, 326 tests were conducted across 237 locations, spanning 144 Census blocks (33% of total). Similarly, in Paso Robles, there were 125 measurements taken in 88 locations across 81 Census blocks (9% of total).

Table 8 indicates that approximately 17% of the tested locations fall below the unserved threshold, with around 70% below the underserved threshold. Figure 17 illustrates a GIS view of these results.

Although latency and jitter measures in Atascadero are rated below Paso Robles, the average values for both Cities are sufficient to enable good quality of service for delay-sensitive services like video and voice calls.

Table 8. Speed Test Statistics

Concept	Atascadero	Paso Robles
# of Speed Tests	326	125
# of Locations	237	88
Locations <25/3	41 (17.3 %)	15 (17.0 %)
Locations 25/3 to 100/20	171 (72.2 %)	60 (68.2 %)
Locations >100/20	25 (10.5 %)	13 (14.8 %)
Ping Max	766.5	40
Ping Min	0.5	7
Ping Avg.	21.15	13.5
Jitter Max	116.13	34.5
Jitter Min	0.01	0.08
Jitter Avg.	7.23	5.07
ISP Name (# Speed Tests)	Surfnet Communications (4) Outback Internet, LLC (3) Ranch WiFi LLC (2) Charter Communications Inc. (277) Unrecognizable (40)	Outback Internet, LLC (1) Charter Communications Inc. (113) Unrecognizable (11)
# Census Blocks w/ Speed Tests	144	81
# Census Blocks w/o Speed Tests	293	791
% Census Blocks w/ Speed Tests	33%	9%
% Census Blocks w/o Speed Tests	67%	91%
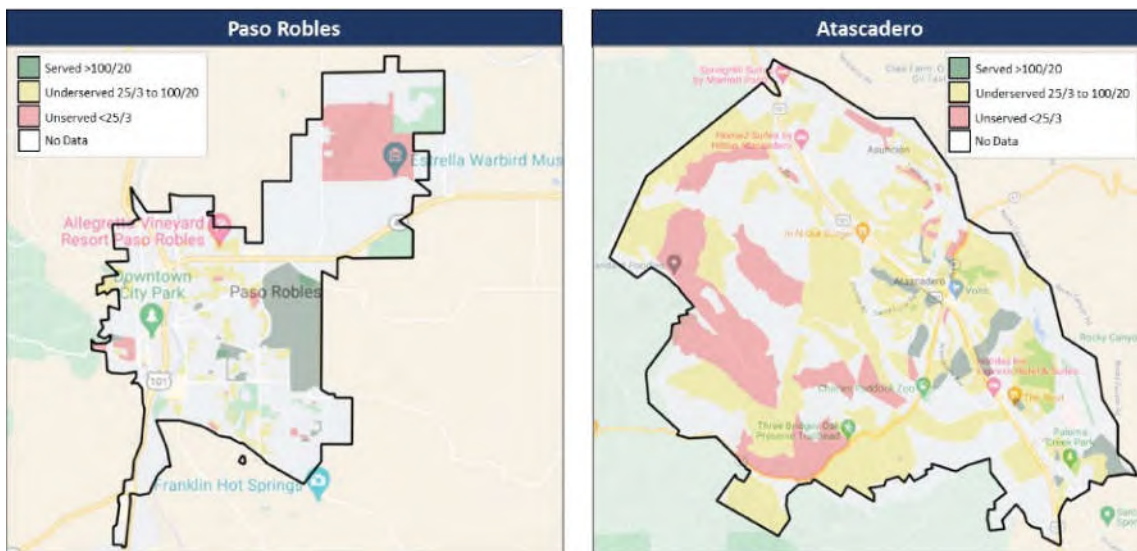
Note: Larger versions of these maps can be found in Appendix IV.

Figure 17. Served Status by Census block based on speed test data.

The results of the speed test assessment, although limited in the number of measurements, support the notion that Charter is the dominant ISP. Not a single end user speed test is attributable to AT&T, which infers a very small market share in North County.

2.3 North County Priority Area Identification

An important requirement from the North County RFP and the City management teams was to identify priority areas for broadband service. Priority areas for the City are low-income and disadvantaged communities and areas with economic development potential. New housing developments were also identified as priority areas.

This section examines the three priority area categories of interest to City management and serves as input into the Broadband Strategic Plan.

Low-income and disadvantaged communities

Low-income areas and disadvantaged communities often lack access to affordable broadband services or adequate broadband infrastructure. To identify low-income areas the 150% poverty line was used in alignment with the Digital Equity Act.[42] Based on an average household size of 2.57 people, the 150% poverty line is $33,974, as compared to the Federal Poverty Guidelines for 2023, which set the poverty line at $22,649.

By analyzing the North County 12-month household income[43], a concentration of low-income households was identified in the west of Paso Robles and southeast of Atascadero. This information was used in conjunction with the CPUC Wireline Served status map to identify 60 households in Atascadero and 23 in Paso Robles as low-income and unserved. It was further revealed that 30% of these households were in the northern part of Paso Robles. Figure 18 illustrates the geographical distribution of these low-income, unserved areas.

---

[42] Digital Equity Act of 2021

[43] B19001: HOUSEHOLD INCOME IN THE ... - Census Bureau Table
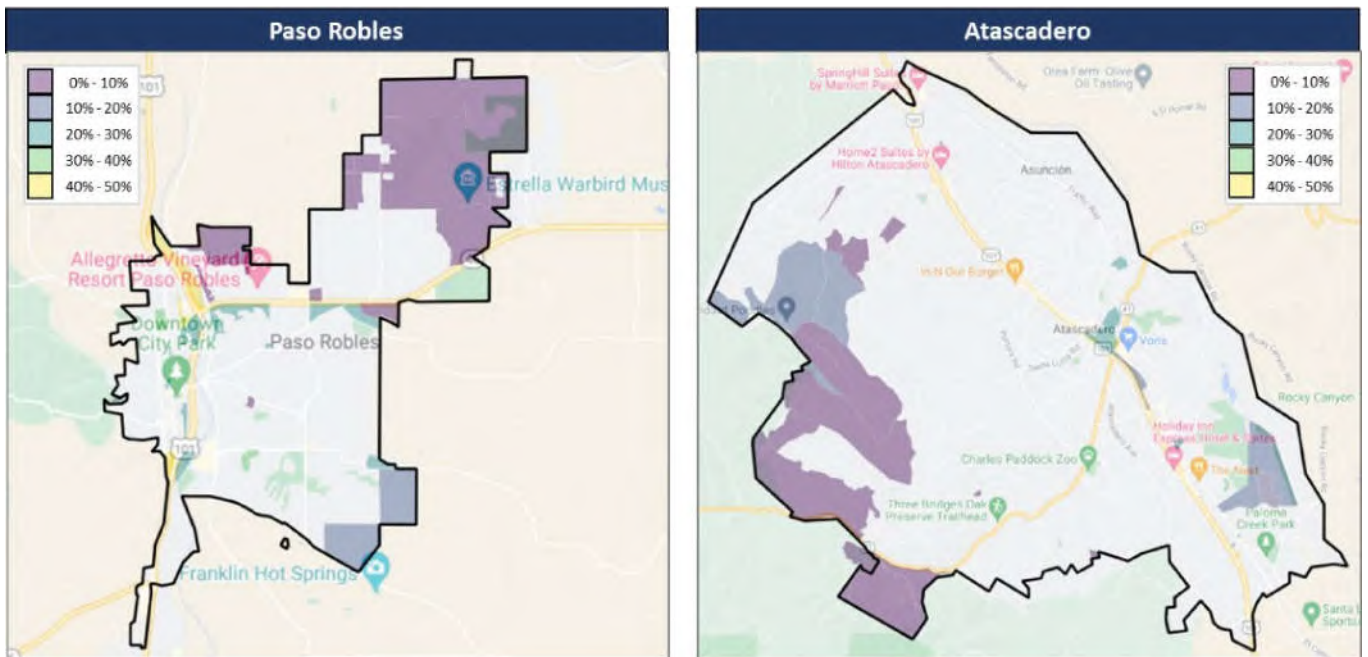
Figure 18. Distribution of low-income census blocks falling under CPUC Unserved Areas

Socioeconomic Vulnerability Index

The Socioeconomic Vulnerability Index (SEVI) is a metric that represents the relative socioeconomic standing of communities, at the Census tract level, in terms of poverty, unemployment, educational attainment, language proficiency, and percentage of income spent on housing. In general, communities that score high on the SEVI are disadvantaged as they are more vulnerable to economic and social challenges.

It should be noted that SEVI is used by State Broadband Funding authorities to determine broadband funding eligibility. In addition, SEVI is a useful tool for City planners to identify areas of social need.

Disadvantaged communities can be found in the east and south of Paso Robles, as well as in the south and west of Atascadero, according to the SEVI indicator. By intersecting the CPUC data on unserved Census blocks with the SEVI analysis, it is possible to identify unserved disadvantaged communities. Figure 19 presents this view, which highlights the priority Census blocks north and south of Paso Robles downtown and in the southwest corner of Atascadero.

Table 9 provides a summary of the distribution of unserved vulnerable households by SEVI index.

To the west and south of Paso Robles, and in the south and east of Atascadero, the SEVI criteria locates disadvantaged communities. By intersecting the CPUC maps for unserved Census blocks with the SEVI analysis mentioned earlier, it is possible to identify the unserved disadvantaged communities, which are mainly located north and south of Paso Robles downtown, and in the southwest portion of Atascadero. Table 9 summarizes the distribution of vulnerable households that are unserved classified by the SEVI index.
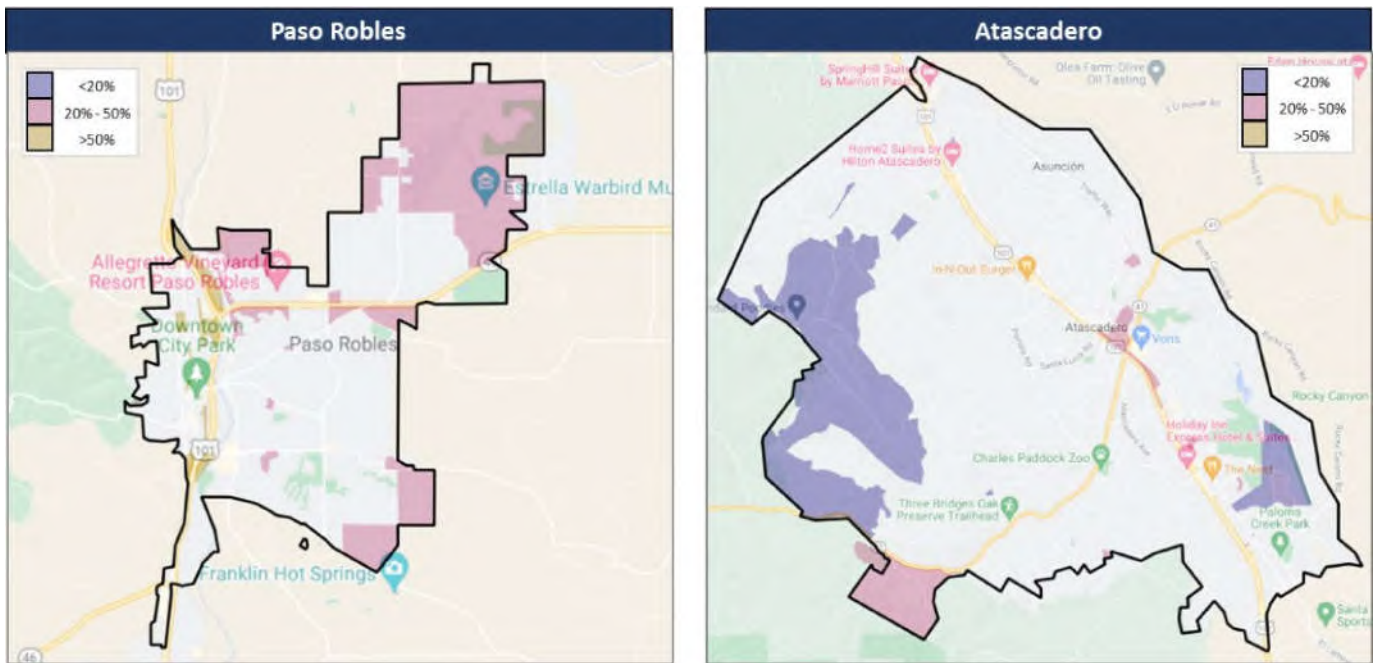
Note: Larger versions of these maps can be found in Appendix IV.

Figure 19. Disadvantaged Communities (Socioeconomic Vulnerability Index (SEVI))

Table 9. Vulnerable households in unserved/underserved areas by SEVI score

	Unserved Households	
SEVI Score	**Atascadero**	**Paso Robles**
< 20%	365	0
20% to 50%	105	145
> 50%	0	14
Total	470	159

Economic Development Projects

The Paso Robles City Council has advanced plans for the creation of a commercial spaceport in this North County city. The proposed spaceport is targeted for Paso Robles Municipal Airport area and will be designed to attract space tech companies and support commercial spaceflight and research activities. The City is currently waiting for approval of their application to the FAA for a spaceport license, which would allow it to conduct commercial space operations.

Constructing a spaceport in Paso Robles has the potential to greatly enhance the local economy by generating employment opportunities and luring advanced technology industries to the region. To ensure this objective is achieved it is essential to have access to high-speed broadband services.

After comparing the location of this new economic growth area with the CPUC maps in Figure 20, it was discovered that a substantial portion of the future development will lack suitable broadband services. It is expected that ISPs will extend their networks to cover this area if a sizable construction project is approved.

Economic development priority area	CPUC unserved areas within the economic development priority area
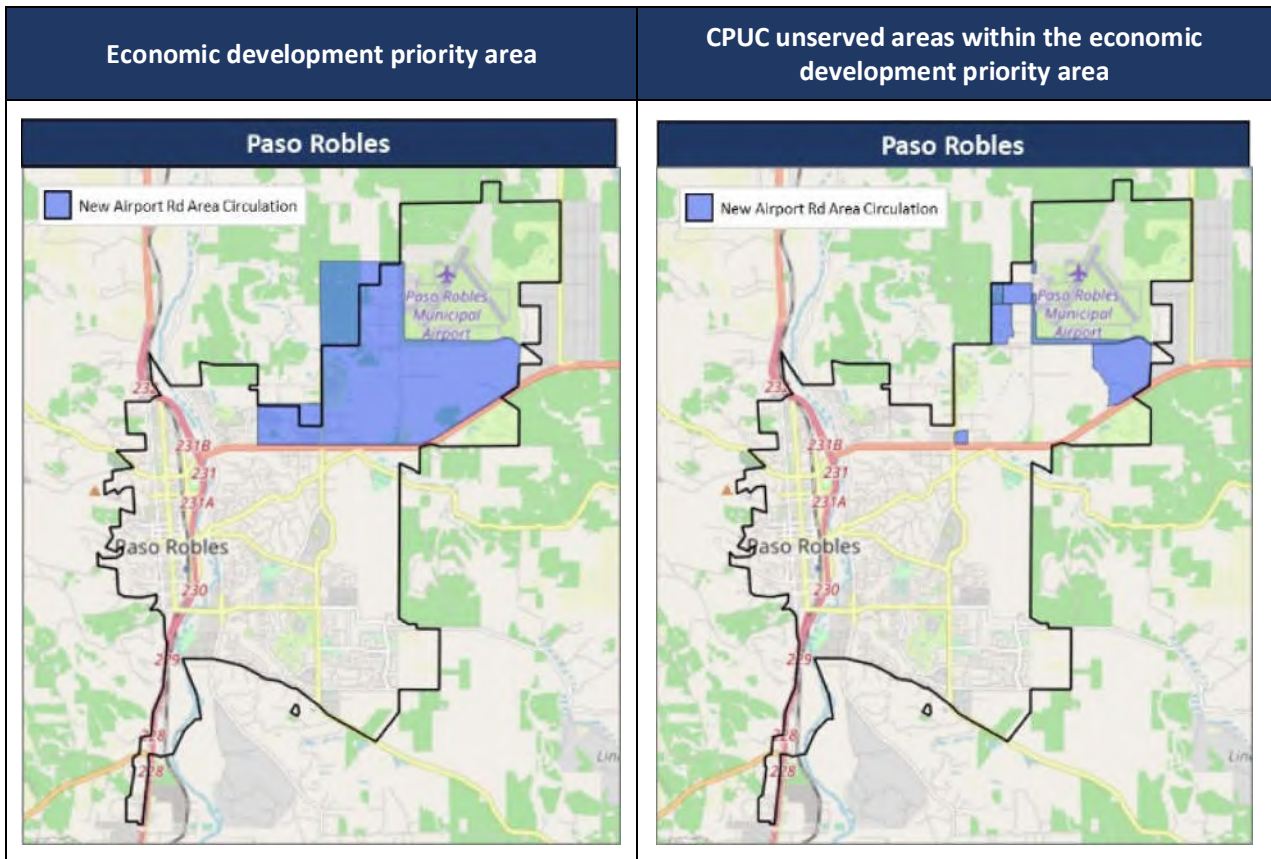
Figure 20. Identification of unserved locations in the economic development area

In the case of the City of Atascadero, there are two main economic development projects: "Del Rio Road Commercial Area" and "North El Camino Real" corridor. Both projects are in areas with adequate internet connectivity.

Single and Multi-Family Housing Developments

Paso Robles is in the early stages of a decade plus build out of housing developments. Generally, a new housing development is seen as very attractive targets for the service provider community as they can deploy their infrastructure in a greenfield setting.

Paso Robles has not added any significant housing units since 2007 and now has 4,372 single family and multi-family units in queue. Information provided by the City identifies that the bulk of the new development is on the Eastside of Paso Robles. Some of the recent and upcoming projects are infill such as the Uptown/Town Center and then continuation of buildouts in the North. Within these projects, there will be affordable housing options for low-income families and seniors.

Figure 21 shows the location of the new single and multi-family developments within the city.
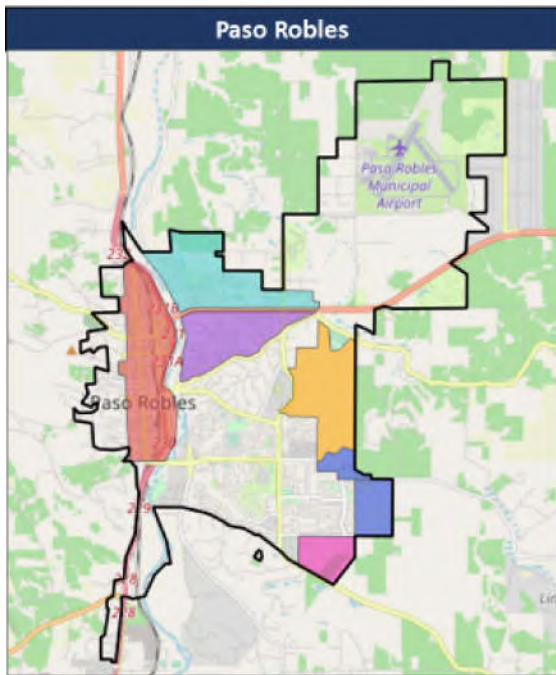
Plan Area	New Housing Units
Olsen / South Chandler Ranch Specific Plan	1,293
Beechwood Specific Plan	911
Uptown / Town Center Specific Plan	929
Borkey Specific Plan	226
North Chandler Ranch	879
Union / 46 Specific Plan	134
Total	**4,372**

Figure 21. Housing Developments

Figure 22 indicates that there is an overlap between the new housing projects and the areas that do not currently have access to broadband services. The southern portion of the development is anticipated to be impacted by inadequate connectivity which will hinder the ability of new residents to access broadband services. It is expected that these new housing developments will represent an attractive extension of broadband coverage for the ISPs.
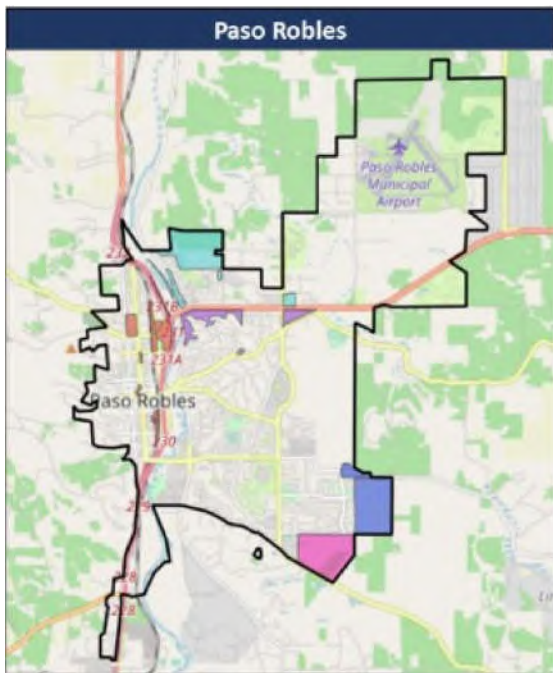
Plan Area	% Overlap w/ CPUC Unserved Areas
Olsen / South Chandler Ranch Specific Plan	86%
Beechwood Specific Plan	100%
Uptown / Town Center Specific Plan	12%
Borkey Specific Plan	35%
North Chandler Ranch	0%
Union / 46 Specific Plan	19%

Figure 22. Housing Developments & CPUC Unserved Areas

The City of Atascadero also has ongoing housing developments located mainly within the City's core, which implies a high probability that these units will have adequate internet service.

The priority areas identified above are important inputs to the North County Broadband Strategy as broadband availability will have a significant impact on the social and economic development of North County.

2.4 Infrastructure Assessment

Identifying broadband and civic infrastructure that can be leveraged for broadband deployment is a crucial factor in lowering the cost of broadband deployment across the City and priority areas.

An asset inventory was developed by collecting data through public research and interviews with the Information Technologies (IT), Public Works, and Planning departments in Atascadero and Paso Robles. An overview of the existing and planned infrastructure documented in the inventory is provided below:

1) **City buildings and anchor institutions**. As shown in Figure 24, there are 33 locations controlled by the Cities, 26 in Paso Robles, 7 in Atascadero. In addition, as shown in Figure 24 there are 88 anchor institutions, 30 in Paso Robles, 58 in Atascadero, including schools, healthcare facilities, public safety facilities, and retirement homes, among others. While these assets are considered as "broadband serviceable locations", they can also be utilized to host network equipment, reducing the need for communication central offices and remote huts.
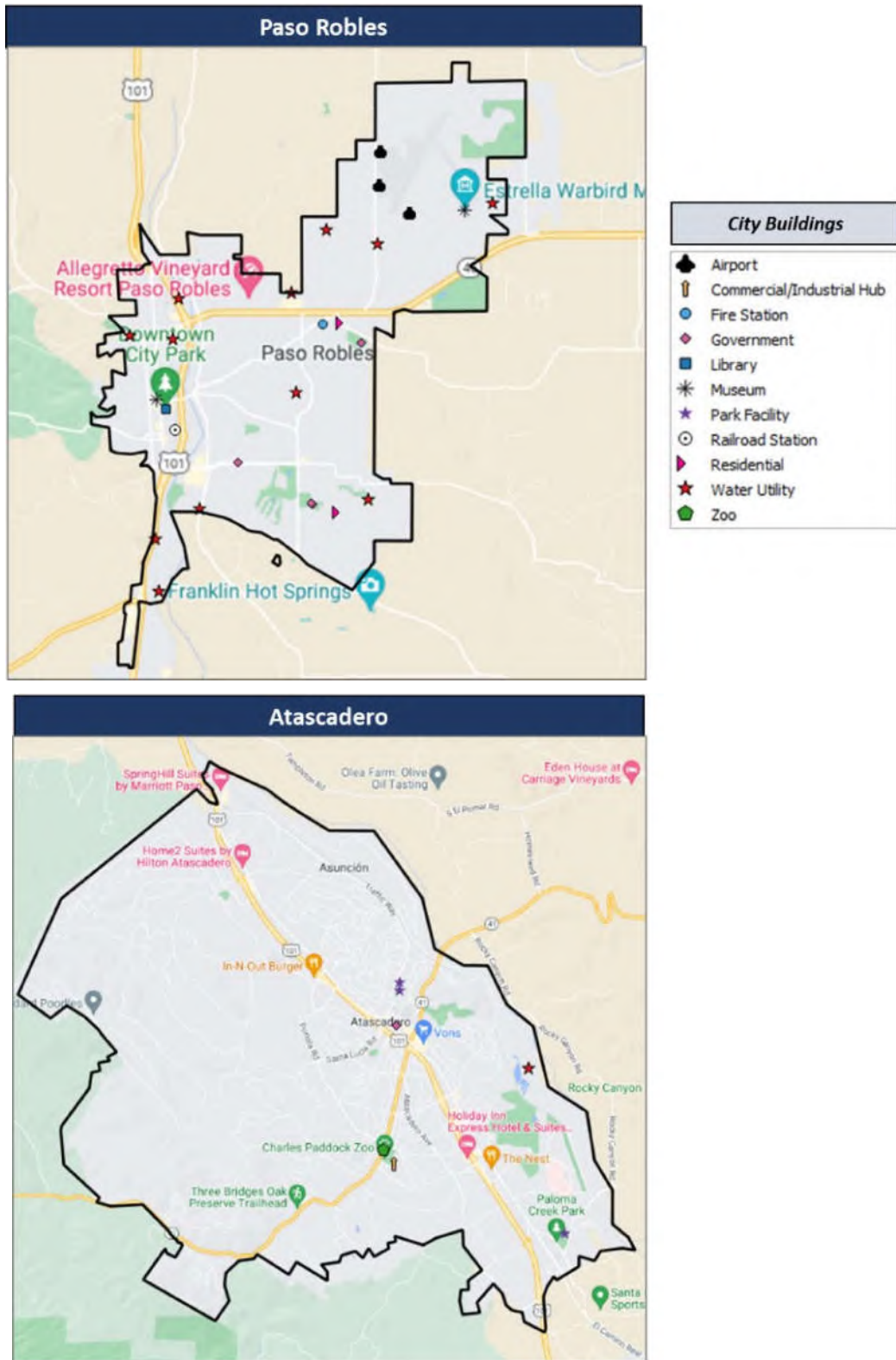
Figure 23 City buildings
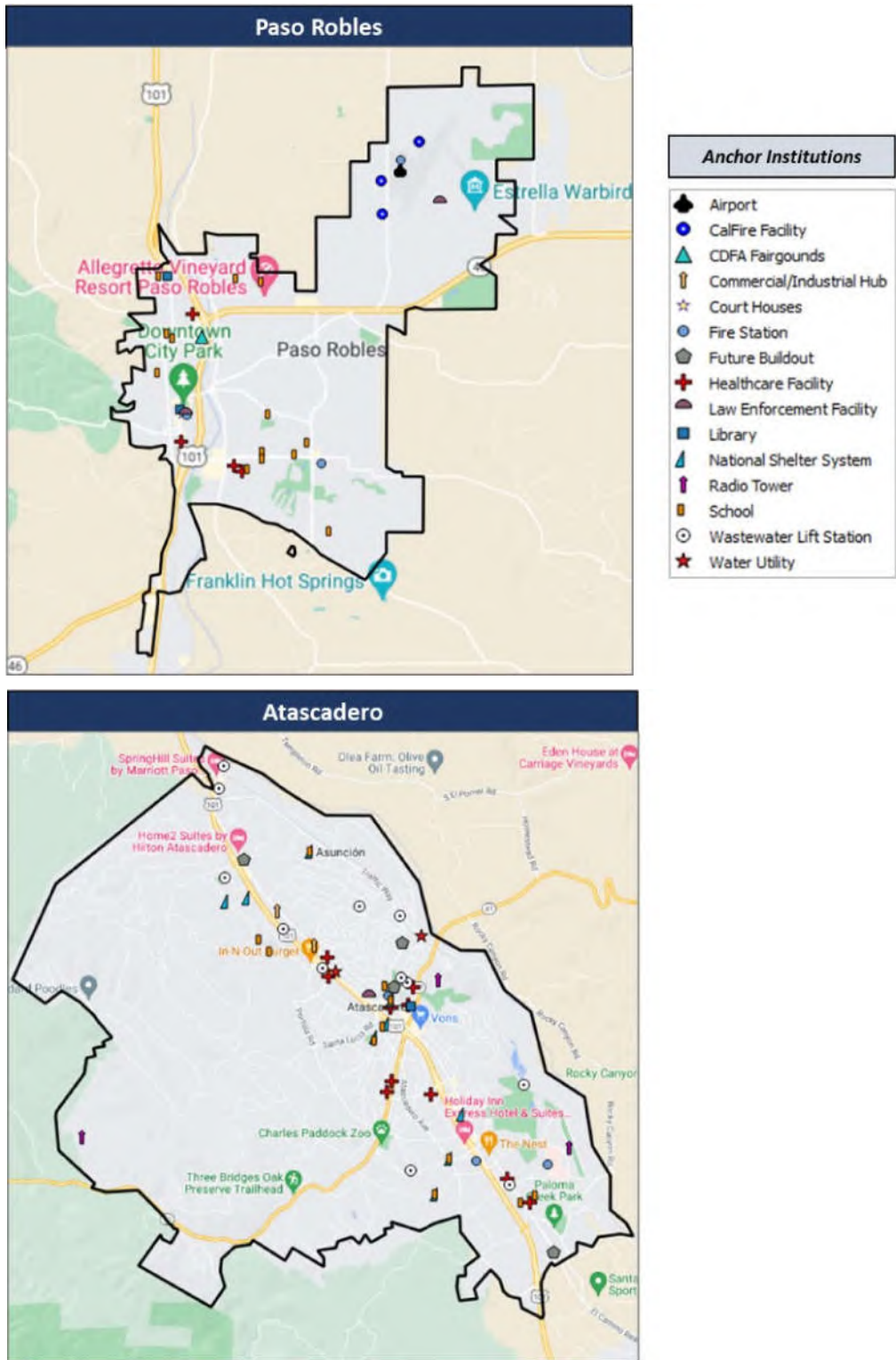
Figure 24. Anchor Institutions.

2) **Conduit and dark fiber**. The City of Paso Robles has deployed conduit and fiber through various projects, totaling 10.1 miles of fiber. In addition, Paso Robles has been awarded a $3,537,447 Grant from the US Economic Development Administration (EDA) for the deployment of 14.2 miles of conduit and a 288-strand fiber providing connectivity to key areas of the city. These routes are captured in Figure 25.
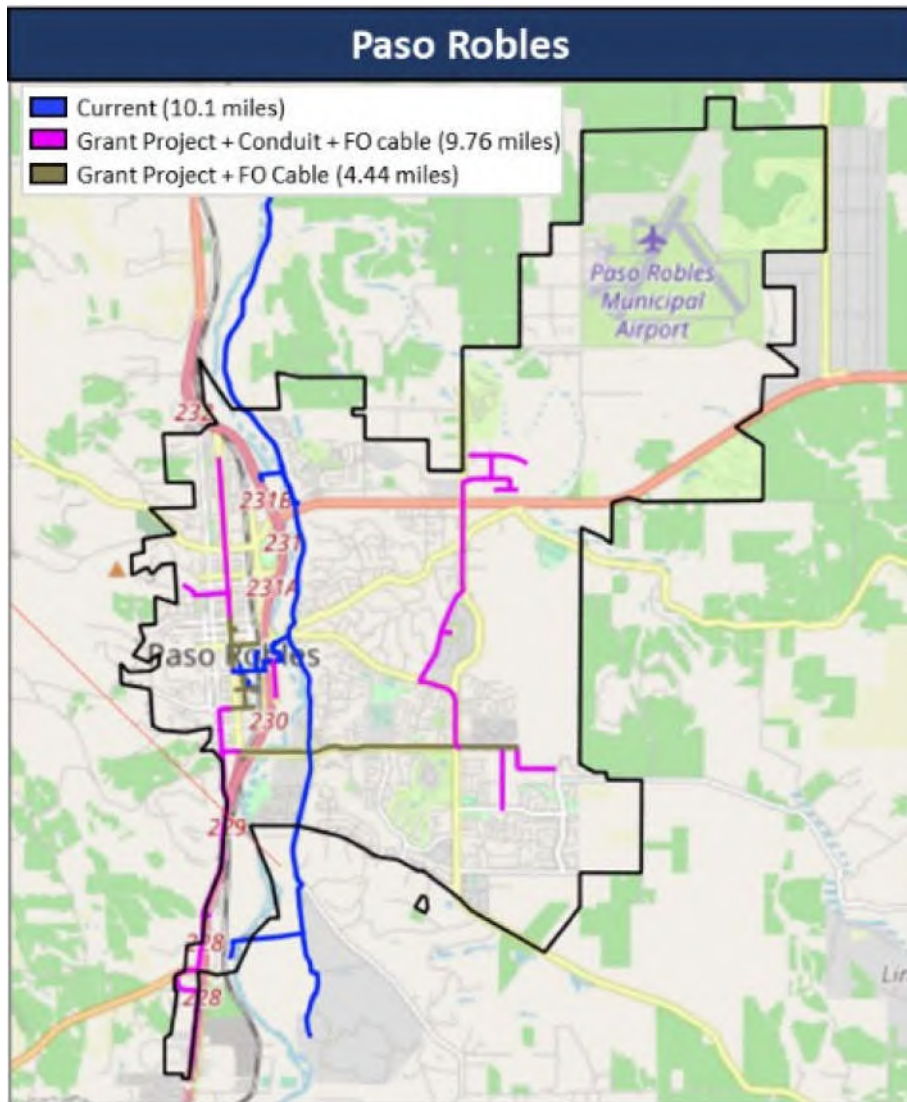
Figure 25. City conduit and dark fiber in Paso Robles.

In the case of Atascadero, there is no conduit or fiber owned by the City that can be leveraged for broadband deployment.

3) **Middle-Mile Fiber**. There are two middle-mile projects that are relevant to North County, the Nacimiento Water Pipeline and the California Middle Mile Broadband Initiative (MMBI) also known as GoldenStateNet[44].

---

[44] https://goldenstatenet.org/ (accessed March 2023)

The Nacimiento Water Pipeline, shown in Figure 26, is a 45-mile pipeline from Lake Nacimiento to SLO. During construction conduit and fiber were deployed along the entire route, providing connectivity for the water system but also middle mile fiber for the County and cities involved, including Atascadero and Paso Robles. This is an asset that can connect last-mile networks to the internet or possibly offer route diversity and resiliency.

Figure 26. Nacimiento Water Pipeline

This middle mile network will ensure better and more connectivity throughout the State of California and improve the economics of last mile networks, particularly in rural areas. At the time of this writing the final design has not been confirmed and finalized. The middle mile construction commenced in October 2022 in the San Diego area and there is a statutory requirement to complete the entire network by end of December 2026.

GoldenStateNet is the entity that will manage the planned middle mile open-access network consisting of 10,000 route miles that is a central component of SB-156 that provides $3.25 billion for the buildout.

The current design for SLO County is captured in Figure 27. As shown, the route includes Highway 101 from Santa Maria (in Santa Barbara County) to San Miguel, Highway 1 from

Guadalupe to Grover Beach and from SLO to San Simeon, and Highway 46 from Paso Robles to Cholame. A total of 184 miles are planned within SLO, including 7.5 miles in Atascadero and 8.5 miles in Paso Robles.
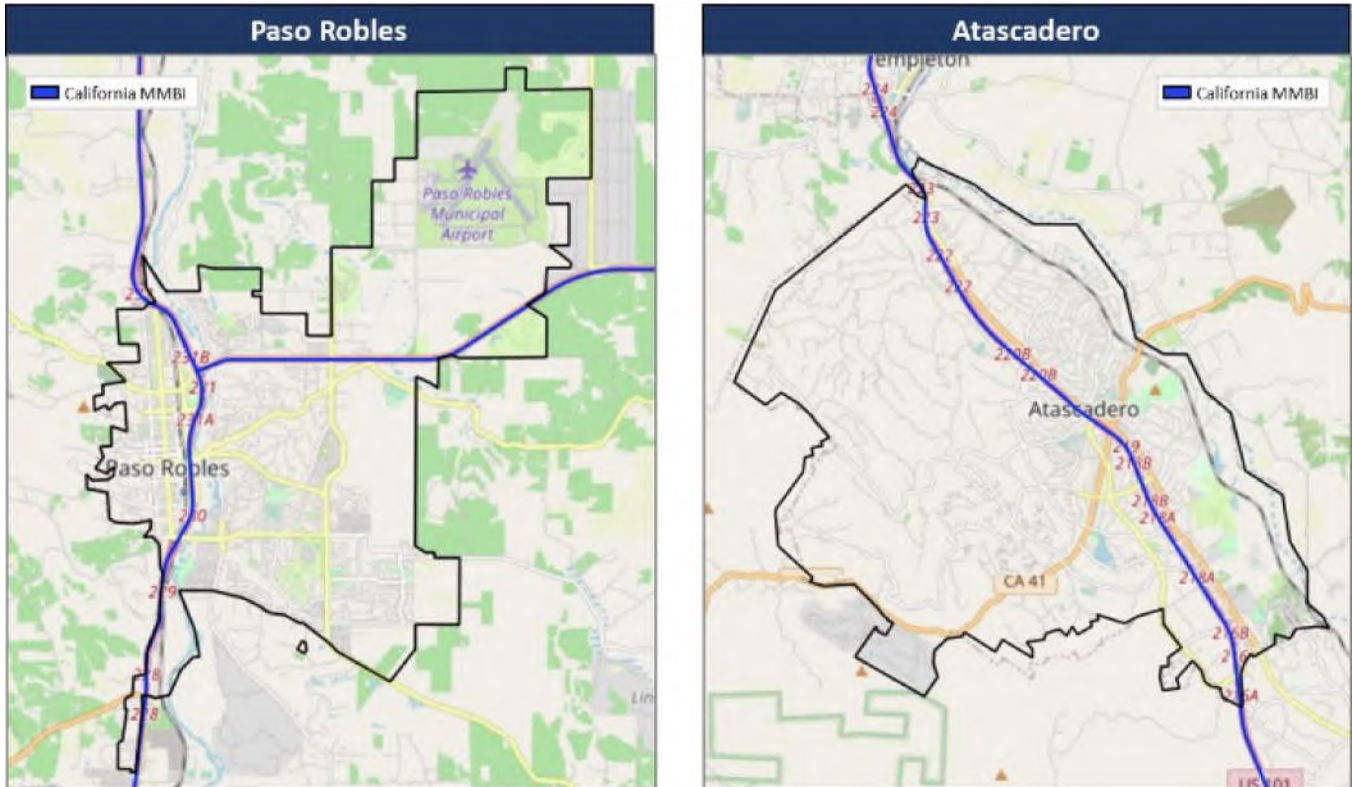
Figure 27. California Middle Mile Broadband Initiative – Current Design for SLO County.

GoldenStateNet can play an important role in developing last-mile access for North County, depending on the timing of its construction and potential synergies with ISP partners and other City projects.

4) **Utility Infrastructure**. The main utility asset that can be leveraged for broadband are the utility poles owned by the Pacific Gas & Electric Company (PG&E), which is the electric utility in the area. It is estimated there are existing poles covering 95% of the area in Atascadero and 91% in Paso Robles.

In Atascadero, there are 3.1 miles of abandoned sewer lines. Investigation into these sewer lines suggests that for cost reasons they are not likely to be repurposed for fiber deployment. These sewer lines are shown in Figure 28.

Figure 28. Abandoned Sewer Lines in Atascadero.

2.5 Broadband Readiness

Broadband readiness refers to the assessment of local policies and regulations around broadband construction, reflecting the level of "readiness" or "friendliness" to attract broadband investments. This is a critical aspect in today's environment as broadband needs throughout the country are exploding and service providers will look to prioritize investments based on attractive markets that can be deployed efficiently.

Broadband policies to facilitate Service Provider efficiency and to attract Service Providers have been demonstrated across the country. Recently, Ventura City Council approved an agreement with SiFi Networks to build a citywide fiber network[45]. Contributions from the City include access to the city's

---

[45] https://www.cityofventura.ca.gov/DocumentCenter/View/32475/13C

rights of way and a Master Encroachment Agreement. The City was able to avoid direct funding for this initiative, in part, through attractive broadband policies.

North County broadband readiness was assessed through workshops and interviews with the Public Works and Planning Departments of Paso Robles and Atascadero to understand their permitting and construction policies and processes. These policies were then evaluated based on the California Local Permitting Playbook[46], considering the four categories illustrated in Figure 29..
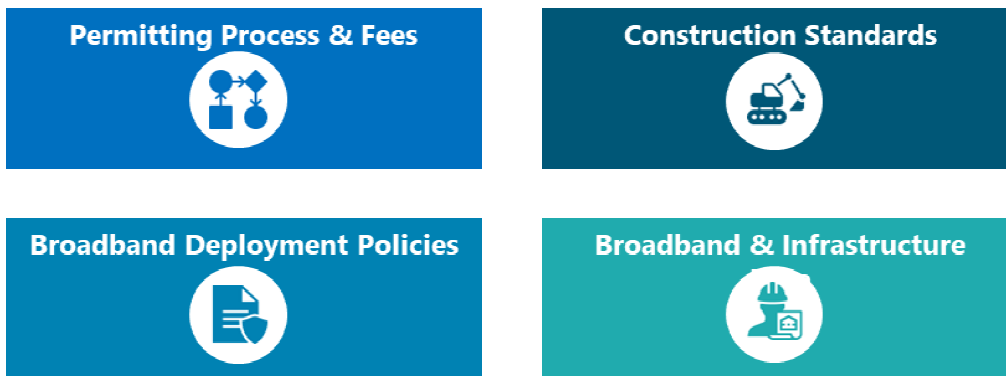
Figure 29. Broadband Readiness Assessment Categories.

2.5.1 Permitting Process & Fees

The evaluation of this category includes the examination of the existing permitting processes and the applicable permit fees for broadband deployment against the best practices set forth below:

1) Document the permitting process and make it available to the public

2) Provide an online portal for permit applications

3) Establish a dedicated telecommunications permit

4) Distinguish between major and minor permits

In the case of Paso Robles, telecommunications permitting follows the standard encroachment permit process which is documented on the City website. There is no telecommunications-specific permit and there's no distinction between major and minor permits. The permit application cannot be completed online.

For Atascadero, telecommunications permitting follows the standard encroachment permit process, but is not documented. There is no distinction between major and minor permits and, while the online application portal has been implemented[47], it is not yet configured to process telecommunications permit applications. In addition, the permit fees are considered high as they are calculated on a per foot basis[48].

---

[46] State of California Local Permitting Playbook (August 2022)

[47] https://permits.atascadero.org/eTrakit/

[48] Trench - $675 plus $8 per linear foot; Boring - $675 plus $4 per linear foot; Overhead - $675 plus $2 per linear foot

2.5.2 Broadband Deployment Policies

Evaluation of broadband deployment policies were based on the following critical issues:

1) *Microtrenching Policy*[49]

Microtrenching is 3x faster and up to 6x cheaper than traditional trenching methods and has minimal environmental disturbance. California Senate Bill 378[50] requires local agencies to allow, except as provided, microtrenching for the installation of underground fiber, if the installation in the microtrench is limited to fiber.

2) *Dig Once Policy*

A "Dig Once" policy encourages the placement of fiber or conduit in the ground whenever the road is dug up for a public works project. Dig Once policies break down barriers of entry for new market entrants, by lowering the cost of deployment[51], creating a competitive marketplace that ultimately can result in more options, lower prices, and higher quality of service for consumers.

3) *Access public assets for broadband deployment*

The high capital cost of network construction is a primary challenge for broadband deployment. Enabling service providers to lease existing public assets has the potential to reduce ISP cost while providing revenues to the city.

None of the policies above have been implemented by Paso Robles or Atascadero. However, it is important to note that Paso Robles has taken steps to install conduit alongside new road construction and major maintenance/repair work.

2.5.3 Construction Standards

Construction standards for aerial and underground fiber and conduit promote consistent and safe construction practices across broadband deployments. These standards can help enhance the permitting application and review processes. Construction standards should be industry best practices and they should also be publicly accessible and transparent.

Both Paso Robles and Atascadero have construction standards available through their web portals. In the case of Paso Robles this includes standards for underground utility location and Pipe in Trench, but no further details are provided. For Atascadero, there are generic construction standards for public works but not for broadband / telecom specific construction.

---

[49] "Microtrench" refers to a narrow open excavation trench that is less than or equal to 4 inches in width and 12 to 26 inches in depth and that is created for the purpose of installing a subsurface pipe or conduit.

[50] California SB-378

[51] The cost of pulling fiber in an existing conduit is ~10 percent of the cost of underground construction without the conduit.

2.5.4 Broadband and Infrastructure Data

An organized government database of geographic information dramatically increases efficiency and reduces costs. Access to relevant data reduces the cost and time required to plan and build broadband infrastructure. Essential infrastructure data includes housing units, rights-of-way, and easements, building footprints, conduit lines, fiber lines, zoning, and existing underground utilities.

Paso Robles has an online map with broadband related data, although it is incomplete. In the case of Atascadero, the majority of GIS data relevant to broadband is not yet available to the public.

Summary and Recommendations

The results of the broadband readiness assessment are presented in Figure 30.
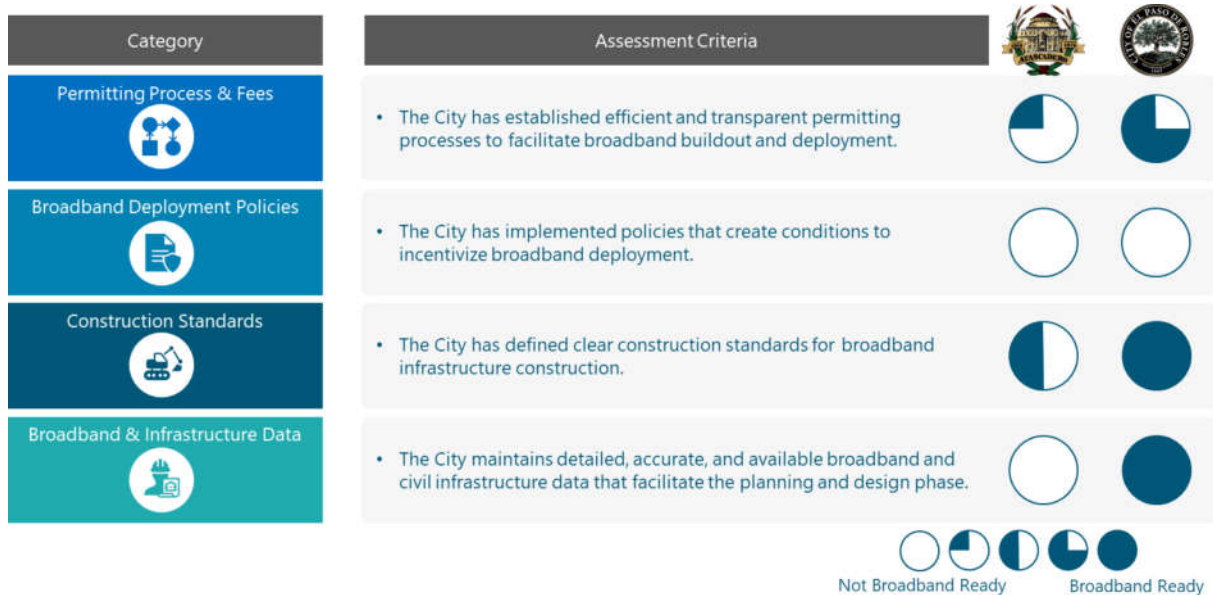
Figure 30. Broadband Readiness Assessment Summary.

Based on the analysis described above, recommendations to improve broadband readiness for North County are set forth below:

1) The Cities of Paso Robles and Atascadero should improve the permitting process and fees for broadband construction by:

   a. Implementing and/or enhancing online permitting portals.

   b. Establishing separate permits for broadband distinguishing between major and minor projects.

   c. Documenting and publishing the Atascadero permitting process

   d. Reviewing current permit fees applicable for broadband construction projects in Atascadero

2) The Cities should establish and reinforce the following policies:

   a. Establish a "Microtrenching" Policy as required by California Senate Bill 378.

   b. Establish a "Dig-Once" Policy

     c.   Explore potential synergies with utilities (e.g., PG&E) for joint deployment

     d.   Explore the leasing of public assets to ISPs or other stakeholders

3) The City of Atascadero should promote consistent and safe construction practices across broadband deployments by:

     a.   Developing publicly accessible and transparent construction standards for aerial and underground fiber and conduit.

4) The Cities can reduce cost and time required to plan and build broadband infrastructure by:

     a.   Add essential City infrastructure data to the GIS portal in Atascadero[52].

     b.   Complementing and maintaining an up-to-date GIS portal in Paso Robles. Importantly, the asset inventory and GIS plan generated as part of this project can be used to implement this recommendation.

2.6 Key Findings and Recommendations

Key Findings:

- The examination of the FCC broadband availability data in North County indicates that the percentage of unserved and underserved areas in the region is small, with Atascadero below 1.5% and Paso Robles reporting under 0.1%.

- The CPUC Broadband map generally matches the FCC data. There are however some relevant discrepancies that should be clarified.

- The North County is a de facto one-ISP region, with Charter being the clearly dominant provider.

- Speed tests show lower performance than reported by FCC data. This inconsistency presents an opportunity to challenge the FCC data and potentially influence funding eligibility.

- New economic developments and new housing projects could be affected by lack of service in portions of these areas.

- Vulnerable communities are concentrated in clusters, farther from the City center.

- The California Middle Mile Network, GoldenStateNet, represents a potential opportunity to stimulate last mile connectivity for the Cities and their ISP partner(s).

- There are distinct levels of broadband readiness in the North County Cities, but the desired goal of best-in-class readiness is within reach.

Recommendations:

- Review and analyze discrepancies between FCC and CPCU data to secure a coherent point of view in grant applications. Challenge state and federal data as required.

- Establish mechanisms to evaluate broadband performance in the whole of North County for an extended period. Establish a speed test practice that can provide a clear view of broadband

---

[52] https://atascadero.maps.arcgis.com/home/index.html

access and competition and can be used to track achievement of broadband improvement objectives.

- Consider purchasing a speed test service to achieve these results to generate a more comprehensive view of broadband performance and to challenge ISP data provided to the FCC and CPUC.

- Promote public-private partnerships to improve broadband access which are based on Open Access Network methodologies to favor competition and service improvement.

- Promote formalization and documentation of permitting and construction procedures to facilitate the deployment and effective maintenance of broadband infrastructures.

3 ISP Assessment and Engagement

ISPs are a key stakeholder for the broadband present and future of North County. A process to assess and engage ISPs was developed to discover ISP service offerings, their broadband infrastructure, and their plans for the Cities, if any. An effort was also launched to gauge interest and willingness to collaborate with the Cities of Paso Robles and Atascadero to extend and improve broadband infrastructure.

ISP interest and support for the Open Access Network (OAN) business model was also an area of pursuit. Open Access Networks enable multiple retail ISPs to offer services to end customers over a broadband network deployed and operated by an OAN service provider. In short, this is a wholesale service to retail ISPs with non-discriminatory pricing. The effect of this business model is to lower the aggregate deployment costs while maintaining competition at the retail level. In certain rural geographies only one

network is financially sustainable, and the OAN model often ensures it is built with the added feature of customer choice and retail service competition.

Most state and federal funding programs for broadband encourage OANs and some stipulate OAN as a condition of funding. Moreover, the GoldenStateNet middle mile initiative will be launched as an OAN. In addition, the Golden State Connect Authority, a California RCRC initiative for last mile connectivity, will also be launched as an OAN[53].

ATT and BlackRock, the world's largest asset manager, announced in December 2022 a $15 Billion investment to build OANs in certain areas of the US which further validates the OAN business model.

While OANs were of interest in the North County RFI, it was not positioned as a requirement.

3.1 ISP Engagement through an RFI

The ISP assessment and engagement process is captured in Figure 31. The first task was to identify target ISPs for engagement. This was conducted via desktop research along with a preliminary ISP assessment. Secondly, an ISP engagement package was developed in parallel with the RFI and the coordination of introductory meetings. After the introductory meetings with each of the ISPs, the RFI was issued. RFI responses were analyzed, and further discussions and qualifications were conducted based on responses.
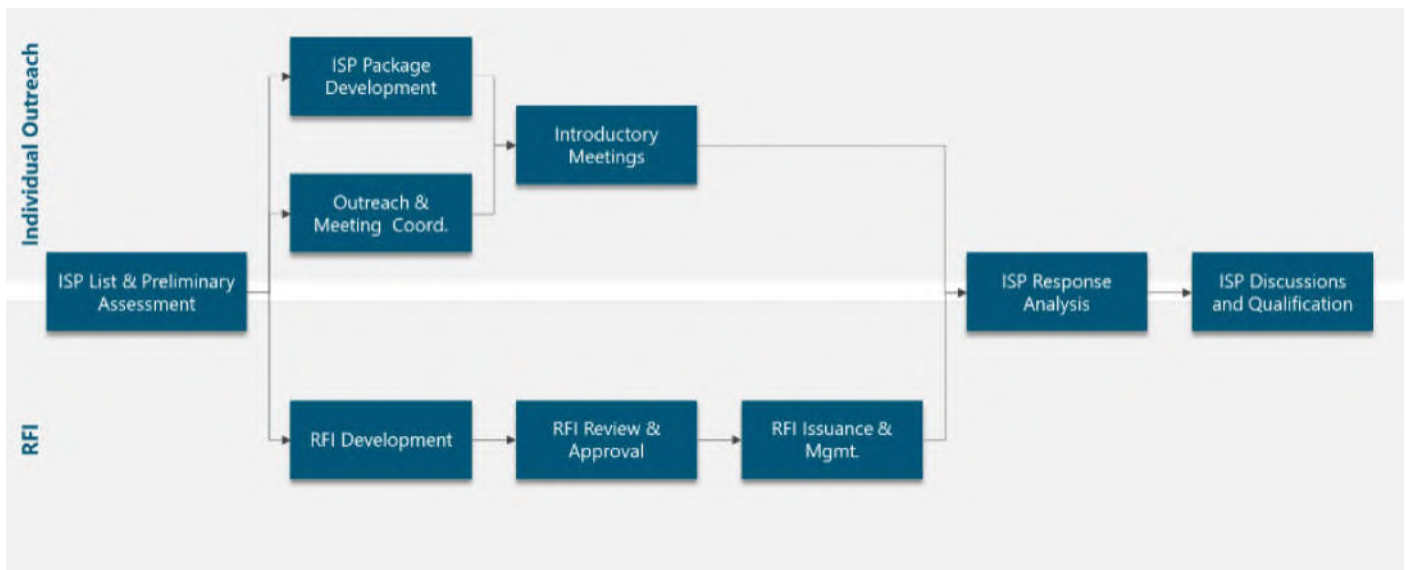
Figure 31. ISP Assessment and Engagement Process.

The ISPs identified in the preliminary assessment were grouped into three categories: 1) **Area 1 ISPs**: ISPs operating within the Paso Robles and Atascadero City boundaries; 2) **Area 2 ISPs**: ISPs in close proximity; and 3) **Area 3 ISPs**: ISPs operating out of region. The resulting categorization is shown in Figure 32. Satellite ISPs are not considered as in most cases, it is not a grant-eligible technology.

---

[53] [Golden State Connect Authority (accessed March 2023)](#)
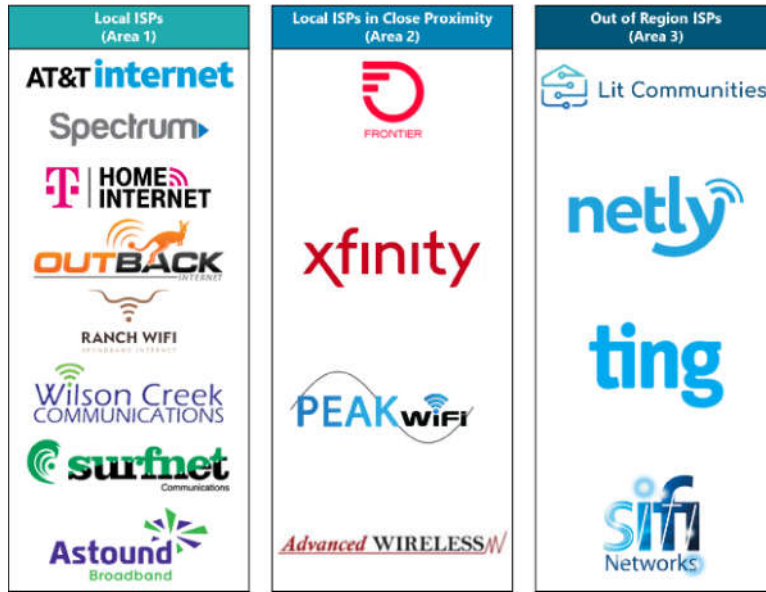
Figure 32. List of ISPs analyzed.

Table 10 provides a comparison of ISP service offerings based on desktop research including official websites and online tools based on ISP and user reported data[54]. Please note that service offerings shown for Local ISPs correspond to those offerings available in Paso Robles and Atascadero, while service offerings shown for other ISPs correspond to a wider geographic and often national plans.

Table 10. ISP Service Offering Summary

Service Provider	Broadband Technology	Download / Upload Speeds (Mbps)	Monthly Fee (USD)
Local ISPs (Area 1)			
AT&T Internet	FTTH/FWA/xDSL	300 | 500 | 1, 000 25 (FWA)	$55 | $65 | $80 $55 (FWA)
Spectrum (Charter)	FTTH / DOCSIS	300 | 500 | 1,000	$49.99 | $69.99 | $89.99
T-Mobile Home Internet	FWA	Up to 182	Starting at $50
Outback Internet	FWA	10/5 | 20/7 | 30/10 | 40/15	$60 | $100 | $150 | $225
Ranch WiFi	FWA	5/5 | 10/5 | 20/10 | 30/10	$65 | $95 | $135 | $165
Wilson Creek Communications	FWA	1/1 | 7/5 | 12/8 | 24/12 | 35/12	$25 | $45 | $85 | $115 | $ 155
Surfnet Communications	FWA	10/3 | 15/4 | 50/10100 / 20 (Residential) 40/20 | 100 / 20 (Business)	$55.96 | $79.96 | $119.96 (Residential) $239.95 | $349.95 (Business)

---

[54] https://broadbandnow.com/, https://www.broadbandsearch.net/

			$25 | $45 | $65 | $80
Astound Broadband	Fiber	100 | 500 | 940 | 1200	
Local ISPs in Close Proximity (Area 2)			
Frontier	Fiber	500 | 1,000 | 2,000	$49.99 | $69.99 | $99.99
Xfinity	Fiber / Cable	400 | 800 | 1,200	$24.99 $59.99 $79.99
Peak WiFi	FWA	50/10 | 100/20 | 100/100	$69.95 | $149.95 | $199.95
Advanced Wireless	FWA	4/1 | 20/4 | 25/4 | 30/5 | 35/5	Starting at $49.99
Out of Region ISPs (Area 3)			
Lit Communities	Fiber	See Note 2	
Netly	Fiber	See Note 3	
Ting	Fiber	100	$89
SiFi Networks	Fiber	See Note 4	
Note 1: Single quantity service speed refers to the download speed. Note 2: Lit Communities offers planning, deployment, and operation of fiber networks to communities. Therefore, the service offering is defined by the community on a case-by-case basis. Note 3: Netly offers wholesale fiber services to cities, ISPs, utilities, among others. Note 4: SiFi Networks funds, builds, and operates open access fiber networks across the US. The retail providers define speeds and pricing plans.			

The RFI was developed with specific objectives for each ISP category as set forth below:
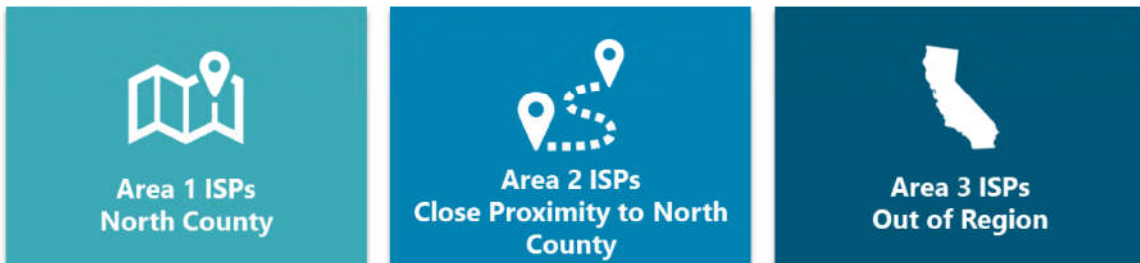
1) *Area 1 ISPs – North County*

- Characterize the ISP footprint and capabilities within North County

- Understand the ISP plans to upgrade their services and coverage area

- Explore and identify requirements that North County can potentially address to accelerate ISP upgrade plans and commitments.

2) *Area 2 ISPs – Close Proximity to North County*

- Characterize the ISP footprint and capabilities in Area 2 which is proximal to the North County Cities

- Understand and assess the potential of Area 2 ISPs as partners to deploy, operate or manage broadband infrastructure within Area 1, North County

3) Area 3 ISPs - Out of Region

- Understand the ISP criteria to enter a new market such as North County

- Identify the ISP capabilities and their potential role as partners to deploy and operate broadband infrastructure within North County

Initial engagement and meetings took place with nine (9) of the ISPs: Astound, AT&T, Charter, Lit Communities, Netly Fiber, Outback, Ranch WiFi, Ting, and Wilson Creek Communications. Of those, only Astound, AT&T, Charter and Ranch Wi-Fi responded to the RFI, the rest declined. Highlights from the ISP responses are captured below.

Astound Broadband provided complete answers to the RFI, including details about its current service offering and preferred operating models.

- Astound's goal is to partner with cities to expedite fiber buildout and keep costs at a minimum.

- Intention to replace DSL with fiber in Paso Robles

- No concrete plans for Atascadero, but there is interest in a potential partnership with the city.

- Willing to partner with the cities to deploy and operate a dark fiber network. Preference is not to make it open access.

AT&T provided high-level answers to most of the RFI requirements.

A Non-Disclosure Agreement (NDA) was required to provide further information regarding network infrastructure in the area and broadband infrastructure deployment plans.

• AT&T currently offers wireless (C band) symmetrical service in metro areas and is committed to increasing its fiber footprint.

• Willing to consider open access models only if required by the funding program.

• AT&T offers programs regarding promotion and support for Affordable Connectivity Program (ACP) subscription and digital literacy workshops.

Charter provided high level information, requiring an NDA to provide detailed information (confidential) about the current network infrastructure in the area.

• Willing and able to engage in broadband expansion projects

• Interested in partnering with the City in grant applications and leasing infrastructure from the city

　　o Currently deploying FTTP in San Ardo and San Lucas in southern Monterey County and three communities in northern Monterey County through ARPA money

• Unwilling to consider Open Access models

Ranch WiFi provided full topology data available.

Potential partner to deploy and operate open access infrastructure.

• Ranch WiFi fiber expansion is mainly to connect their existing sites and to extend service to customer homes

     o Teragraph can be considered as interim step

• Have applied for grants in other locations and willing to get grant money for North County projects

• Open to all the open access models under a clause of non-compete with FWA in areas where they provide FWA service.

The ISP RFI process shed the light on the ISP community positioning towards North County, providing the following insights:

1) While the North County broadband environment can be attractive for new entrants, the time and effort to engage in an unknown market without a clear sense of opportunity resulted in marginal interest and lack of responses to the RFI. The major impediments are: 1. level of time and resource investment to develop commercial opportunities; opportunity development is often a multi-year process with no assurance of a successful outcome; 2. perceived high cost of doing business in California for out of state new entrants and concern over the prevailing wage requirement.

2) Smaller wireless ISPs are not prepared to address city-wide needs.

3) Local ISPs which already have a stake in the area are engaged and willing to collaborate with the city. Therefore, further discussions with Astound, AT&T, Charter, and Ranch Wi-Fi should be pursued based on other findings and recommendations captured in this report.

3.2 Request for Concept Proposals

After reviewing the RFI responses described in Section 3.1, it became evident that there was a lack of a tangible, concrete, and actionable course of action from the ISPs to meet the Cities broadband objectives.

As a result, a decision was made to pivot towards an ISP centered approach where the Cities offer various forms of support to improve the ISP business case for broadband deployment in North County and to encourage a creative ISP response. Importantly, this pivot also formalized a North County goal for affordable city-wide gigabit symmetrical service.

This initiative was codified in a Request for a Concept Proposal.

ISP Assessment and Engagement

The Concept Proposal was an open invitation to the ISPs to submit a proposal to meet City objectives with a business plan that works for the ISPs. The Request for Concept Proposal was drafted without excessive requirements. Additionally, it furnished ideas and opportunities to the ISPs on how and where each City might possibly contribute to the solution up to and including financial inducements.

Three ISPs with the capability to deploy last-mile fiber throughout the Cities were contacted as part of the concept proposal: AT&T, Charter, and Astound. AT&T declined to respond, while Charter requested a 30-day extension until April 10, 2023. Astound responded with a Concept Proposal that is currently being evaluated independently by the Cities.

Importantly, this approach can and should be replicated in case the first round of discussions with Astound and Charter results in no agreements. In this case, out-of-region ISPs should be re-engaged as the Cities are now in a position to offer a clear path for new entrants that includes contributions from the Cities, creating a more compelling business case for these ISPs.

4 Analysis of Broadband Scenarios

The focus of the North County Broadband Strategic Plan is to develop an actionable plan to provide Atascadero and Paso Robles broadband services that meet the needs of today and especially tomorrow.

While the federal and state thresholds for broadband speeds hover between 25/3 Mbps and 100/20 Mbps, the prevailing view from City leadership after the broadband market analysis, is to leap forward to the upgraded objective of gigabit symmetrical service which is widely available throughout the US. This grade of service is a byproduct of any ISP commitment to FTTH deployment. This determination resulted in a key focus of this North County Broadband Strategic Plan to bring gigabit symmetrical service to the Cities.

While it is crucial to identify the priority areas mentioned in Section 2.3 and obtain connectivity solutions for residents of these areas, it is important to recognize that modern broadband solutions need not be throttled down to the minimum threshold and should and can leap forward to FTTH standards (e.g., gigabit symmetrical service).

To understand the prospects of realizing the ambitious broadband objectives a brief architecture overview is established in Section 4.1.

Operating models and scenario analysis incorporating high level designs and operating models targeted at 100% availability of gigabit symmetrical service is developed in Section 4.2.

Informed by insights from the ISP engagement described in Section 3 and the infrastructure assessment in Section 2.4, Section 4.2 develops various operating models that are matched against conceptual network designs. Models are then compared considering preferences from both Cities and other key decision factors including cost, level of effort, speed of deployment, and financial viability from each City's perspective.

Recommendations on optimal models are provided that are comfortable for the Cities and aligned with the principles established in the request for concept proposals issued to the ISPs.

Finally, funding sources and economic impact are assessed in Section 4.3 providing recommendations for potential grant applications and summarizing the economic impact of broadband deployment to all the premises within the Cities.

4.1 Architecture Overview

Considering the goal for gigabit symmetrical service, network designs for the broadband scenarios were developed based on a FTTH architecture, as described in Section 1.3.2, specifically using XGS-PON technology which can deliver downstream and upstream line rates of approximately 10 Gbps per OLT optical port.

The scope of each network design differs based on the specific target under each broadband scenario. All the designs are developed in accordance with the following guidelines:

1) An access node is assumed to be hosted in the City Hall providing last-mile connections to locations within 12 miles. For locations farther than that distance, other access node(s) are installed in other City buildings.

2) The route design is optimized to maximize the use of existing infrastructure, minimizing fiber route length, subject to connecting all the locations within the target area.

3) Network scenarios were designed considering aerial and underground fiber installation:

   - For aerial construction, the strand and lash construction method with a 96-strand aerial dielectric cable is assumed.

   - For underground construction, a mix of trenching and boring techniques is considered for the installation of two 2" High-density polyethylene (HDPE) conduit, one of them filled with 288-strand all dielectric cable.

4) Network electronics are dimensioned to support 1 Gbps symmetrical service and capacity spare for future growth.

4.2 Operating Models and Network Scenarios

The broadband operating model establishes the roles and responsibilities for each of the stakeholders in the deployment and operation of a broadband network. A myriad of models can be developed through simple variations in roles and responsibilities. A framework to understand model variations is useful as a tool to assess optimal models for the Cities.

CPUC Framework

The CPUC has been using a high-level framework to overview the potential models where local governments engage in the deployment and operation of broadband networks based on the US Ignite Whitepaper on Broadband Models. A modified version of this framework is illustrated in Figure 33, where five common public/private models are presented.
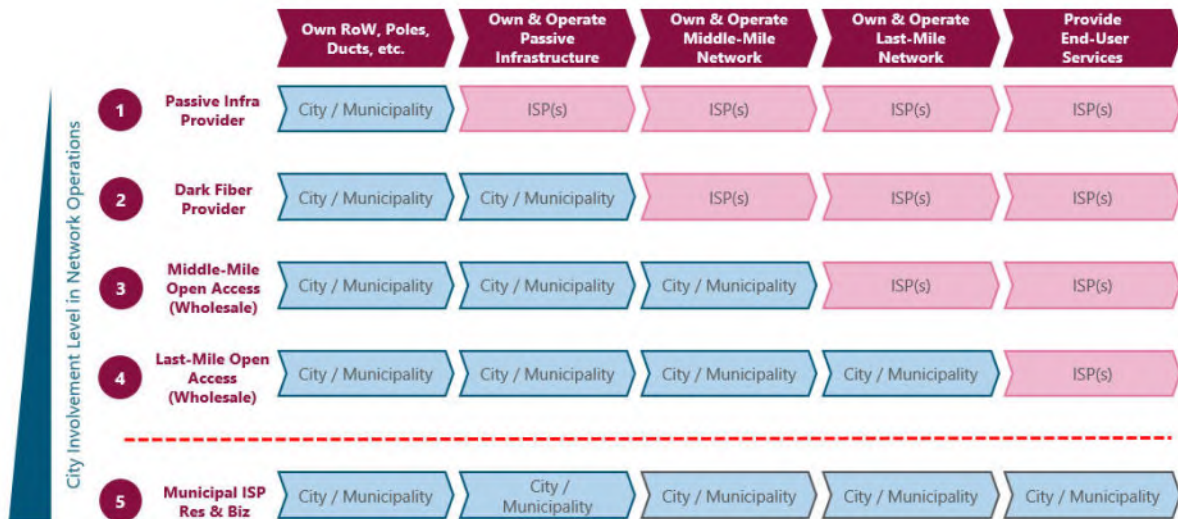
Figure 33. Operating models for broadband expansion through City involvement.

Cities' Preferences

The CPUC / US Ignite framework was used to discuss operational preferences with the Cities of Atascadero and Paso Robles. The key findings and guidelines obtained from these discussions are captured below:

- The Cities are not positioned to launch and manage a full-service municipal ISP.

- The Cities prefer not to be active in broadband operations but would consider it if other viable options do not surface.

- There is a relative preference and interest in owning a middle-mile network, active or passive, that can be leveraged by ISPs to extend and provide last-mile service to end users.

Scenario Overview

Considering the Cities' preferences, four scenarios were developed to evaluate their feasibility and relative attractiveness and to guide the Cities in future engagements with key stakeholders as the Broadband Strategy and Plan advances. These scenarios were also developed as proof positive as to why certain scenarios are of no interest to the Cities.

For the analysis, the CPUC / US Ignite framework was extended to capture the roles to fund, own, deploy, and operate the components of the broadband network including poles and conduit, middle-mile passive and active infrastructure, last-mile passive and active infrastructure, and service delivery. The analysis is done considering that each City may select a different model, therefore, models are described using "the City" as a placeholder for the City of Atascadero or the City of Paso Robles.

The four scenarios are summarized in the following:

1) ***Fast-Track: Light-form Public-Private Partnership***. An ISP partner commits to deploy a citywide fiber network with support from each City through light-form contributions.

2) ***Conventional: Leverage City assets to establish a middle-mile dark fiber network***. The City funds the deployment of a middle-mile dark fiber network that is leveraged by ISP partners to provide broadband services to unserved / underserved locations.

3) ***Pump Priming: Deploy a middle-mile Open Access Network to improve last-mile economics.*** The Conventional scenario with the addition of active infrastructure in the middle-mile network to offer lit active services.

4) ***Bold (and Risky): Own the last-mile Open Access Network***. The City partners with a third-party operator to deploy and operate a last-mile open access network.

The scenarios are ordered based on the level of involvement from the City from low to high. Scenarios 1-2 are best aligned with both Cities' preferences while scenarios 3 and 4 are presented for contrast as they require heavy involvement from each City to deploy and operate middle-mile and last-mile infrastructure, respectively. Therefore, the analysis presented in the following sections puts emphasis on Scenarios 1 and 2.

4.2.1 Scenario 1 – Fast Track: Light-form Public-Private Partnership

In this scenario, an ISP partner commits to expand its infrastructure to provide FTTH service throughout the City, subject to light-form contributions from the City. In exchange, the ISP charges end users for the service and, depending on the type and amount of City contributions, may provide some form of payback to the City, as illustrated in Figure 34.

Figure 34. Scenario 1 – Task Track: Light-form Public Private Partnership.

The classic example of this type of scenario is what occurred in Kansas City with Google Fiber. Kansas City provided the right environment through access to existing infrastructure and broadband-friendly policies, resulting in the City being selected by Google Fiber in 2011 to be the first market to deliver 1 Gbps broadband service to residential and business users, boosting quality of life and entrepreneurship.[55]

Roles and responsibilities for the implementation of this scenario in North County are further analyzed below.

Funding

The infrastructure to be deployed under this scenario includes the necessary middle-mile and last-mile infrastructure to ensure 100% availability of 1 Gbps symmetrical service. For an ISP without existing infrastructure, this would represent an estimated 447 miles of fiber. The required infrastructure and

---

[55] https://www.forbes.com/sites/eliseackerman/2012/08/04/how-kansas-won-the-google-fiber-jackpot-and-why-california-never-will/?sh=5bbc9ffe4b76

associated cost will vary greatly based on the level of infrastructure of the selected ISP partner – from significant to none.

The role of the Cities is to provide light form funding. Funding levels are designed to trigger interest of potential ISP partners, enabling their business case. The proposed contributions include the following:

1) **Removing barriers and streamlining the permitting processes**. Ensures a clear and efficient permitting process which addresses the issues captured in Section 2.5 and provides certainty to the ISP partner while reducing the overall time and cost for deployment.

2) **Access to existing and planned City infrastructure**. Provides access to the existing and planned City infrastructure described in Section 2.4, particularly existing conduit and fiber which reduces the investment required to provide city-wide service.

3) **Contract to provide connectivity to City buildings**. Offers a long-term contract to provide inter-building connectivity and broadband service for City buildings to ensure revenue for the ISP partner, improving its business case.

4) **Collaboration for Grants**. Partnering with the ISP partners to apply for broadband grants to help pay for infrastructure expansion. The role of the City can vary from extending a letter of support to serving as the primary applicant for the grants. Potential grant opportunities are further explored in Section 4.3.

   Note: Additional inducement funding can be considered under this section to meet the clearing threshold for an ISP commitment.

Ownership

Under this "Fast-Track" scenario, the ISP partner keeps ownership of most of the newly deployed infrastructure including passive and active last mile and middle mile infrastructure.

The notable exception is for infrastructure that is funded through grants awarded to the City. In that case, the City will be the owner of the portion of the infrastructure funded by the Grant, and the ISP partner may enter into a long-term lease agreement at reduced or no fee.

Deployment

The ISP partner is responsible for the deployment of the required last-mile and middle mile infrastructure (passive and active), meeting the agreed upon timelines.

The City is responsible for accelerating the permitting process and tracking the progress of the deployment.

Operation

The ISP partner is responsible for operating the last-mile and middle mile infrastructure, passive and active, and for providing residential and business broadband services within the City in accordance with a Service Level Agreement (SLA) to be established between the ISP partner and the City.

The City oversees SLA compliance based on some level of reporting and community feedback.

Figure 35 shows the roles and responsibilities for Scenario 1.

Figure 35. Light-form Public-Private Partnership Operating Model.

Further analysis of this scenario was done by generating a conceptual network design. Since the specific ISP partner has not been selected, the conceptual network design, shown in Figure 36, includes 100% of premises within Atascadero and Paso Robles. As stated before, the specific infrastructure to be deployed under this model will vary based on the selected ISP partner.

Figure 36. Network Scenario for the Light-Form Public-Private Partnership Model.

The business case for this scenario is also analyzed for each City through a high-level financial analysis. The results are captured in Figure 37 for the City of Paso Robles and in Figure 38 for the City of Atascadero. Importantly, the CAPEX is absorbed by the Service Provider and the operational costs to the City are insignificant.

Note: This analysis does not provide a Net Present Value (NPV) analysis. The primary purpose is to provide an operating view of the City budgets.

City of Paso Robles

CAPEX Contribution	Annual Fixed Costs	Annual Revenue
~$0	~$9k	$0
No CAPEX contribution	SLA Management	No Rev. generated

Broadband Impact	5-yr Cumulative Operating Project Surplus/Deficit
159	~-$45k
Unserved /underserved premises	

Figure 37. Financial view for Scenario 1 – City of El Paso Robles.

Since the City of Paso Robles has existing and planned conduit infrastructure to be leased by the ISP partner, connectivity services for the City can be provided by the ISP at no fee, resulting in a minimum annual operating cost to manage the SLA with the ISP partner.

City of Atascadero

CAPEX Contribution	Annual Fixed Costs	Annual Revenue
~$0	~$129k	$0
No CAPEX contribution	SLA Management City Connectivity services	No Rev. generated

Broadband Impact	5-year Cumulative Project Surplus/Deficit
470	~-$645k
Unserved /underserved premises	

Figure 38. Financial view for Scenario 1 – City of Atascadero.

For Atascadero, the cumulative deficit shown above is primarily due to the payment for connectivity services which is estimated to be $10,000 per month. As connectivity services are already part of the City operating costs more favorable pricing can be negotiated improving the scenario financials.

The primary benefit of the Fast Track Scenario is its low cost for the Cities and fast implementation. In addition, there is no need for the Cities to be involved in broadband operations. In this scenario, the City does not own new assets and the model is ISP dependent with limited City control on the implementation.

4.2.2 Scenario 2 – Conventional: Leverage City assets to establish a middle mile dark fiber network

This scenario, captured in Figure 39, is built around the City led deployment of a middle mile dark fiber network to connect City assets and anchor institutions. The City hires a contractor for the deployment of the middle mile passive infrastructure which is then leased to one or more ISP partners. ISPs leverage the dark fiber network to extend their last-mile infrastructure and provide broadband service to end users across the Cities. The ISP charges end users for the service and pays fees to the City for the lease of dark fiber infrastructure. As part of the arrangement the ISP may also provide high-speed internet access for the internal network of the City.
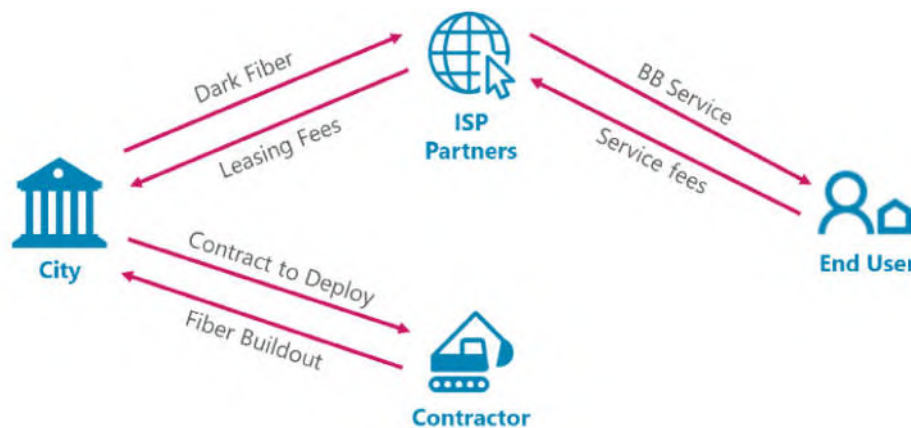
Figure 39. Scenario 2 – Conventional: Leverage City assets to establish a middle mile dark fiber network.

This type of scenario has been implemented by the City of West Des Moines in Iowa[56]. Since 2021, the West Des Moines has been building a citywide conduit network (~1,000 miles) funded through a municipal bond under an open access model. In exchange, Google Fiber has committed to install fiber passing every home and business in the city. Other ISPs are being onboarded including local ISPs such as Mi-Fiber.

The roles and responsibilities associated with this scenario for North County are set forth below:

Funding

The City funds the passive infrastructure for the middle mile network through grants, municipal debt, or general funds while the ISP partners fund their own middle mile active infrastructure and the passive and active infrastructure for the last mile.

To support the last mile deployments the City can streamline the permitting process to reduce overall time and cost for deployment.

Ownership

Ownership of the newly deployed infrastructure belongs to the entity that funds the deployment. Therefore, the middle-mile passive infrastructure is owned by the city, while the middle-mile active infrastructure and the last mile infrastructure, passive and active, is owned by the ISP partner.

---

[56] https://www.bloomberg.com/news/articles/2023-01-27/to-span-the-broadband-gap-an-iowa-town-built-its-own-fiber-network

Deployment

The City is responsible for the permitting process and the deployment of the middle-mile passive infrastructure. For these tasks the City relies on a single partner which can be an ISP or a construction company under a turnkey contract.

On the other hand, the ISP will oversee the deployment of its own infrastructure for middle mile (active only) and last mile (active and passive).

Operation

The middle-mile passive infrastructure is operated by the city, including the delivery of conduit segments and fiber strands, establishment of lease agreements, billing, and associated maintenance. These tasks can also be outsourced to a third party or to an anchor tenant in exchange for reduced lease fees.

Each ISP is responsible for operating the last-mile (active and passive) and middle-mile (active only) infrastructure and for providing residential and business broadband service. Depending on how the leasing fees are negotiated, an SLA between the City and the ISPs for the provisioning of end user services might be agreed upon in which case the City would need to oversee SLA compliance.

A summary of the roles and responsibilities above is captured in Figure 40.

	City	**ISP Partner**
Funding	- Streamlined permits - Middle mile passive infra	- Middle mile active infra - Last-mile infra (passive and active)
Ownership	- Middle mile passive infra	- Middle mile active infra - Last-mile infra (passive and active)
Deployment	- Permitting - Relies on contractor or ISP to deploy middle-mile infra	- Middle mile active infra - Last-mile infra (passive and active)
Operation	- Middle mile passive infra (potentially outsourced) - Oversees SLA compliance (optional)	- Provisioning of broadband services - Network O&M

Figure 40. Conventional Operating Model: Leveraging City assets to establish a middle mile dark fiber network.

The conceptual network design for this scenario, shown in Figure 41, includes fiber termination to 121 premises within Atascadero and Paso Robles, which include City buildings and anchor institutions, with an estimated length of 61 miles of fiber and a total cost between $6.3 million and $8.7 million.
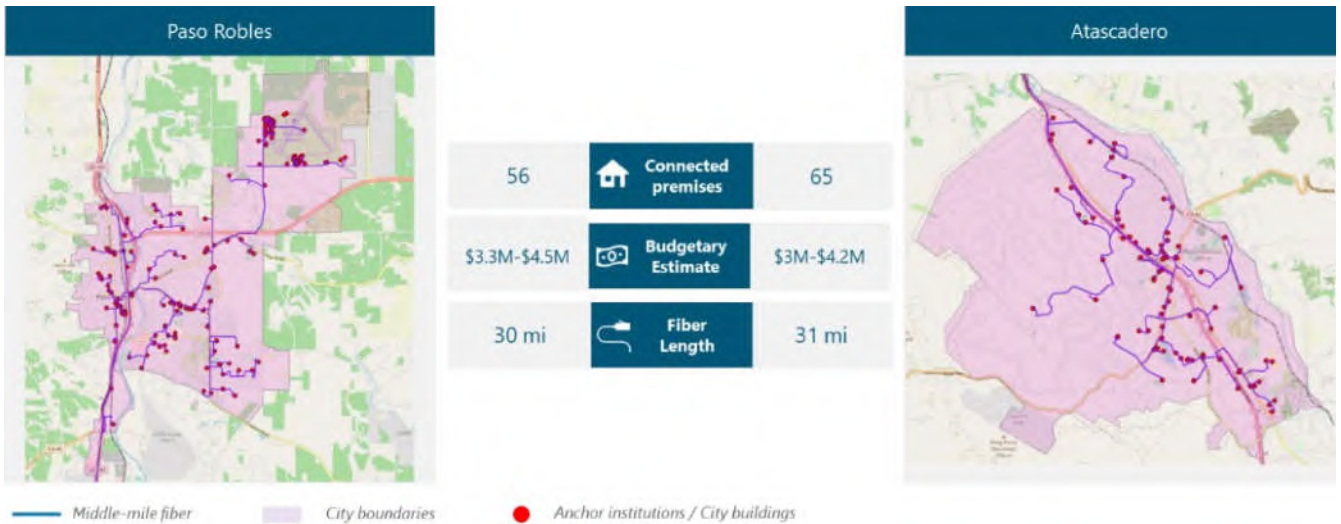
Figure 41. Network Scenario for the Middle Mile Dark Fiber Network.

It is important to note that the number of premises and the design of the network can be adapted to the available budget and/or key areas where partner ISPs have a higher need for middle mile passive infrastructure.

The results of the high-level business case analysis are shown in Figure 42 for the City of Paso Robles and Figure 43 for the City of Atascadero. For both Cities, excluding the required CAPEX, the Cities will generate revenues from dark fiber leasing which cover the annual fixed costs related to SLA management and the payment for high-speed internet, resulting in a positive operational surplus over a five-year period.

Note: This analysis does not factor in CAPEX cost, which may be provided through grants, nor does it provide an NPV analysis. The primary purpose is to provide an operating view of the City budgets.
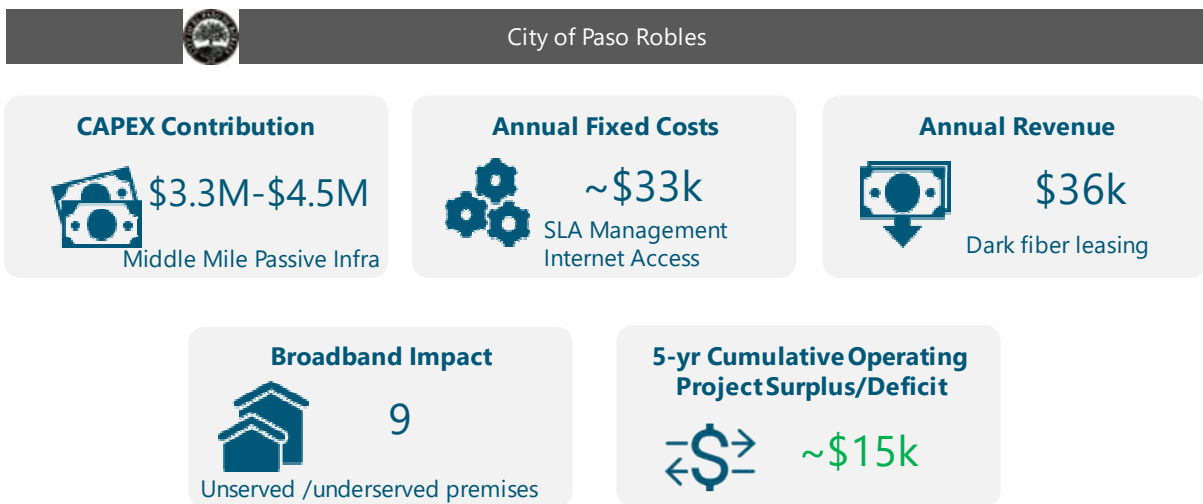
Figure 42. Financial view for Scenario 2 – City of Paso Robles.

City of Atascadero

CAPEX Contribution
$3M-$4.2M
Middle Mile Passive Infra

Annual Fixed Costs
~$33k
SLA Management
Internet Access

Annual Revenue
$37k
Dark fiber leasing

Broadband Impact
18
Unserved /underserved premises

5-yr Cumulative Operating Project Surplus/Deficit
~$21k

Figure 43. Financial view for Scenario 2 – City of Atascadero.

Scenario 2 has the advantage of addressing City connectivity needs while enabling last-mile deployments without the level of investment or the operational complexity required for an end-to-end network. Furthermore, the City will own broadband assets that can be leveraged to obtain revenues.

Scenario 2 presents the challenge to operate the passive infrastructure and raise the required funding. It is important to note that the City may not control the implementation of the last mile, therefore, leasing agreements should be effectively negotiated to obtain last mile commitments, perhaps in exchange for reduced leasing fees.

4.2.3 Scenario 3 – Pump Priming: Deploy a middle mile Open Access Network to improve last-mile economics

Scenario 3 is a variation of Scenario 2 in which the middle mile passive infrastructure is complemented with active infrastructure to establish a middle mile open access network. In this case, the middle mile network operation is outsourced to a third-party operator under a flat fee model subject to an SLA. The third-party operator provides middle mile services and dark fiber to the ISPs, which in exchange, pay wholesale fees to the city. Figure 44 captures these interactions.
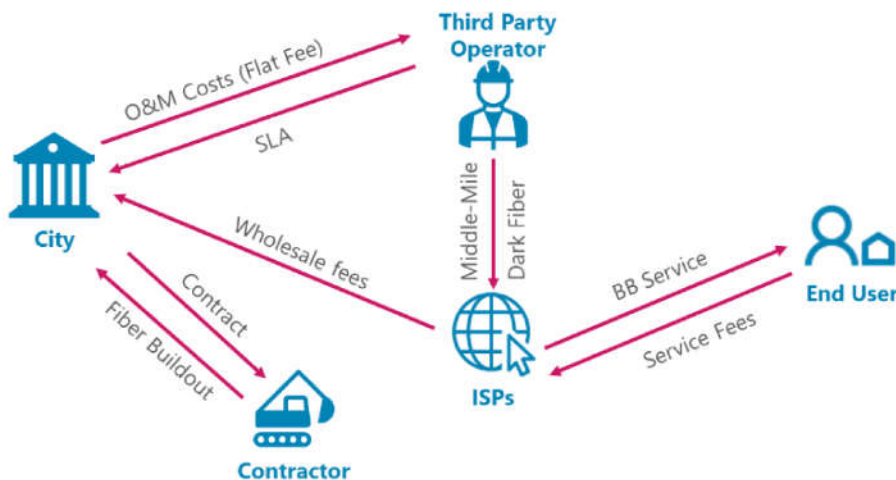
Figure 44. Scenario 3 – Pump Priming: Deploy a middle mile Open Access Network to improve last-mile economics.

This model has been implemented in multiple places across the country. For example, in LA County, the South Bay Cities Council of Governments[57] developed a middle-mile network that connects various municipal buildings and public agency sites across the 15 South Bay Cities. The network commenced operations in August 2020 and is operated by American Dark Fiber. The expectation is that the network will be leveraged to extend low-cost broadband service to residents and businesses throughout the Southwest Los Angeles region.

A summary of the roles and responsibilities under this scenario is captured in Figure 45.

Figure 45. Middle Mile Open Access Network Operating Model.

The results of the high-level business case analysis for Scenario 3 are shown in Figure 46 for the City of Paso Robles and Figure 47 for the City of Atascadero.

Note: This analysis does not provide an NPV analysis. The primary purpose is to provide an operating view of the City budgets.

---

[57] https://southbayCities.org/programs/south-bay-fiber-network/

Figure 46. Financial view for Scenario 3 – City of Paso Robles.

Figure 47. Financial view for Scenario 3 – City of Atascadero.

For both Cities the results are similar: the cost for the middle mile network operation is greater than associated revenues, yielding a deficit over five years of approximately $100k.

The implementation of the middle mile open access network creates a more robust infrastructure to enable last-mile deployments. However, the operation of an open access network is more complex requiring another entity, the third-party operator, to manage and operate the network on behalf of the City impacting the sustainability of the business case. As in Scenario 2, the City may not have control on the implementation of the last mile, and hence, the importance of negotiating leasing agreements considering commitments for last mile deployments.

4.2.4 Scenario 4 – Bold (and Risky): Own the last-mile Open Access Network

In this scenario the City implements a last-mile open access network to serve priority unserved and underserved areas. The interactions between stakeholders under this scenario are captured in Figure 48.

The City hires a contractor for the deployment of the middle mile and last mile infrastructure. The operation of the network is outsourced to a third-party operator under a flat fee model subject to an

SLA. The third-party operator provides middle mile and last mile services to the ISPs, which in exchange pay wholesale fees to the city. Finally, the ISPs provide broadband services to end users charging them the corresponding service fees.
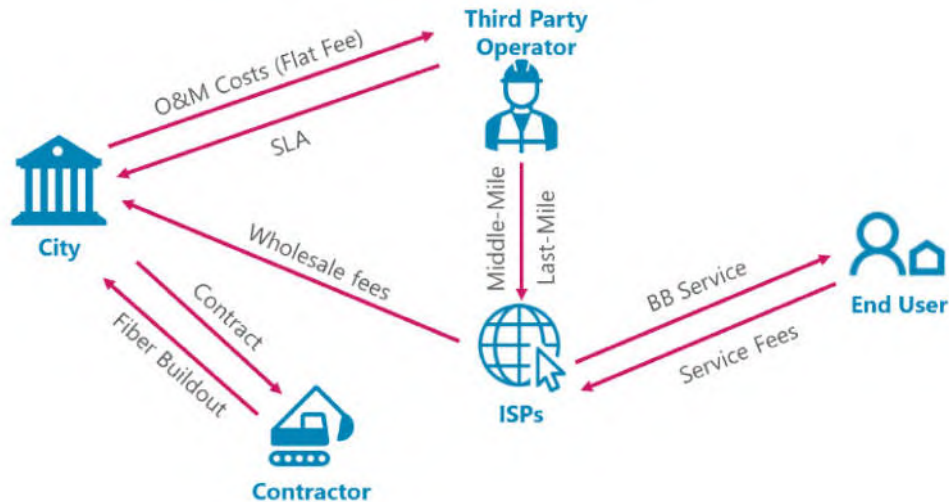
Figure 48. Scenario 4 – Bold (and Risky): Own the last-mile Open Access Network.

The flagship implementation of such a scenario is Utopia Fiber in Utah[58], a last-mile open access network founded by a consortium of 16 cities in Utah in 2002. Utopia currently manages more than 40,000 subscribers in partnership with 11 ISPs that provide retail broadband services. Interestingly, California's Rural County Representatives of California (RCRC) entered into an agreement with Utopia to operate last mile networks in rural California under the auspices of the Golden State Connect Authority using this open access model.

The roles and responsibilities for Scenario 4 are summarized in Figure 49.

[58] https://www.utopiafiber.com/

Figure 49. Last Mile Open Access Network Operating Model.

The results of the high-level business case analysis are shown in Figure 50 for the City of Paso Robles and Figure 51 for the City of Atascadero.

Note: This analysis does not provide an NPV analysis. The primary purpose is to provide an operating view of the City budgets.
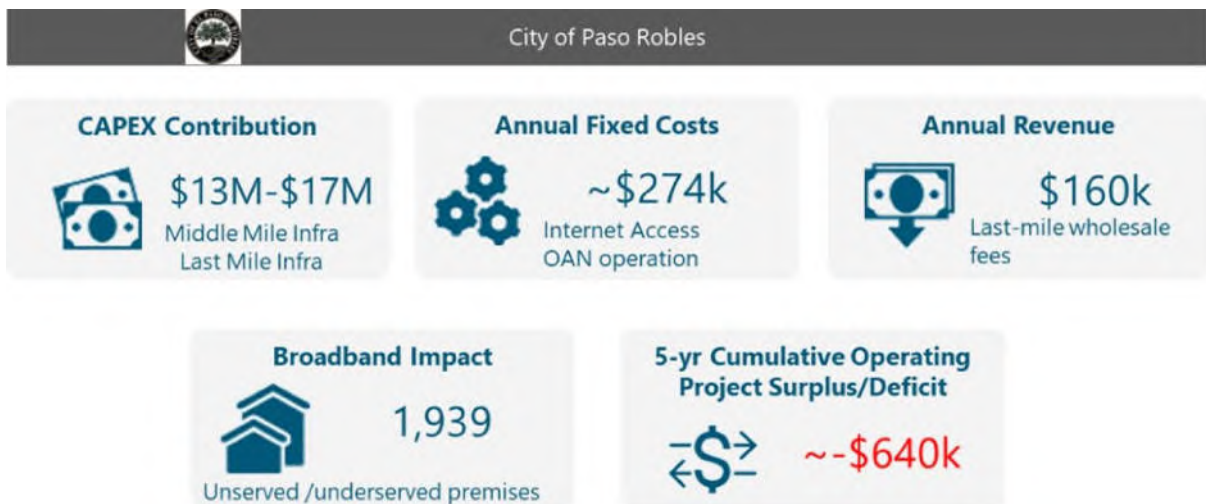
Figure 50. Financial view for Scenario 4 – City of Paso Robles.

Figure 51. Financial view for Scenario 4 – City of Atascadero.

Under this scenario the Cities collect significantly more revenue due to the wholesale service fees. However, this revenue is not enough to cover the higher costs of operating the last mile network. In addition, the CAPEX requirement exceeds reasonable expectations of public funding as addressed in Section 4.3.

This scenario presents a notably higher cost, risk, and complexity for North County, requiring more involvement in operations. Moreover, municipal funding through grants is not likely to be sufficient to cover the priority areas. This scenario does provide a unique benefit for the community which is the ability to ensure that priority unserved and underserved areas are addressed. The City would have control regarding the implementation process and timelines. Furthermore, the City would own important revenue-generating assets.

This scenario is not recommended as it presents a high degree of risk, funding requirements, and operational complexity.

4.2.5 Summary of Scenarios & Recommendations

Figure 52 summarizes the most prominent features of the four scenarios that have been analyzed. As shown, Scenarios 1 and 2 are recommended for further investigation. The rationale for this recommendation is as follows:

- The CAPEX contribution from the Cities is viable. Scenario 1 requires minimum contributions from the Cities. For Scenario 2, Paso Robles can leverage the existing EDA grant, while Atascadero can complement the $1.39M available for broadband with grant money.

- The operational complexity of these two scenarios is manageable for both Cities. Furthermore, the City of Paso Robles already owns and has experience with the operation of a fiber network.

- These scenarios minimize the financial risk and accelerate the expansion of broadband infrastructure toward the objective of 100% availability of gigabit symmetrical service.

- These scenarios are compatible with the path defined for concept proposals from ISPs.

	Recommended Scenarios			
	Fast-Track	**Conventional**	**Pump Priming**	**Bold (and Risky)**
Cost for the City	Low (light-form contributions)	Medium (Paso Robles: $3.3M-$4.5M Atascadero: $3M-$4.2M)	Medium (Paso Robles: $4.3M-$5.5M Atascadero: $4M-$5.2M)	High (Paso Robles: $13M-$17M Atascadero: $23M-$30M)
Operation Complexity	Very low (ISP operated)	Medium (Passive Infra)	High (3rd Party Operator)	High (3rd Party Operator)
Asset Ownership	None (No City-owned assets)	Medium (Owns passive Infra)	High (Owns middle-mile Infra)	Very High (Owns middle and last-mile Infra)
Likelihood of Getting Funded	High	Medium	Medium	Low
Deployment Time	Low	Medium	High	High
Implementation Control	Low	Low	High	High

Figure 52. Broadband Scenarios Summary.

4.3 Funding Sources Overview and Assessment

To achieve North County objectives, capital investment will be required either by the private sector, the public sector or both. There are three primary categories of funding sources that are captured in Figure 53 below.

Figure 53. Funding Sources Categories.

The first category refers to funding that has already been awarded to the Cities through a grant for broadband deployment and can be used immediately. As described in Section 2.4, Paso Robles has been awarded an EDA grant for $3,537,447 to deploy 14.2 miles of fiber. Atascadero, in turn, has assigned $1,390,000 from various grants to be spent on broadband.

The second category includes state and federal programs for broadband infrastructure deployment. It is important to note that these programs can only be used to deploy infrastructure to connect currently unserved and underserved locations as identified in FCC and CPUC maps. Consequently, initial estimates indicate that the maximum amount that Paso Robles and Atascadero can apply for is ~$3.9M and ~$11.6M, respectively with no assurance of receiving funding.

State and federal funding sources are further characterized in Section 4.3.1

The third category considers methods for self-financing. This means funds raised by the Cities either through internal budgets, bonds, or assessments/taxes. Self-funding is not the focus of this section as it is not expected to be an important instrument in achieving North County's objectives.

4.3.1 State and Federal Funding Sources

Multiple programs related to broadband have been created in response to the COVID-19 pandemic and the urgent need to close the digital divide. Most of these programs can be traced back to the following legislation:

1. Bipartisan Infrastructure Law

In November 2021, President Joe Biden signed the Infrastructure Investment and Jobs Act (IIJA) or Bipartisan Infrastructure Law (BIL) to support internet expansion, access, and use nationwide. The BIL provides a total of $65 billion for the following areas:

- Planning activities and studies for the development of Internet expansion projects.

- Network infrastructure deployment for high-speed Internet

- Activities to increase Internet access and meaningful use of high-speed internet. This includes digital literacy, skills training, telehealth, and remote learning.

The Broadband Equity, Adoption, and Deployment (BEAD) Program emanates from the BIL, assigning $42 billion for infrastructure deployment that will be distributed among the states and US territories based on their number of unserved locations.

2. American Rescue Plan Act

The American Rescue Plan Act (ARPA) funding is an answer to the COVID-19 pandemic to help families and small businesses get affordable high-speed internet connections. ARPA acts as an addition to the BIL, and among others, it has already committed $4.3 billion to the State of California.

Atascadero existing funds are coming substantially under ARPA funds.

3. Senate Bill 156

Governor Newsom signed the Senate Bill 156 (SB-156) that allocates $6 billion for expanding broadband infrastructure and access in California. Most relevant programs emerging from this senate bill focus on deploying Middle-mile and Last-mile networks across the state.

Multiple funding programs for broadband infrastructure and adoption were created from these three legislations. Each program targets slightly different objectives and incorporates different eligibility criteria and requirements. Existing programs were exhaustively researched and analyzed to determine North County eligibility and likelihood of getting funded. As a result, four programs were selected as possible funding sources:

- Last Mile Federal Funding Account

- CASF Broadband Infrastructure Grant Account

- Loan Loss Reserve Fund

- BEAD

A detailed description of each of the selected programs is presented in Appendix V while Table 11 provides a high-level overview.

Table 11. State and Federal Funding Programs Summary.

Program	Max Estimated Amount	Timeframe	Estimated Scores
Last Mile Federal Funding Account	Paso Robles: $1.5M Atascadero: $4.4M	Application window to be open by mid-June.	110–120 points of 130
Broadband Infrastructure Account	Paso Robles: $3.9M Atascadero: $11.6M	May 1st, 2023	80%-100% of funding
Loan Loss Reserve Fund	5%-20% of total project loan	Quarterly	30 – 50 points out of 50
BEAD Infrastructure	To be determined	~2024	To be determined

Based on the above, the recommended roadmap for grant applications is illustrated in Figure 54 and described below. Importantly, application for grants is subject to re-assessing eligibility once the updated CPUC map is published on March 31st.

Figure 54. Grant application roadmap.

1) Atascadero should apply for the Broadband Infrastructure Grant account whose deadline is May 1st.

2) Both Cities should consider applying to the Last-Mile Federal Funding Account. In the case of Atascadero, this should be based on the status of the Broadband Infrastructure Grant application.

3) Track developments and updates coming from National Telecommunications and Information Administration (NTIA) and CPUC, and evaluate the option to apply once the rules, guidelines, and details for submission are released.

4) It is not expected that the Cities will issue bonds and therefore will not require support from the Loan Loss Reserve fund.

4.4 Economic Impact Analysis

As explained in Section 1.2, broadband access and adoption have a positive impact in multiple areas including economic development, work, health, education, social inclusion, and quality of life in general. Multiple studies in the last two decades[59] have shown the direct and indirect impact in economic (e.g.,

---

[59] Broadband penetration and economic growth nexus: evidence from cross-country panel data, 2014.

gross domestic product, businesses, and jobs) and social (e.g., health, education, transportation) areas due to broadband penetration in communities of diverse sizes.

For North County, there is a particular interest in characterizing the economic impact from broadband deployment across the Cities. In this section, an analysis is presented for the scenario that assumes deployment of gigabit symmetrical service to 100% of premises within the Cities. The economic impact has been estimated by analyzing previous broadband studies within the region – as well as national and international studies – and applying and extrapolating their findings to North County. The results are presented below.

Gross domestic product (GDP) increase

Numerous studies have demonstrated that greater broadband availability leads to economic growth in terms of an increase in the GDP. It's estimated that a 10% increase in fixed broadband penetration results in a per capita GDP increase between 0.9% and 1.5%[60]. This can represent an approximate increase in the GDP between $143 million and $238 million[61].

The specific percentage depends on the current level of connectivity in the region. For North County, it is estimated that a 10% increase in fixed broadband penetration will drive a growth of 0.88% in the GDP per capita.

Given that the current penetration in Paso Robles and Atascadero is around 90%[62], the maximum increase in penetration is 10% and therefore the expected growth in the GDP per capita due to broadband is capped at 0.88%. While penetration is capped, a more robust grade of service will only further increase the GDP affect.

Direct Business Impact

The economic impact of broadband can also be quantified as a direct impact on creating business and jobs. According to the business responses to the Needs Assessment Survey, 14% of business owners could hire more employees and expand their markets with Gigabit Internet at their business.

Extrapolating these results using current data from the Census, a potential number of 230 businesses could hire more employees by adopting Gigabit Internet service in North County.

Workforce Development

The introduction of broadband provides channels for learning new skills for career advancement and completing essential job functions in many professions. This translates into employees capable of working from any location, enabling more flexible work arrangements, and providing employers access to a broader talent pool.

According to the Needs Assessment Survey, 49.3% of respondents use the most data/Gigabytes during remote learning / remote work. It is expected that with enhanced broadband in North County, more people can work or study remotely, significantly improving their skills and job opportunities. It has been shown[63] that the gross enrollment ratio for tertiary schools (post-secondary education) increases by

---

[60] ITU Publications: The economic contribution of broadband, digitization, and ICT regulation.

[61] Calculated based on San Luis Obispo county GDP.

[62] Census Quick Facts

[63] ITU Publications: The economic contribution of broadband, digitization and ICT regulation.

0.051% with a 1% increase in fixed broadband adoption. With the expected increase of 10%, this ratio is expected to increase by 0.51%. This means 1,313 and 1,439 enrolled students for Paso Robles and Atascadero (respectively).

Labor Productivity

Labor productivity measures the hourly output of a country or the economy of a city. Specifically, it charts the real GDP produced by an hour of labor. The high-quality reliable home internet opens diverse opportunities for employment making the idea of working from home more attractive. Moreover, remote working combined with high-quality (fast and reliable) internet is estimated to impact labor productivity by an estimated 1.1% [64]. A recent study[65] points out that 1% percentage of additional productivity could mean an increase in per capita GDP about $3,500.

Figure 55 presents a summary of the estimated economic impact of 100% availability of high-speed reliable and affordable broadband across the Cities.

	Potential Impact in North County
Gross domestic product (GDP) impact	• A 10% increase in fixed broadband penetration leading to a 0.88% growth in GDP per capita. • $143 million to $238 million increase
Direct Business Impact	• Up to 230 businesses could hire more employees
Workforce Development	• A 1% increase in leads to a 0.051% increase in enrollment for tertiary schools. • Paso Robles: 1,313 new enrolled students • Atascadero : 1,439 new enrolled students
Labor Productivity	• Productivity estimated to increase by 1.1% that translates into $3,500 GDP per capita.

Figure 55. Broadband economic impact on North County

---

[64] Internet Access and its Implications for Productivity, Inequality, and Resilience.

[65] What is productivity? – McKinsey & Company

5 Digital Divide Analysis

According to the Digital Equity Act of 2021, "digital equity" is a condition in which individuals and communities have the information technology capacity that is needed for full participation in the society and economy of the United States.

To achieve digital equity, it is necessary to ensure that all individuals have reliable and affordable access to broadband services, internet-enabled devices, and the necessary digital skills and resources to leverage the benefits of a connected world.

Digital equity is increasingly considered as a 21st century social justice and fair opportunity issue since lack of access and adoption of broadband negatively impacts quality of life and limits economic, educational, and health care opportunities. Therefore, it is important to understand the barriers resulting in the digital divide to implement the right strategies to achieve digital equity.

The California Department of Technology (CDT) is currently developing the State Digital Equity Plan (SDEP)[66], a complimentary process that will support the goals of the California Broadband for All Action Plan. It is anticipated that implementation of the SDEP will take up to five years after funding is distributed. The SDEP will be submitted to the NTIA to access funding from the $2.75 billion assigned by the IIJA to close the digital divide.

The SDEP must:

1) Identify the digital equity barriers for eight Covered Populations:

2) Identify the state's plan to address outcomes in key priority areas including education, healthcare, digital inclusion, economic and workforce development, and civic participation and access to essential services.

This Digital Divide Analysis performed as part of this project is aligned with these requirements. The digital equity barriers for covered populations are analyzed in Section 5.1, while key priority areas are characterized in Section 5.2. Finally, programs and recommendations are provided in Section 5.3 with Section 5.4 assessing the alignment with the California Broadband for All initiative.

The following section presents a characterization of the Covered Populations in North County and the key challenges they face that are unrelated to broadband.

5.1 Digital Equity Barriers for Covered Populations

As a first step, covered populations defined in the Digital Equity Act are identified within North County, based on various data sources including the Needs Assessment Survey, the SLO County Digital Divide Report and the latest data from the Census Bureau. The Digital Divide[67] is the gap between those who have affordable access, skills, and support to effectively engage online and those who do not.

- **Individuals living in covered households**
  Covered households are defined as households whose income is not more than 150 percent of the amount equal to the poverty level. As discussed in section 2.3, the Cities of Paso Robles and Atascadero have 22% and 17% of their population (respectively) living on an income lower than the 150% of the poverty level.

---

[66] State Digital Equity Plan (accessed March 2023)

[67] https://www.digitalinclusion.org/definitions/

- **Aging Individuals**
  According to the 2020 Census, the population of Paso Robles is 31,513, while Atascadero's is 29,794. The percentage of individual aging is very similar for both Cities, 17.5% for Paso Robles and 16.9% for Atascadero.

- **Incarcerated individuals**
  Atascadero State Hospital is part of the California Department of Corrections and Rehabilitation (CDCR) system with approximately 1,184 beds. It is unclear how many of the inmates would be likely to participate in digital skills training.

- **Veterans**
  The veteran population living in North County is approximately 1,186, 632 in Paso Robles and 554 in Atascadero.

- **Individuals with disabilities**
  The US Census[68] reveals there are about 5,101 people (8.2%) in North County under 65 living with a disability.

- **Individuals with language barriers**
  The US Census indicates that 28% (3,349) of homes in Paso Robles speak a language other than English, while in Atascadero, it is in 11% (1,290) of homes. As discussed in section 2.1, 20% of Paso Robles students are considered ELL while speaking range of languages like Spanish, Arabic, Chinese among others. In Atascadero, 7.6% of their student population are ELL with Spanish as their primary language.

- **Member of racial or ethnic minority groups**
  Paso Robles and Atascadero population is composed by a significant percentage of Hispanic or Latino population, 35.6% and 18.3% respectively. At Paso Robles, 2% belong to American Indian or Alaska Native population and the rest fall into smaller ethnical groups. Similarly, in 3.7% of Atascadero population is a combination of Asian, American Indian, and Alaska Native and African American.

- **Individuals who primarily reside in rural areas**
  The Cities of Paso Robles and Atascadero are both considered as urban areas. While the Cities are considered urban areas, the bulk of the area in North County is rural and access to services is within the City boundaries, specifically the school districts. The education system and social services serve many of the rural residents of North County.

---

[68] U.S. Census Bureau, American Community Survey (ACS) and Puerto Rico Community Survey (PRCS), 5-Year Estimates.

After identifying the covered populations, the digital equity barriers around access, affordability, devices, and skills were analyzed based on the Needs Assessment Survey, interviews with key stakeholders, public data, and previous reports at the county, state, and national level. The results of the analysis are presented in the following sections.

5.1.1 Access

According to the Census[69], most of the North County households have internet access: 91.8% of households in Paso Robles and 90.4% in Atascadero. This is in alignment with the Needs Assessment Survey results where 96% of respondents reported to have access to internet at home.

Among survey respondents without internet access, 32% claimed that there is no internet service provider in their area. Also, it's worth noting that almost 85% of survey respondents without internet access are older than 55 years old, while 44% are older than 65, revealing an adoption gap for aging individuals.

According to the SLO County Digital Divide Report, 8.2% of the Hispanic or Latino population living in Paso Robles and 6.1% in Atascadero have no Internet connection. This shows that these minority groups are not unequally affected by broadband availability, given that the average for both Cities is around 10%.

Importantly, the Needs Assessment Survey shows that most respondents who have internet access (53%) consider their service reliability as the most important feature, but 35% consider their connection to be unreliable or very unreliable.

5.1.2 Affordability

The Needs Assessment Survey revealed that 73% of respondents with internet at home consider their service too expensive. Of those, 58% are older than 55 years and 32% older than 65.

In addition, the SLO County Digital Divide Report shows that 40% of Paso Robles' and 37% of Atascadero's households cannot afford the so-called "Digital New Normal". The "New Normal" considers digital services among the basic needs of the population together with other essential services like electricity.

This barrier could be addressed through the FCC's Affordable Connectivity Program (ACP). According to the ACP enrollment tracker from the California Emerging Technology Fund (CETF)[70], there are 4,666 households in Paso Robles and 2,583 in Atascadero that are eligible for this benefit. In fact, this number might be higher since households with students in the NSLP automatically qualify for the ACP, that means 61% of students in Paso Robles and 49% in Atascadero. However, according to the ACP Enrollment Tracker, only one third of eligible households (34% in Paso Robles and 36% in Atascadero) have enrolled into the program.

In conclusion, consistent outreach through partnerships will continue to be an essential effort to increase the percentage of ACP enrollment in North County.

---

[69] U.S. Census Bureau, American Community Survey (ACS) and Puerto Rico Community Survey (PRCS), 5-Year Estimates.

[70] California Affordable Connectivity Program Enrollment Tracker (accessed March 2023)

5.1.3 Devices

Having internet-connected devices at home is essential to make use of broadband services[71]. According to the Census[72], the percentage of households with at least one computer is 96% for Paso Robles and 95% for Atascadero. These percentages are comparable with the Needs Assessment Survey, where 96% of aging respondents have at least one computer at home.

Aging respondents also reported to own other internet devices, such as the following:

- Security Systems (e.g., doorbells and cameras) – 44%

- Supporting Systems (e.g., Alexa) – 35 %

- Medical equipment – 9%

In a similar way, the SLO County Digital Divide Report identified that 4.3% of the Hispanic or Latino population in Paso Robles and 4.1% in Atascadero do not have a computer at home. This report also identifies the 18-year-old population sector as the one that suffers the least from the lack of a computer: 1% in Paso Robles and 4% in Atascadero.

Based on the above, there doesn't seem to be important barriers regarding devices, in general and across covered populations. The gap could be closed through existing programs such as the ACP, which provides one-time discount of up to $100 for a laptop, tablet, or desktop computer.

5.1.4 Skills

Figure 56 summarizes the digital skills of the respondents to the Needs Assessment Survey.
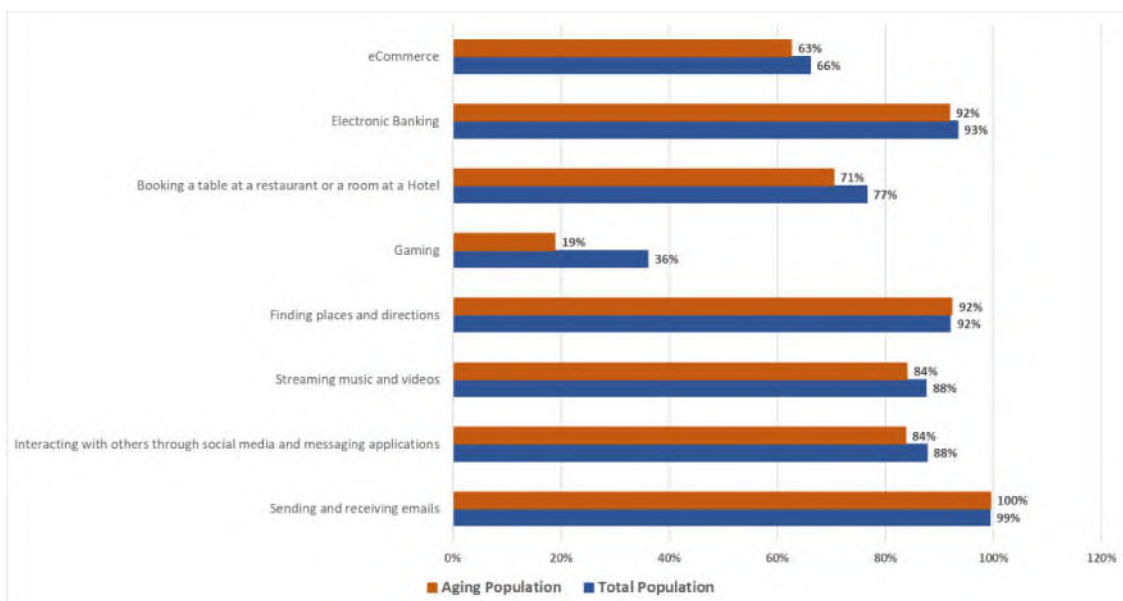

Figure 56. Digital skills in North County.

---

[71] Smartphones are not considered to be adequate devices for fully accessing the internet.

[72] U.S. Census Bureau, American Community Survey (ACS) and Puerto Rico Community Survey (PRCS), 5-Year Estimates.

The survey reveals that most of the aging population (above 90%) can perform essential internet activities such as sending/receiving emails, finding places and directions, or doing electronic banking. They start struggling with social media, messaging applications, streaming services, and (even more) eCommerce applications.

An increase in the adoption of e-commerce applications would represent not only an improvement in the economy of cities but it can also improve the lifestyle of the aging population.

During the public forum conversations in Paso Robles and Atascadero, digital skills, and training on how to use the internet was deemed to have primary importance when considering steps to take towards closing the digital divide. Panelists noted that while most of the community can access some internet services, there are many who need to access services that they don't know how to use such as telehealth, banking, eGovernment and eCommerce. Based on interviews with Community Based Organizations (CBO) partners and County staff, of significant importance are digital training opportunities for senior populations and parents of the ELL students.

The Youth Works program, located within the Housing Authority, has a computer lab to support students with internet access for doing homework. In an interview with the Executive Director, he explained that all their residents would benefit from training to fully utilize the resource.

5.2 Priority Area Assessment

5.2.1 Education

School districts from Paso Robles and Atascadero have been working towards improving connectivity at schools and at student homes. For schools this has led to 100% of the schools in North County connected to the K-12 High Speed Network (K12HSN), 100% of them through fiber in Paso Robles, and 92.3% in Atascadero[73].

Nevertheless, there are still important gaps regarding student connectivity. IT directors of both districts were asked what their top priority would be for their students if money was not a barrier. Atascadero's director would like to provide accessible high-speed Internet to every household. Paso Robles would like to deploy fiber to connect all their school sites and administrative buildings to provide wireless services to surrounding areas, specifically rural residents that lack reliable internet access.

This is consistent with the Needs Assessment Survey that shows that only 27% of remote learning students consider their home to have good internet service. In comparison, 34% would like to have better connectivity, 10% consider their home as having bad service which makes them struggle constantly, and 8% consider their service to be awful, which makes it impossible to work with.

5.2.2 Health Care

According to the Needs Assessment Survey, 57% of respondents rely on the internet for telehealth services, leaving 43% behind. Furthermore, of those doing telehealth only 25% are satisfied with their experience, with 19% of respondents referring that their doctors/nurses struggled to provide the service.

This indicates that faster, more reliable connections are required to fully leverage telehealth programs.

5.2.3 Economic and Workforce Development

---

[73] K12HSN Data Portal

As demonstrated in Section 4.4, broadband has a significant impact on economic and workforce development. Importantly, this requires not only access to broadband but also the development of digital skills throughout.

Results from the Needs Assessment Survey provide relevant insights regarding the use of broadband for economic and workforce development:

- Only 27% of respondents are satisfied with their internet service regarding remote working, the rest said they would like their connection to be better (32%), they constantly struggle (11%) or consider it almost impossible to do any remote work (4%).

- Almost all business owners that claimed an internet connection are satisfied with their internet service regarding remote working, the rest said they would like their connection to be better (32%), they constantly struggle (11%) or consider almost impossible to do any remote work (4%).

5.2.4 Civic Engagement and Access to Essential Services

Both cites have accessible services via their websites that identify important resources as well as City council meeting agendas and other City processes and procedures. Most of the information is geared towards City operations and upcoming projects and priorities, paying bills, recreational opportunities, etc. The sites also include general information for special events and critical announcements for raising awareness during emergency events. Where applicable, the Cities have embedded external links to additional information regarding County social services and housing and other programs managed by and addressed at the County level.

A key challenge to accessible and affordable broadband are gaps in the multi-unit housing infrastructure. While some of the housing includes Wi-Fi for the residents, it may be difficult for those households that would qualify for the ACP to connect if individual lines are not accessible within each unit. Therefore, it is important for the Cities to ensure within their policies that multi-unit housing in development is wired for high-speed internet access.

5.3 Digital Inclusion Programs and Partners

Digital inclusion refers to the activities necessary to ensure that all individuals and communities, including the Covered Populations identified for the SDEP, have access to and use information and communication technologies. The five elements of digital inclusion are access to affordable and robust internet service, internet enabled devices, access to digital literacy training, quality technical support and applications and online content to enable and encourage self-sufficiency.

Meaningful digital inclusion work requires programs and policies that meet the needs of the community in culturally appropriate and language accessible materials. Recommended programs and partners are captured below:

Affordable Connectivity Program. Affordable access to broadband services can be accomplished through the ACP[74]. Furthermore, the ACP offers an opportunity to purchase a low-cost computing device for households who are enrolling in ACP for the first time.

---

[74] Affordable Connectivity Program (accessed 2023)

It is recommended for North County to promote and support enrollment into the ACP by working with CBO partners, libraires and schools to facilitate registration events, and access to online resources within the City online websites.

The Northstar Online Learning (NSOL) program[75] is available through the Public Library system of SLO. The NSOL was developed to help job seekers lacking digital literacy skills obtain and retain employment that require such skills. Furthermore, the NSOL is a nationally recognized program that provides a digital literacy certification once completed and that certificate can be turn in for a low-cost device.

Recommendation is to increase awareness and promotion of this program that would benefit the local community. While the NSOL program is only accessible via the Atascadero library, community members served by County programs can utilize the resource. All that is required is a library card number and a computer.

Paso Robles Library System

While the NSOL program is not currently available within the Paso Robles library system, the City's Five Year Library Strategic Plan has four goals that align with digital inclusion strategies with one of these goals specifically targeting the implementation of technology and innovation platforms and staff support.

Community Learning Centers

A recommended initiative is to provide learning centers within already established community centers that families or seniors already utilize and could receive assistance with devices and training programs. Initiatives like this can already be found in some of the subsidized housing developments in Paso Robles and there is evidence that there is a greater need. Libraries are an important partner and already have some infrastructure and resources available to build upon and have access to unique grants, funding, and programs via the California State Library system.

Devices and digital navigator programs can be developed and deployed via funding through the CASF Adoption Funding Account described below and programs can be implemented through partnerships noted above. Key to success is identifying trusted and collaborative partners.

The Boys and Girls Club of Mid Central Coast reported that if they had 130 devices, they could set up computer labs in both Cities and serve all their school and club sites and support students with homework projects. Devices can be funded through the CASF Adoption Funding Account described below.

---

[75] Northstar Digital Literacy (accessed March 2023)

In addition, they could also work with parents who need to learn how to use a computer to access the internet. Finally, partnerships to provide the support needed to overcome language barriers would need to be established.

CASF Adoption Funding Account

A program for the deployment of low-cost devices could be developed in partnership with the Cities and CBOs by utilizing the CASF Adoption funding account[76]. The bulk purchase of devices for training centers within housing developments, after-school programs, libraries and for workforce training centers, and to subsidize the purchase of home computers for individuals that participate in digital skills training would play a significant role in closing the digital divide in North County.

The Workforce Development Board of San Luis Obispo County

(WDBSLO) is in the third year of its local plan to support employment and training services. The Workforce Innovation and Opportunity Act (WIOA) guides these efforts focusing on digital fluency, distance learning, and cultural competencies.

In North County, a partner for this work is Eckerd Connects[77]. The programs provided by Eckerd could play a role in supporting basic digital skills training to covered populations utilizing their resources.

Importantly, to ensure alignment with the SDEP and the California Broadband for All Action Plan, a similar type of online or in person training program would need to be accessible in other languages, primarily Spanish.

El Camino Homeless Organization (ECHO)[78] operates two shelters

in North County, one in each city. Through a conversation with their client services manager, it was identified that there are not enough computers available to support their client needs as they move into independence since most job and rental applications need to be completed online and ECHO has only one or two computers that clients can use with supervision, which is insufficient as they serve hundreds of individuals a year in the temporary shelter program and their transition to housing program.

A program to provide ECHO clients with a computer and to ensure they have access to the internet when they move out into housing should be considered. Collaborating on a CASF Adoption Funding Account application would prove to be beneficial.

---

[76] CASF Adoption Account (accessed March 2023)

[77] Eckerd Connects (accessed March 2023)

[78] ECHO (accessed March 2023)

Regional Coordination and Awareness

The County of SLO, the County Office of Education, County and local library systems, local school districts, Cuesta Community College and the WDBSLO are all partners in determining the best path towards closing the digital divide. This is key as regional coordination will be the most effective approach to support digital inclusion and improve digital literacy. Through regional coordination, the task to identify gaps of services, identify needs and subsequent opportunities becomes a collaborative process with the potential for a higher rate of success.

Increased engagement with CBOs is critical to support digital equity programs as they tend to be the trusted partners with access to priority populations who will benefit the most from digital accessible training and services.

As the Cities continue to work towards prioritizing broadband for the community, special considerations should be given to synthesizing information and resources within their webpages, including library resource links, to support broadband access and adoption.

5.4 Alignment with California Broadband for All

The California Broadband for All Action Plan (CBA) was developed to provide access to affordable and reliable broadband to transform the lives of all Californians[79]. It has the following goals, with actions and partners identified at the state level to close the digital divide:

- All Californians have high-performance broadband available at home, schools, libraries, and businesses.

- All Californians have access to affordable broadband and the devices necessary to access the internet.

- All Californians can access training and support to enable digital inclusion.

The CBA, established in December 2020, covers access to affordable broadband, accessible broadband and access to equipment and training to close the digital divide as shown in Figure 57.
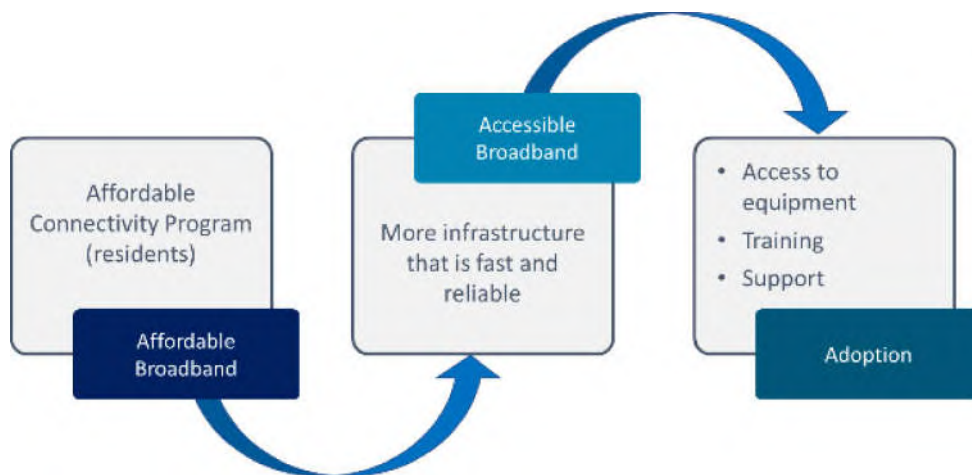
Figure 57. California Broadband For All Action Plan Elements.

---

[79] Broadband for All (accessed March 2023)

Digital Divide Analysis

Despite the analysis being framed in accordance with the SDEP development process, building on the partners and programs identified throughout this section, North County is well positioned to achieve Broadband for All's initiative goals as well: affordability is addressed through the Affordable Connectivity Program and associated support and promotion programs, accessibility through the implementation of recommended Broadband scenarios in Section 4, and adoption through investments in developing digital inclusion projects and programs which ultimately benefit the entire community.

6 Broadband Strategy & Action Plan

The findings and recommendations captured throughout the analysis are synthesized into the Action Plan presented in this section.

The action plan has been shaped by the following strategic pillars:
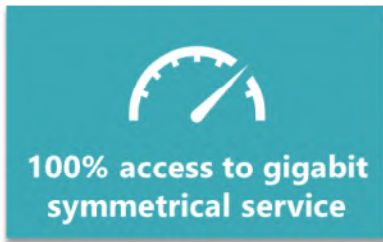
- *Achieving the upgraded objective of 100% access to gigabit symmetrical service*. The analysis of the broadband market in North County shows that both Paso Robles and Atascadero are reasonably well served according to FCC and CPUC standards with only 1.3% of households (159) in Paso Robles and 3.8% (470 households) in Atascadero being without access to services with speeds higher than 100/20 Mbps. That said, the results of the Needs Assessment Survey indicate that respondents are dissatisfied with the current ISP service offerings regarding cost (73%), speed (25%), or reliability (35%). Moreover, ambitious economic development plans and job growth will be restrained without best-in-class broadband infrastructure and services. Becoming "gigabit symmetrical cities" is a highly desired feature needed to compete in the economic development arena.

  Today's ISP environment is a soft monopoly with Charter as the dominant provider. The Cities lack vibrant competition and virtually no ISP announced deployment of plans for FTTH technology which is becoming more commonplace across the US by the day.

  City demographics and population density build a compelling case for the expanded objective of 100% availability of gigabit symmetrical service.

- *Prioritization of ISP-led scenarios*. The notion of the City running its own network is deemed not viable from an operational, financial, and risk perspective. Therefore, the pathway to realizing 100% access to gigabit symmetrical service lies with the incumbent ISPs or possibly new entrants willing to deploy FTTH service across the Cities.

  The "broadband positive" conditions of the Cities, as seen through its income levels and attractive population density is sufficient to trigger broadband deployment, albeit with a level of support and financial inducements characterized by a light form PPP.

  The request for concept proposals is a step in the direction of dialogue with the ISP community to encourage one or more ISPs to embrace the gigabit symmetrical objective and develop a financially positive business case. This may come out of necessity with a level of support from the Cities of Atascadero and Paso Robles.

- *Digital inclusion through affordability, devices, and skill development programs*. The Digital Divide analysis revealed that these are the areas where concrete actions from the Cities are needed to close the gap and achieve digital equity.

Based on these strategic pillars, the high-level plan captured in Figure 58 specifies tasks and timelines to advance broadband objectives of the Cities. Importantly the implementation of the action plan will be in an independent manner for each City.

As shown in Figure 58, the first step is presenting the action plan to each of the City Councils for the necessary acknowledgement and/or approval. Afterwards, the action plan is structured in three

workstreams: 1) Broadband Infrastructure, 2) Broadband Policies, 3) Digital Inclusion. Each of the workstreams is addressed in the following sections.

		Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024
	Presentation to City Council for Approval	■					
1. Broadband Infrastructure	1.1. Incumbent ISP Concept Proposal Discussions	■					
	1.2. Non-incumbent ISP Discussions (conditional)		▨	▨			
	1.3. Atascadero CASF Broadband Infrastructure Grant Application	■					
	1.4. ISP light-form PPP Negotiation		■	■			
	1.5. MoUs and/or Agreements			■			
	1.6. Non-incumbent Negotiations / Agreements (conditional)				▨	▨	
	1.7. FFA Grant Application (if appropriate)		■				
	1.8. BEAD Monitoring				■	■	■
	1.9. ISP 1G Deployment Commencement				■		▨
2. Broadband Policies & Management	2.1. Monitoring/challenging of FCC and CPUC data	■	■	■	■	■	■
	2.2. Permitting Process Upgrades	■	■	■			
	2.3. BB Policy Impl.	■	■	■			
	2.4. BB Constr. Standards Impl.		■	■			
3. Digital Inclusion	3.1. Regional Coordination	■					
	3.2. CASF Adoption Application	■		■			
	3.3. ACP Enrollment Program		■	■	■	■	■
	3.4. NSOL Program Promotion		■	■	■	■	■
	3.5. Paso Robles Library System		■	■	■	■	■

Figure 58. North County High-Level Action Plan

6.1 Broadband Infrastructure
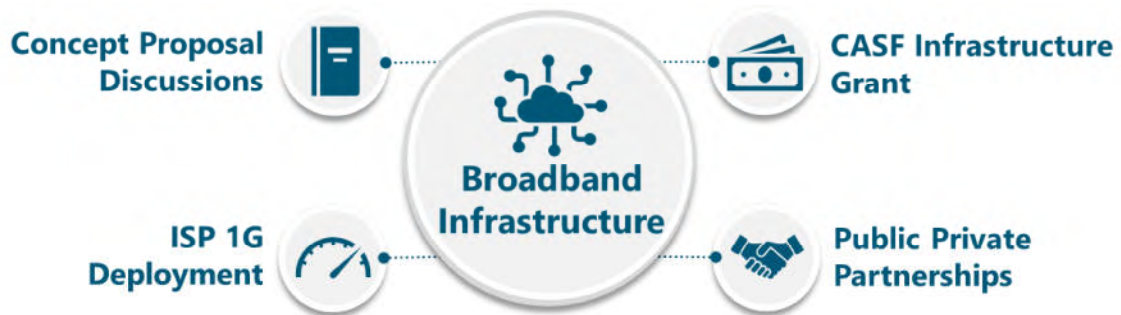
This workstream captures the activities related to the deployment of broadband infrastructure. Importantly, there are activities that are conditioned upon certain outcomes as explained below:

1) *Incumbent ISP Concept Proposal Discussions*. The first step in the action plan, starting in April 2023 is to form a Broadband Advisory Committee to evaluate concept proposals from the ISPs and engage in discussions with them, in order to detail the contributions from each City and the specific commitments from the ISP. This Committee should include the City Manager, Economic Development Manager, IT, Planning, and Public Works Departments. Importantly, these discussions should be conducted independently for each City and should follow the recommendations in Section 4.2.5. It is expected that these initial discussions will take two to three months from April to June 2023.

2) *Non-incumbent ISP Discussions*. In the case that the discussions with incumbent ISPs don't result in a suitable scenario for one or both Cities, each City should reengage with the broader ISP community, leveraging City contributions to obtain commitment from an ISP to deploy gigabit symmetrical service across the City. This would require coordinating meetings with non-incumbent ISPs identified during the RFI process described in Section 3.1, and possibly issuing a second Request for Concept Proposals that clearly states City goals and contributions.

3) *Atascadero CASF Broadband Infrastructure Grant Application*. In parallel with ISP discussions, starting the week of April 17th, the City of Atascadero should consider applying or supporting an ISP to apply for the CASF Broadband Infrastructure Grant which is due on May 1st. Eligible areas will be based on the latest CPUC map to be released on March 31st, but it is expected that this grant can fund fiber infrastructure to ~125 unserved households in the west of Atascadero. The City Manager and Finance Director will need to be involved.

4) *ISP Light-form PPP Negotiation*. Provided the discussions of ISP proposal(s) are successful, the Cities should enter into detailed negotiations for the light-form PPP. This task can start as early as June 2023 and will require the involvement of the City Manager, the Economic Development Manager, IT Department, Public Works Department, Finance Director and the Legal Team from each City. Preliminary terms and conditions negotiated may need to be presented to City Council for approval as appropriate, with a target date to close negotiations before the end of September 2023.

5) *MoUs and/or Agreements*. After negotiations are finalized, the City and the selected ISP partner should sign the necessary MoUs or agreements to implement the agreed plan. The main task here is to coordinate the Legal teams to prepare the necessary agreements, ensuring the agreements are in accordance with the negotiated terms and conditions. Once the agreements are accepted, an event for the signature and press releases can be prepared to announce the agreement. The estimated timeline for this activity is between September and November 2023.

6) *Non-incumbent Negotiations / Agreements*. In the non-incumbent track, which is contingent upon failure of negotiations with incumbent ISPs, negotiations and agreements with the non-incumbent ISPs should take place in the first half of 2024. Based on the responses to the Request for Concept Proposals, the Broadband Advisory Committee can recommend enter into negotiations with the selected non-incumbent ISP, resembling the process in activity #4 above.

7) *FFA Grant Application*. Starting in July 2023, each City along with a potential ISP partner should assess a potential application to the Federal Funding Account, based on area eligibility. After the window for application is open in June 2023, a designate from each City will confirm eligible areas for this Grant and discuss the opportunity with the (potential) ISP partner. If the opportunity is attractive enough, and in the case of Atascadero, if the risk of not being funded

by CASF is considered medium or high, each City should organize to submit an application, involving the Broadband Advisory Committee and the Finance Director. The City Council should be engaged as required for approval. It is expected that the application window will be open for three months from June to September.

8) ***BEAD Monitoring***. The Cities should keep aware of NTIA and CPUC announcements throughout 2024, in order to characterize the opportunity for additional funding and plan for applications as appropriate. For this task a designate should monitor CPUC and NTIA websites and subscribe to CPUC email lists[80], and send an email to be added to the CASF Distribution List to CASF_Adoption@cpuc.ca.gov.

9) ***ISP 1G Deployment Commencement***. Provided negotiations and agreements are successful, the selected ISP partner should commence deployment either at the beginning of Q1 2024, for an incumbent ISP or Q3 2024 for a non-incumbent ISP. Throughout the process the Broadband Advisory Committee should keep in touch by monitoring progress, while various departments will be involved in the actual permitting and construction process such as Public Works, Planning, IT, providing support according to the terms and conditions of the light-form PPP.

6.2 Broadband Policies

Activities under this workstream are oriented toward creating a more broadband friendly environment that accelerates and attracts broadband infrastructure deployment projects. These activities are further described below:

1) ***Continuous monitoring and challenge of FCC and CPUC maps***. The discrepancies identified in the analysis presented in Section 2.2 evidence the need to keep an active position in collecting accurate data through speed test tools and challenging the federal and state maps as they are updated. It may be necessary for the Cities to purchase a speed test service. This should be considered by the Broadband Advisory Committee and brought to Council for approval between May and July 2023. Importantly, a staff member would need to be designated to perform the monitoring and organize the challenges to the maps.

2) ***Permitting process documentation and update***. This task applies to the City of Atascadero as their current permit process is not documented and has various issues that have been addressed in Section 2.5. Fixing these issues is also related to Workstream 1 as the optimized permitting process is part of the offering toward ISPs. In this case, the Public Works

---

[80] https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/broadband-implementation-for-california

Department should analyze the recommendations in Section 2.5 and best practices from NTIA[81] to develop a proposal to update the permitting process, document it and present it to the City Council for approval, as required. The estimated timeframe for this task is five months between May and September 2023.

3) *Implementation of policy recommendations*. Other policy recommendations captured in Section 2.5 should be implemented throughout the rest of 2023, including the assessment of micro-trenching, Dig-Once, and the update / implementation of the Cities' GIS Portal. This will require the involvement of the Public Works and Planning Departments to analyze examples and considerations from the State of California Local Permitting Playbook[82] and policies from other Cities[83] to develop the policies for the Cities. Once the draft is ready, it should be presented to the City Manager and/or City Council for approval, as required. The estimated timeframe for this task is five months between May and September 2023.

4) *Refinement of construction standards*. Construction standards specific for broadband should be developed in coordination with ISPs. This is a secondary priority but should not be neglected. This task can start in Q3 2023 with a target for completion by the end of 2023 or early in 2024. First, the set of required construction standards should be identified, and based on that, ask ISPs to provide proposals. Then engineers from the Cities can assess and refine the proposals to specify the standards for each City.

6.3 Digital Inclusion

The plan for Digital Inclusion is centered around coordination and support of existing programs, prioritizing those that address devices and skills gaps.

1) *Regional Coordination*. First, regional coordination and engagement with libraries, school districts, higher education, and CBOs should be pursued to identify areas where the City can provide reasonable support to existing programs, including publishing materials to promote these programs and informational material for the community. This includes the partners identified in Section 5.3, in addition to other entities such as the Broadband Consortium of the Pacific Coast. Starting in May-June the Broadband Advisory Committee or a designate should reach out to these partners for initial discussions, considering the possibility to organize forums

---

[81] https://broadbandusa.ntia.gov/sites/default/files/2023-03/Permitting_Best_Practices_Case_Studies.pdf

[82] https://broadbandforall.cdt.ca.gov/wp-content/uploads/sites/19/2022/09/California-Local-Jurisdiction-Permitting-Playbook-1.pdf

[83] https://calcog.org/wp-content/uploads/2020/10/CALSTA-DigOnceWhitePaper.pdf

with the regional stakeholders, with two objectives: 1) Identifying programs and specific next steps that require City support, and 2) Inventory of devices needs to organize the CASF Adoption Funding Account Application.

2) *CASF Adoption Funding Account Application*. A program for the deployment of low-cost devices should be developed in partnership with the Cities and CBOs by utilizing the CASF Adoption funding account whose application is due July 1, 2023. Starting in May, a designate from each City must coordinate the needs for devices across various programs and CBOs, such as training centers within housing developments, after-school programs, libraries, workforce training centers, Boys and Girls Club of Mid Central Coast, and ECHO.

   Then, in June a team for Grant writing must be organized. It can be led by the City or by one of the stakeholders. Partners will collaborate to provide the required information and organize the Application package before July 1, 2023. CPUC has developed a guide for applicants[84].
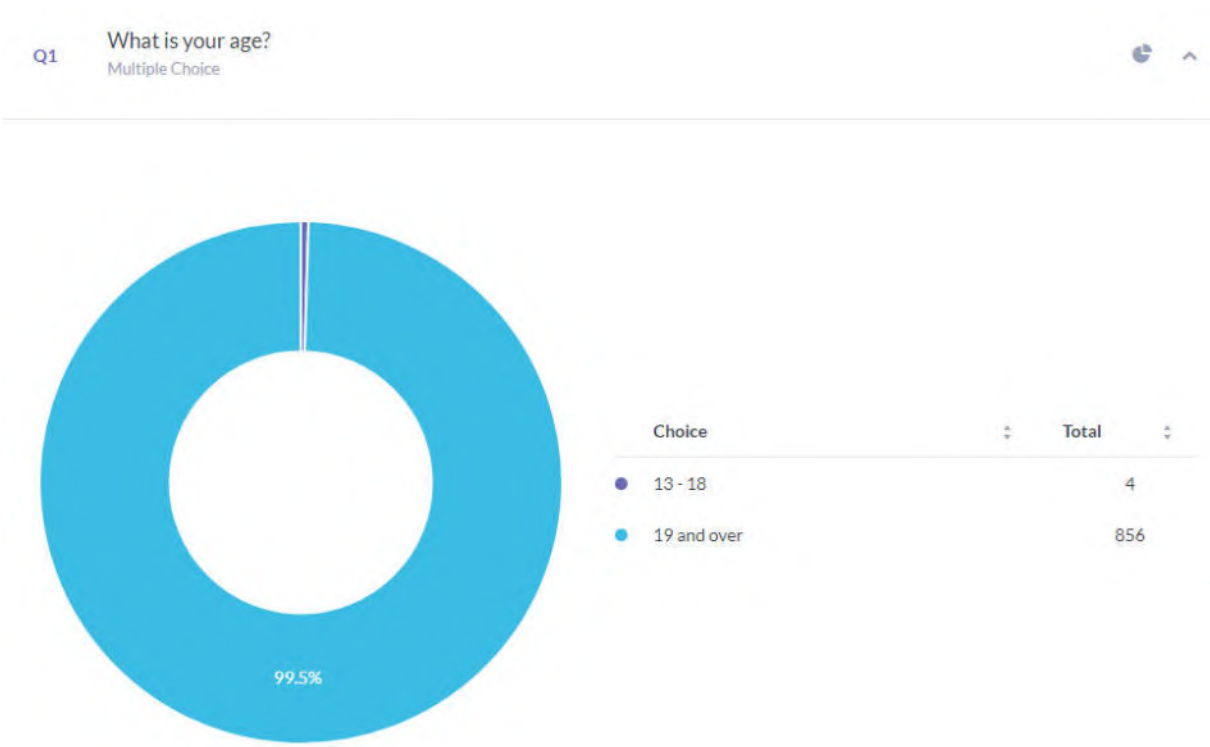
3) *ACP Enrollment Program*. The Cities should actively promote and support enrollment into the ACP, supporting CBO partners, libraries, and schools to facilitate registration events, and enabling access to related online resources within the websites of the Cities. In addition, it is important that the Cities ensure through policies that multi-unit housing in development is wired for high-speed internet access so that these households can apply for the ACP. Subtasks related to this activity are listed below:

   o   Identify, request, and upload online resources to Cities' websites. Starting in July 2023, a designate from each of the Cities from the IT or the Economic Development Department should start the research of materials related to ACP enrollment, and in parallel, request support from identified partners in task #1 above, selecting materials for publication in the Cities' websites.

   o   Establish a channel for partners to send information regarding registration events that can be promoted through the Cities' communication channels. During mid July and early August, the Cities should set up an inbox or point of contact to receive information and requests to support ACP enrollment events. A procedure to upload and publish content should also be established.

   o   Analyze with Public Works and Planning departments how to implement a policy for multi-unit housing wiring for high-speed internet access. The recommended timeframe for this is between September and December 2023.

4) *NSOL Program Promotion*. The Cities should promote the NSOL program through an online campaign and include the program in relevant newsletters and the Cities' websites. This should start in July and continue throughout the end of the year. Over time, it would also be important to create a similar type of online or in person training program to be accessible in other languages, to achieve alignment with the California Broadband for All Action Plan.

5) *Support Paso Robles Library System Plan*. As the City of Paso Robles increases their available technology and innovation resources on their library site, the Broadband Advisory Committee should also provide ongoing and active promotion in alignment with their Library System 5-year strategic plan.

---

[84] [Overview of Steps for Applying for CASF Broadband Adoption Account Grant](#)

Appendix I. Broadband Needs Assessment Survey & Results

Question of the Needs Assessment survey and high-level statistics are documented below.

Q1 What is your age?
Multiple Choice

Choice	Total
13 - 18	4
19 and over	856

99.5%

Q2 More specifically within this range, how old are you?
Scale

17	17.75	18
Min 13		Max 18
Lowest	Average	Highest

Q3 More specifically within this range, how old are you?
Multiple Choice
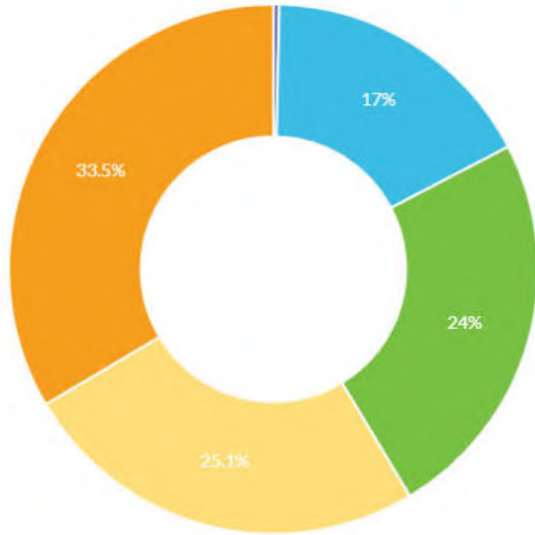
Choice		Total	
● 19-21		3	
● 22-39		145	
● 40-54		205	
● 55-65		214	
● 65+		286	

Q4 Do you have internet access at home (different from your cellular data)?
Multiple Choice
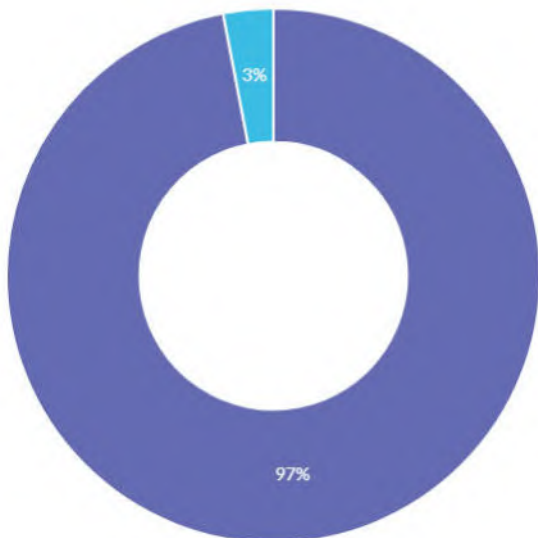
Choice		Total	
● Yes		834	
● No		26	

Q5 If you do have internet service at home, who is your internet service provider?
Multiple Choice
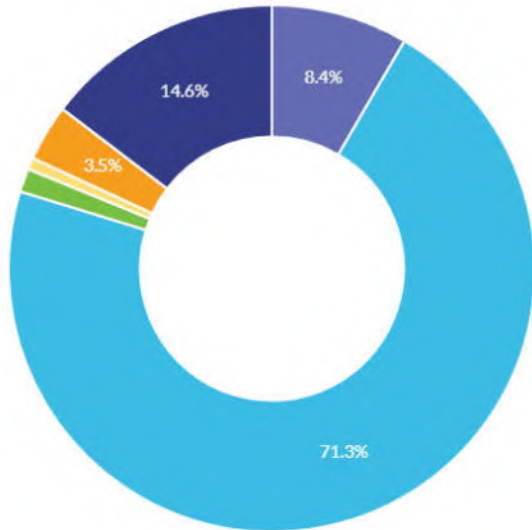
Choice	Total
AT&T	70
Charter Spectrum	595
Outback	12
Peak WiFi	6
Ranch WiFi	29
Astound	0
Other	122

8.4%
14.6%
3.5%
71.3%

Q6 How reliable do you find your internet connection?
Multiple Choice
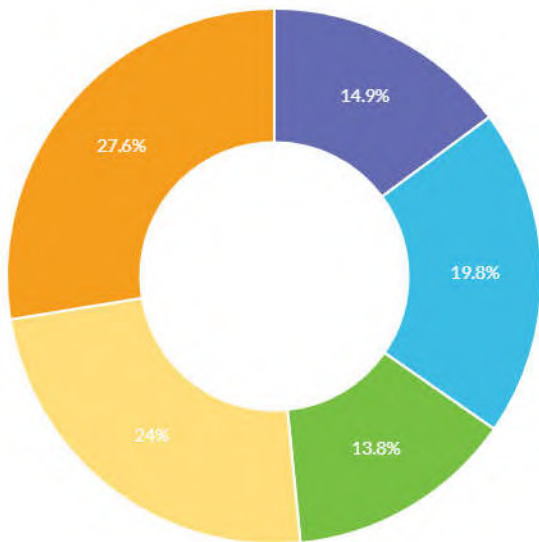
Choice	Total
Very unreliable	124
Somewhat unreliable	165
Average	115
Somewhat reliable	200
Very reliable	230

14.9%
27.6%
19.8%
24%
13.8%

Q7   Does your internet performance meet your needs?
Multiple Choice
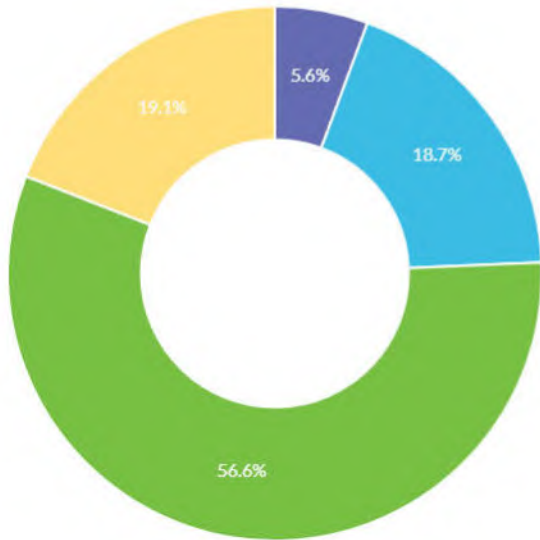
Choice	Total
● Not at all	47
● Only for simple tasks	156
● Yes, for most tasks	472
● Absolutely	159

(Pie chart: 5.6%, 18.7%, 56.6%, 19.1%)

Q8   Do you think your internet cost is:
Multiple Choice
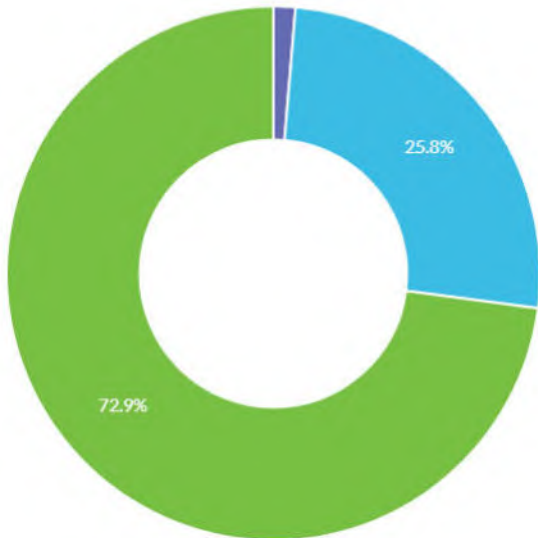
Choice	Total
● Inexpensive	11
● Reasonable	214
● Too expensive	606

(Pie chart: 25.8%, 72.9%)

Q9 What is most important to you regarding your internet service?
Multiple Choice
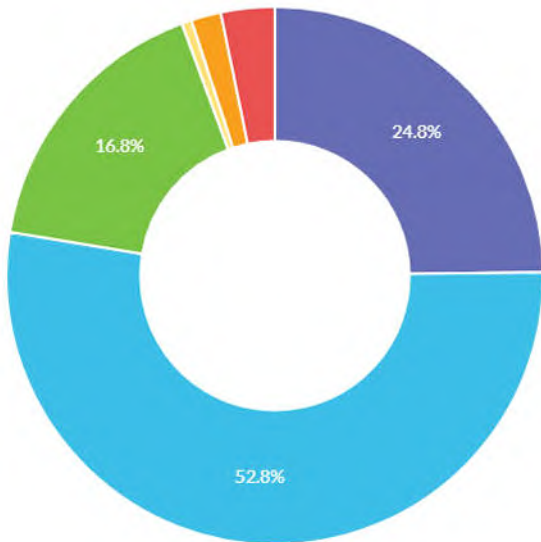
Choice	Total
Speed, I do not want any delay in download or upload	207
Reliability, I do not want my internet to be interrupted	441
Price, I want it to be a competitive price	140
Customer service, I want responsive customer service	5
Bundled services, I want internet, cable, phone service to be in one place	15
Other	27

Q10 If you do not have Internet at home, why not?
Multiple Choice
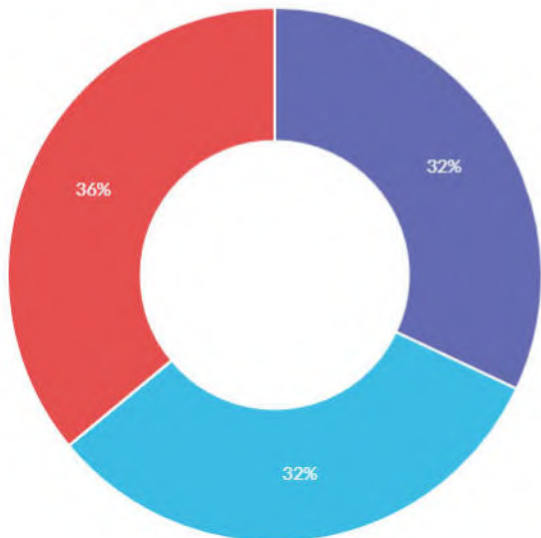
Choice	Total
There is no internet provider where I live	8
Too expensive	8
I don't know how to sign up or connect to the internet	0
I don't have a device to connect to the internet	0
I don't need/want internet at home	0
Other	9

Q11 Where are you most likely to use the Internet?
Multiple Choice
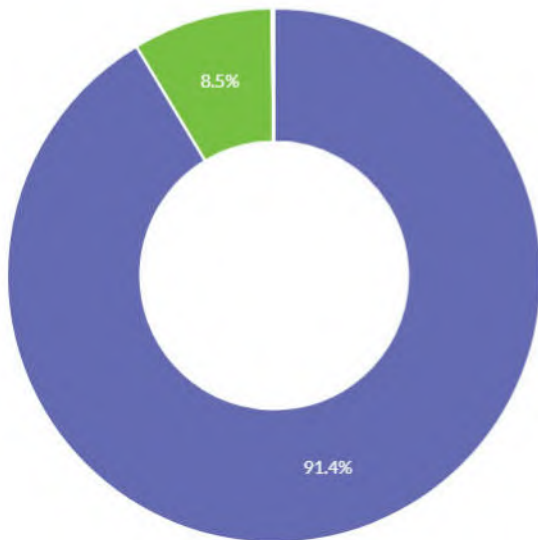
Choice		Total	
●	Home	785	
●	Library	0	
●	Work	73	
●	School	0	
●	Friend's house	0	
●	Café or some other public site	0	
●	I don't use the internet	1	

8.5%

91.4%

Q12 How many people live in your household?
Multiple Choice
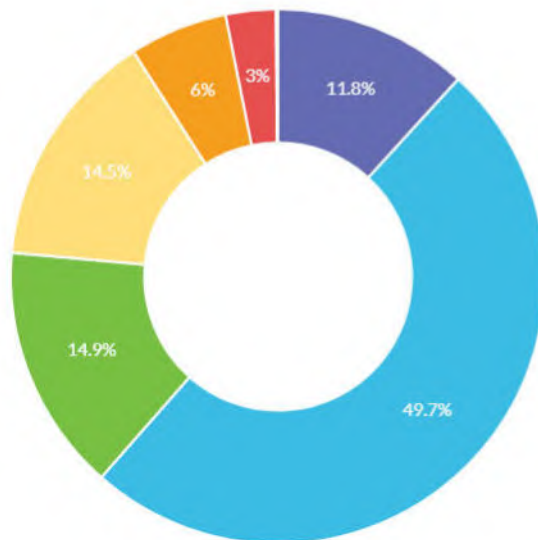
Choice		Total	
●	1	101	
●	2	426	
●	3	128	
●	4	124	
●	5	51	
●	6+	26	
●	I live in a group home or an assisted living facility (please indicate approx. size)	1	

11.8%
3%
6%
14.5%
14.9%
49.7%

Q13 How many people living at your home are in elementary, high school or attending college?
Multiple Choice
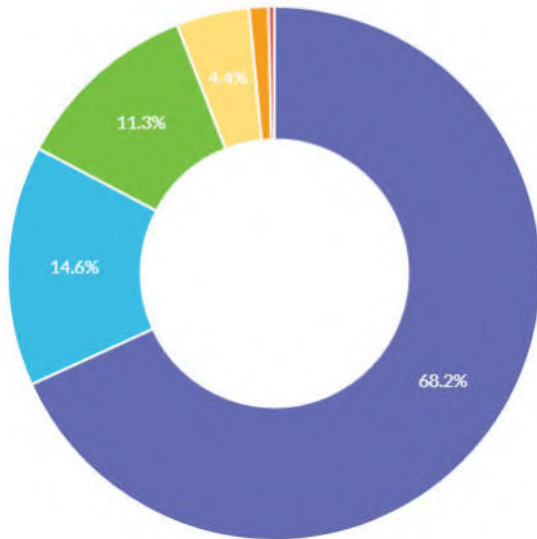
Choice		Total	
● 0		585	
● 1		125	
● 2		97	
● 3		38	
● 4		10	
● 5+		3	

68.2% 14.6% 11.3% 4.4%

Q14 After the pandemic, how many people in your household work or study from home?
Multiple Choice
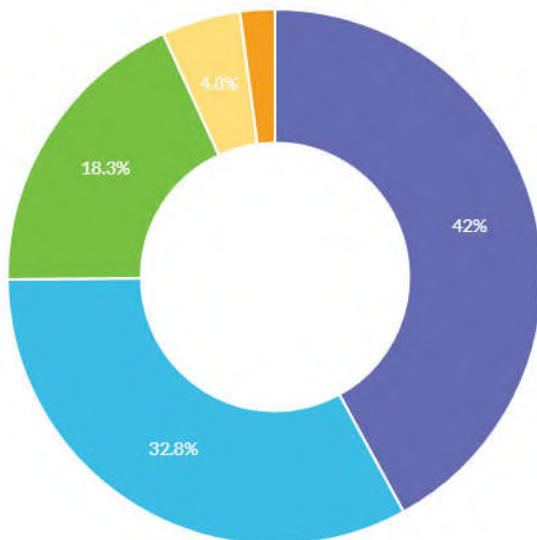
Choice		Total	
● No one from my household works from home		361	
● 1		282	
● 2		157	
● 3		41	
● 4+		18	

42% 32.8% 18.3% 4.6%

Q15 How would you describe your experience with your internet as it relates to remote learning and/or remote work?
Multiple Choice
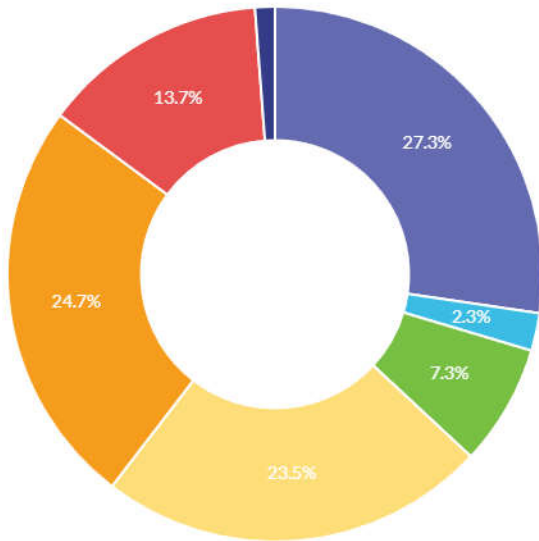
Choice	Total
I do not do remote learning / remote work	228
Awful, It's almost impossible	19
Bad, I always struggle with my connection	61
Okay, but I wish that I had better connectivity	196
Good, I can do most of the tasks	206
Very Good, I have no problems at all with my connection	114
Other	10

27.3%
2.3%
7.3%
23.5%
24.7%
13.7%

Q16 Do you rely on the internet for Telehealth services?
Multiple Choice
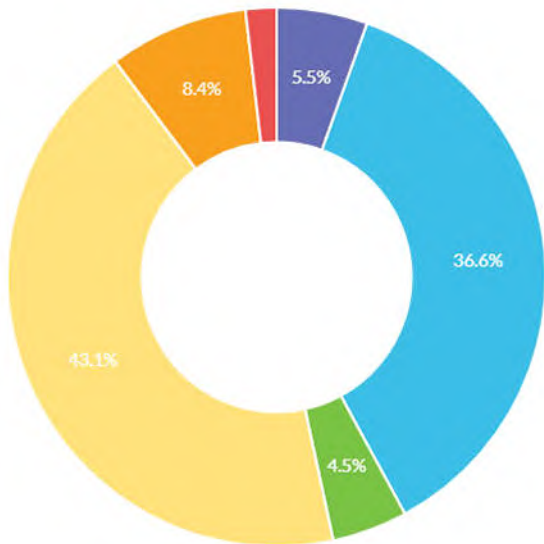
Choice	Total
Not anymore	47
No	315
Yes, exclusively	39
Sometimes, if I want to	371
More often than not	72
What is telehealth?	16

5.5%
36.6%
8.4%
43.1%
4.5%

Q17 How would you describe your experience with your internet as it relates to telehealth?
Multiple Choice
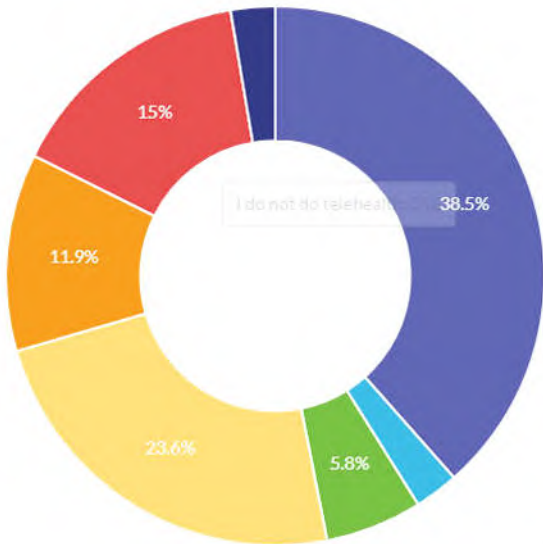
Choice	Total
I do not do telehealth	318
Horrible, my internet connection made it really hard	22
It was bad, but still possible	48
Okay, but wish that I had better connectivity	195
My connectivity was good, but it was hard for the provider (Doctor, Nurse, etc.)	98
Incredible! I had no issues with connectivity	124
Other	22

Q18 What activities do you or people living at your home use the most data/Gigabytes on? (Select all that apply)
Multiple Choice
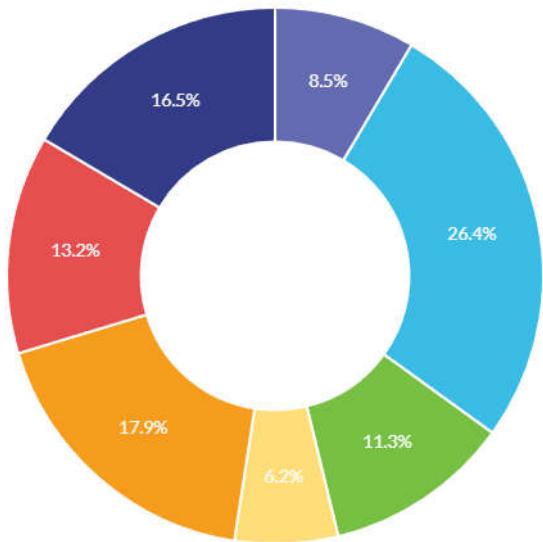
Choice	Total
Gaming	201
Streaming services (Music/Video)	625
Downloads/uploads (Publishing videos or downloading)	266
Telehealth	147
Remote learning / remote work	423
Social media platforms	311
Other devices that connect to Wi-Fi	390

Q19 Which of the following internet-connected devices do you have? (Please select all that apply)
Multiple Choice
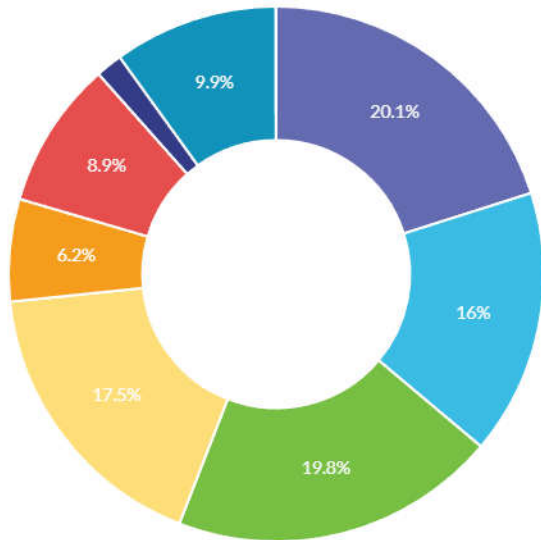
Choice	Total
Laptop or desktop	835
Tablet/Pad	666
Smartphone	821
Smart/Streaming TV	725
Gaming console	257
Supporting accessories (Alexa, etc.)	370
Medical device	67
Security system, doorbell, cameras	412
None	1

Q20 Which of the following tasks are you able to perform using the internet (Please select all that apply?
Multiple Choice
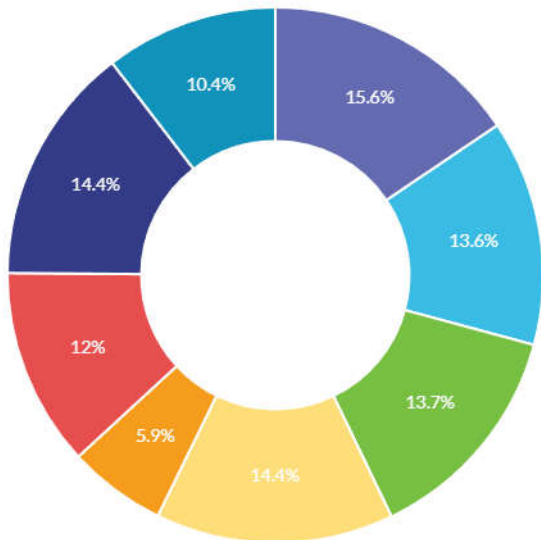
Choice	Total
Sending and receiving emails	853
Interacting with others through social media and messaging applications	748
Streaming music and videos	750
Finding places and directions	788
Gaming	325
Booking a table at a restaurant or a room at a Hotel	657
Electronic Banking	792
eCommerce	572

Q21 If you could subscribe to the broadband service options below, which would you be more likely to choose?
Multiple Choice
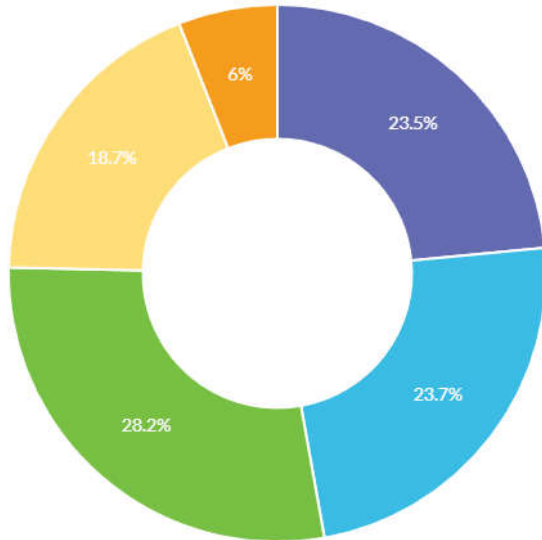
Choice	Total
● BEST, VIRUTALLY UNLIMITED (Really fast internet can support all devices running at the same time, streaming, gaming, operating a business) 1,000 Mbps or 1 Gigabit for $100-$150 per month	201
● GREAT (Streaming, operating a business): 250 Mbps for $80-$100 per month	203
● PRETTY GOOD, and MOST AFFORDABLE (For example – up to 4 devices): 100 Mbps for $55-$60 per month	241
● I'd rather stay with my current service	160
● Other	51

Q22 If your local government asked for the community to help pay for a state of the art, fiber optic system, what would be an acceptable way to help pay for a new system? Please select all that are...
Multiple Choice
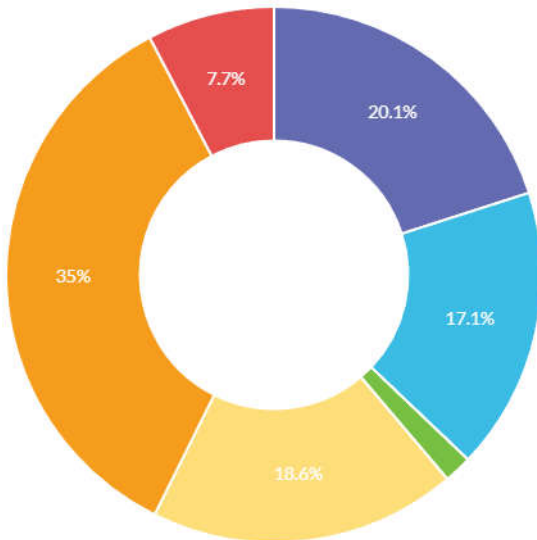
Choice	Total
● Spread the payment over 24-48 months on my internet bill	214
● An annual property tax assessment, of $200-$300 per year	182
● An up-front payment of approximately $5,000; similar to a water or sewer tap fee	18
● A monthly fee of $10-$29 per month, in addition to the monthly service fee	198
● I'm not willing to help pay for a new internet system	373
● Other	82

Q23 Do you think that North County needs to increase broadband access for its youth residents?
Multiple Choice
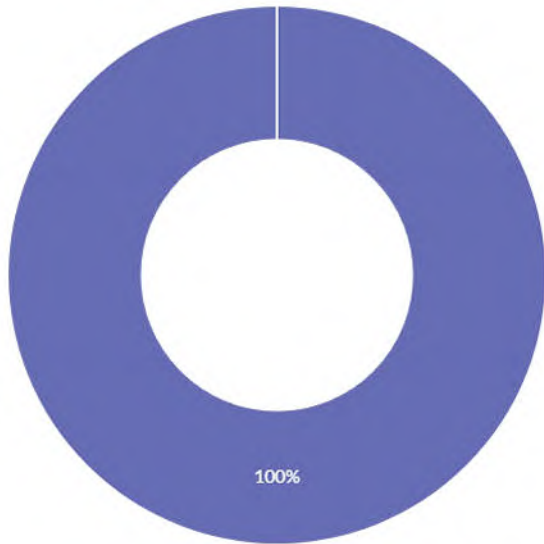
Choice		Total	
● Yes		4	
● No		0	

100%

Q24 What is your zip code?
Essay

Date		Answers
Mar 23		93402
Mar 21		93405
Mar 17		93422
Mar 10		93422
Feb 23		93465
Feb 17		93422
Feb 17		93405
Feb 16		93442
Feb 12		93422
Feb 7		93422

Q25 **What is your gender?**
Multiple Choice
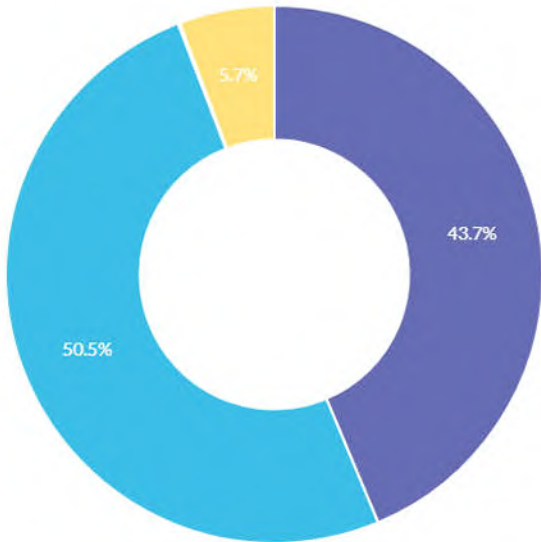
Choice		Total	
● Female		374	
● Male		432	
● Other		1	
● Prefer not to answer		49	

Q26 **Please indicate the race that best identify with (up to 2)**
Multiple Choice
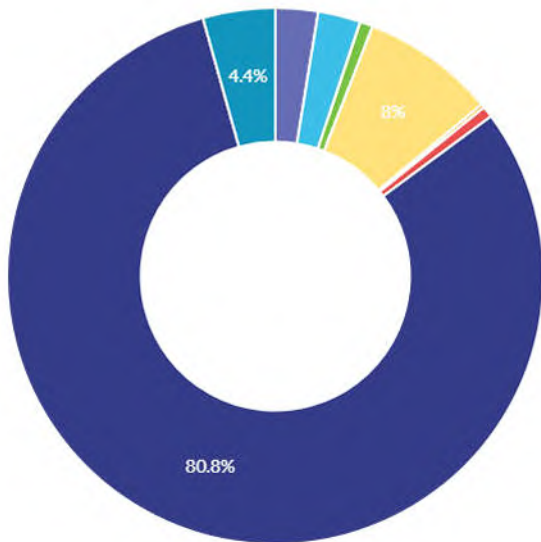
Choice		Total	
● Native American or Alaska Native		23	
● Asian		23	
● Black or African American		7	
● Hispanic or Latino		72	
● Middle Eastern/North African		2	
● Native Hawaiian or other Pacific islander		6	
● White/Caucasian		724	
● Other		39	

Q27 Do you qualify for free or reduced lunch at school?
Multiple Choice
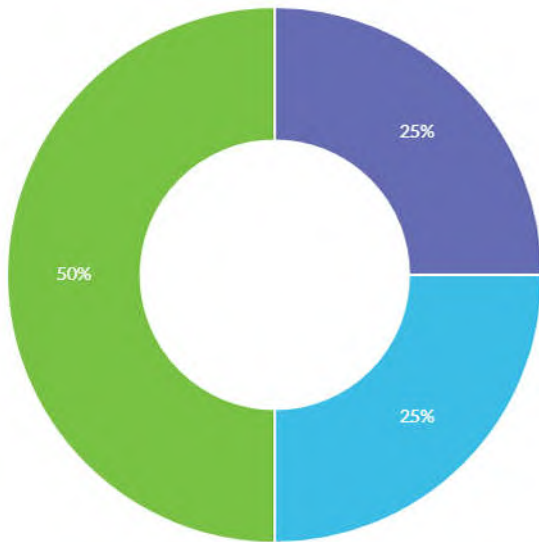
Choice	Total
● Yes	1
● No	1
● I am not sure	2
● I am not in an educational program	0

Q28 What is the estimated annual household income?
Multiple Choice
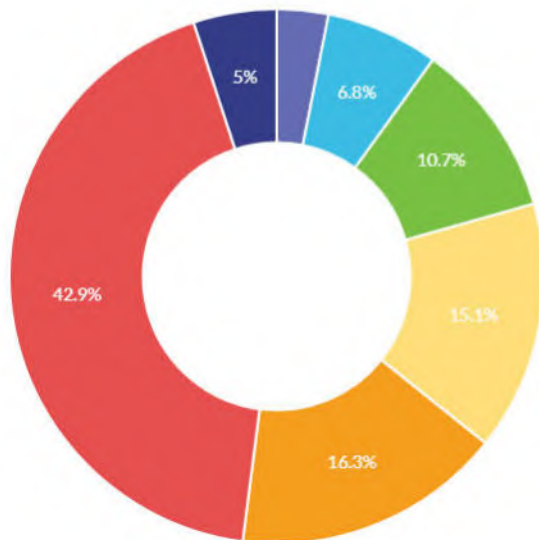
Choice	Total
● < $20,0000	26
● $20,000-$40,000	57
● $40,000-$60,000	89
● $60,000-$80,000	126
● $80,000-$100,000	136
● >$100,000	358
● Other	42

Q29 What is the highest level of education you have completed?
Multiple Choice
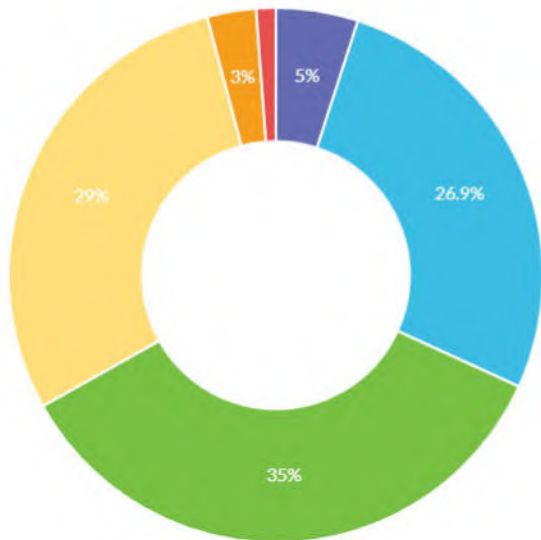
Choice	Total
● High school	42
● Some college	227
● 4-year degree	296
● Graduate/Doctoral/Professional degree	245
● Vocational or Certificate	25
● Other	10

Q30 Do you currently have a home-based business or plan to start one in the next 2 years?
Multiple Choice
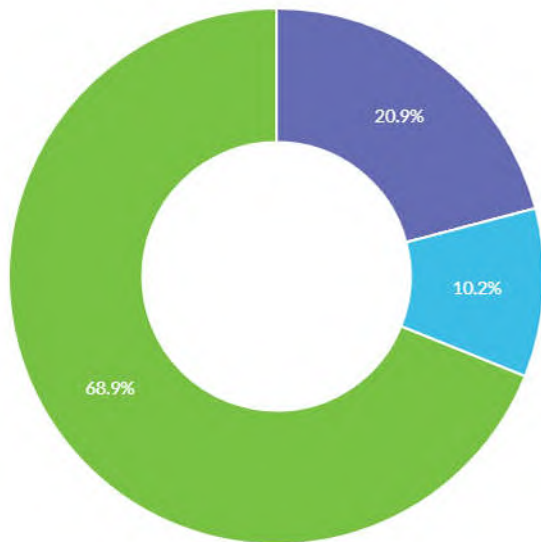
Choice	Total
● Yes, I have a home-based business	179
● I plan to start a home-based business in the next 2 years	87
● No, I do not have or plan to start a home-based business	590

Q31 Do you own a business?
Multiple Choice
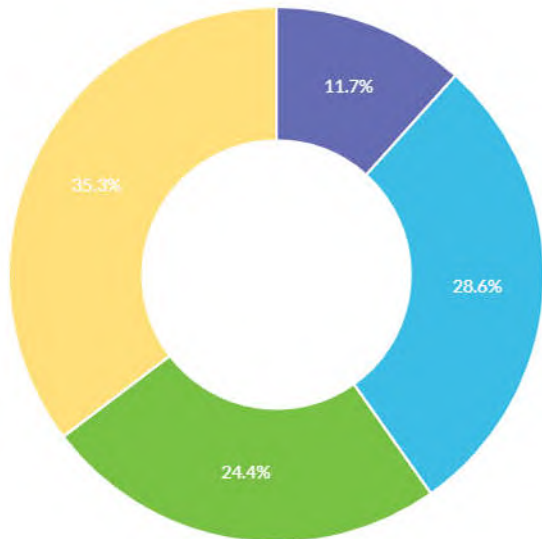
Choice		Total	
Yes, and I would like to answer a few questions on behalf of my business		31	
Yes, and it is a home-based business so answers are similar		76	
Yes, but I am not interested in answering additional questions		65	
No		94	

Q32 What type of business are you in?
Multiple Choice
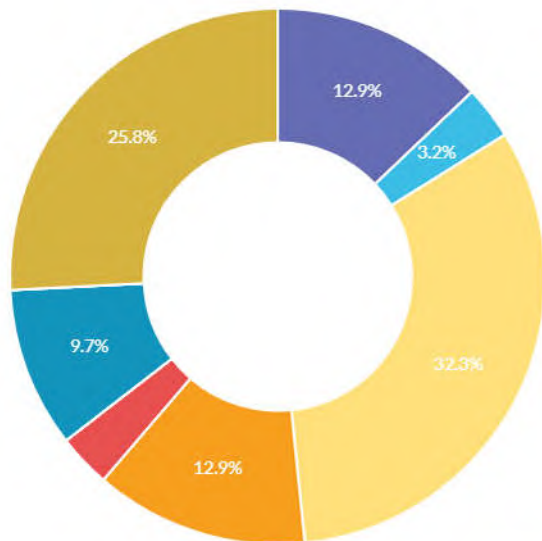
Choice		Total	
Retail		4	
Restaurant/Food		1	
Mining/Manufacturing		0	
Professional services (consulting, legal, engineering, accounting, banking etc.)		10	
High tech		4	
Healthcare		1	
Education		0	
Agriculture or wine		3	
Tourism		0	
Other		8	

Q33 For your business, what type of Internet service do you currently have?
Multiple Choice
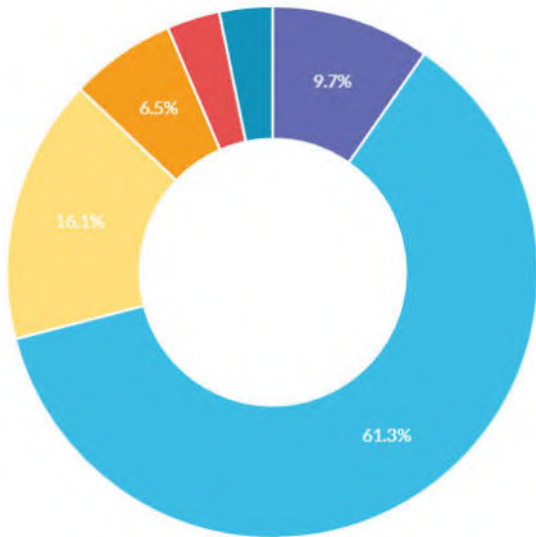
Choice	Total
DSL (usually provided by the phone company)	3
Cable (usually provided as part of your cable TV package)	19
Satellite (usually provided as part of your Satellite TV package)	0
Wireless (usually provided by an independent service provider using an antenna on the roof pointed to another ground antenna)	5
T-1 Service (a special kind of service often available from the phone company rated at 0 a fixed 1.5 Mbps)	2
Fiber connection (uses fiber optics to provide the signal. May be provided by the phone company or other providers. Typically used for higher speeds)	1

Q34 How is your business internet service?
Multiple Choice
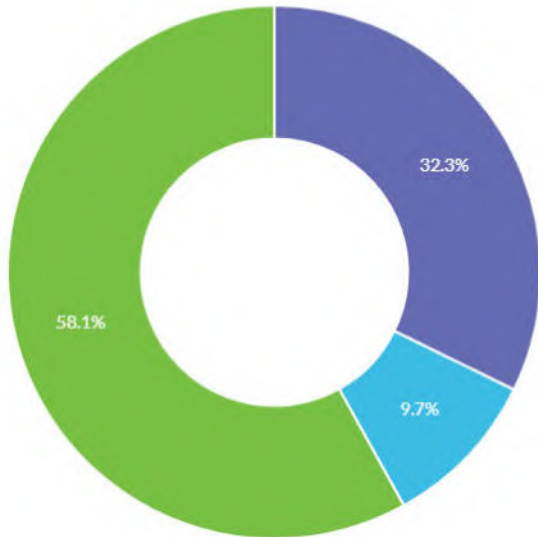
Choice	Total
The speed is slow	10
The connection interrupts	3
It meets my current needs	18

North County Broadband Strategic Plan **120**

Q35 Please, rank the options below based on what is most important to you regarding your internet service (1= most important, 5 = least important)
Scoring
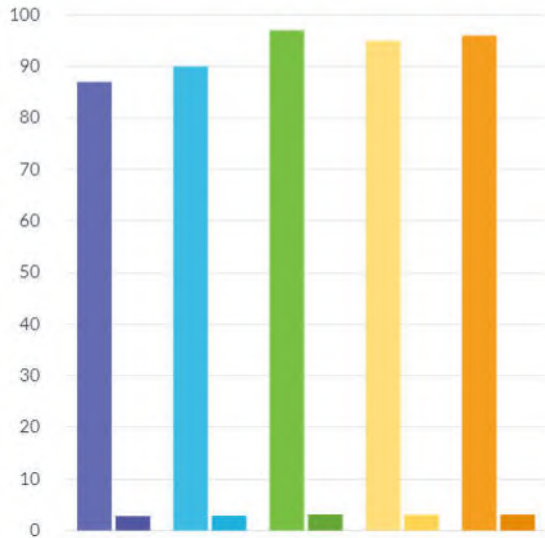
Choice	Score	Average
● Fast, I want speed and availability of abundant broadband	87	2.81
● Reliability, I do not want my internet service to be interrupted	90	2.9
● Price, I want to pay a competitive price	97	3.13
● Customer service, I want a friendly voice and good customer support	95	3.06
● Bundled invoice, I want one invoice for internet, cable TV, and/or phone service	96	3.1

Q36 What impact would Gigabit Internet service have on your business? (Check all that apply.)
Multiple Choice
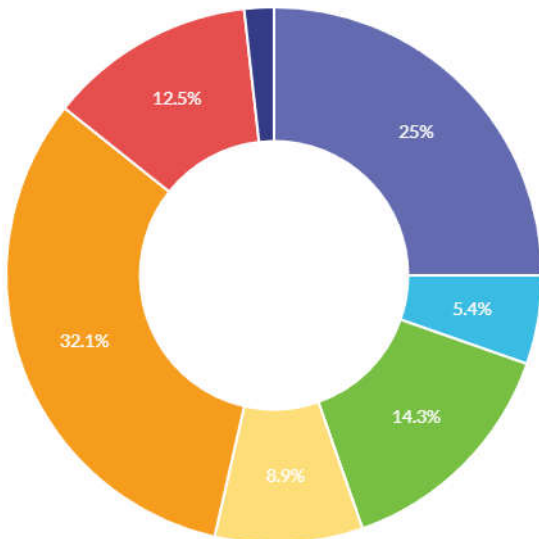
Choice	Total
● No impact	14
● The business would hire more employees	3
● The business could provide/attend more webinars and online training	8
● The business could reach more markets, more territories, more locations	5
● The business would be more efficient	18
● The business could provide more products and services to its customers	7
● What else? (Please specify)	1

Q37 Do you have an agricultural business or do you sell agriculture products in excess of $1,000 per year?
Multiple Choice
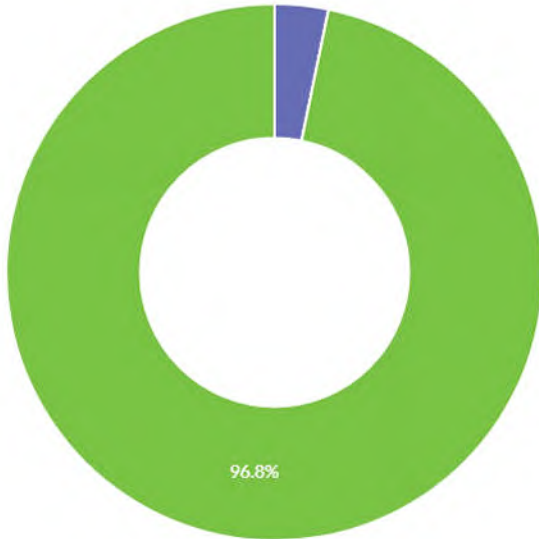
Choice		Total	
Yes, we sell agriculture products in excess of $1,000 per year		1	
Yes, we have a full-fledged farm		0	
No, we don't sell any agricultural products		30	

Q38 How many employees does your company have in the County?
Multiple Choice
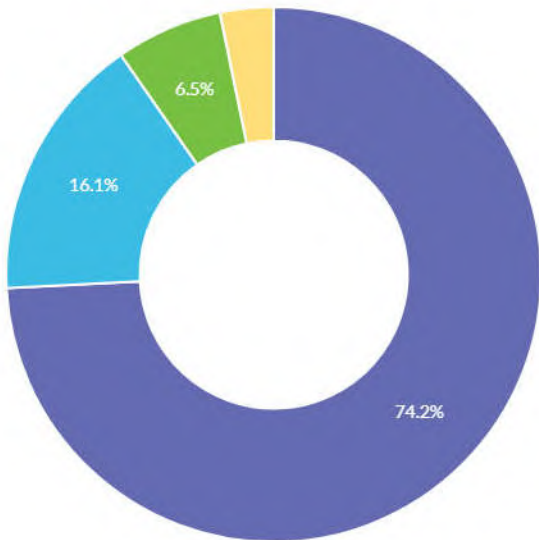
Choice		Total	
1-5		23	
6-10		5	
11-20		2	
21-30		1	
31-40		0	
41-60		0	
61-100		0	
100+		0	

Appendix II. ISP Engagement Package

The following captures compose the ISP Engagement Package.

TeleworX
North County Broadband Strategic Plan Overview

Vision
- North County aims to **accelerate the deployment of broadband infrastructure** to ensure broadband availability, increase capacity, increase disaster preparedness, encourage industry competition, reduce the digital gap, and prepares our city for a Smart City vision for the future.

Scope
- The North County Broadband Strategic Plan focuses on developing an **actionable plan** to provide to our communities broadband services that meets current and future bandwidth demands, and **positions North County to obtain infrastructure funding**.
- This study will integrate the following tasks into implementation strategies:
  - Broadband needs analysis
  - **Asset inventory and identification of infrastructure gaps**
  - Network design
  - **Identification of strategic partners and suitable operating models**
  - Economic Analysis

The Role for ISPs
- As a primary stakeholder, North County is engaging with local and regional ISPs to:
  - Request inputs that facilitate the tasks above, facilitating and improving network design
  - Align and coordinate infrastructure deployment reducing the overall cost
  - **Collaborate to facilitate broadband deployment, get funding**, and potentially, deploy and operate city-owned broadband infrastructure

TeleworX
Broadband Strategic Plan Conceptual View

Development of the Broadband Strategic Plan will integrate the components captured below.
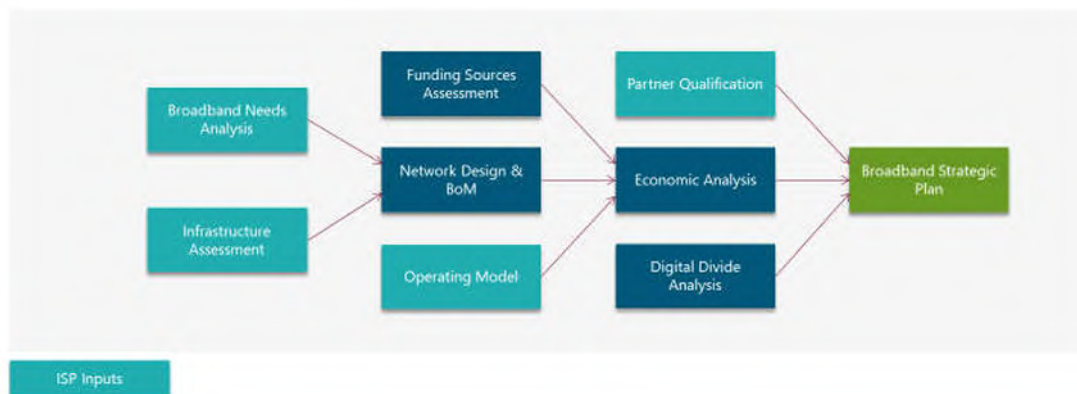
Project Timelines

The development of the Broadband Strategic Plan will take 22 weeks from September 26, 2022 to February 24, 2023, as set forth in the Gantt Chart below

Deliverables & Acceptance	26-Sep Wk 1	3-Oct Wk 2	10-Oct Wk 3	17-Oct Wk 4	24-Oct Wk 5	31-Oct Wk 6	7-Nov Wk 7	14-Nov Wk 8	21-Nov Wk 9	28-Nov Wk 10	5-Dec Wk 11	12-Dec Wk 12	19-Dec Wk 13	26-Dec Wk 14	2-Jan Wk 15	9-Jan Wk 16	16-Jan Wk 17	23-Jan Wk 18	30-Jan Wk 19	6-Feb Wk 20	13-Feb Wk 21	20-Feb Wk 22
1. Convene Meetings & Outreach (Phase 1)																						
2. Data Collection																						
3. Needs Assessment & Digital Divide Analysis																						
4. Broadband Network Design																						
5. Operating Model Development																						
6. Economic Analysis																						
7. Final Project Deliverables																						

Broadband Network Scenarios

The expansion of broadband infrastructure in North County will vary based on the level of collaboration between the City and the ISPs, resulting in a unique scenario.

Network Infrastructure

- Dark Fiber
- Middle-Mile Network
- Last-Mile Network

For each layer, City broadband infra can be deployed and operated as...

1. Independent scenario
Independent networks without coordination, resulting in potential overlaps and inefficiencies.

2. Complementary scenario
Coordinated deployments to maximize coverage and minimize overlap

3. Shared/ open access scenario
Deployment of infrastructure that can be shared among multiple service providers

TeleworX

City Broadband Deployment/Operating Models

The following graphic provides an overview of the most common types of municipal broadband deployment/operating models. ISPs can select and further customize a particular model as multiple variations are feasible within each model.

		Own RoW, Poles, Ducts, etc.	Own & Operate Passive Infrastructure	Own & Operate Middle-Mile Network	Own & Operate Last-Mile Network	Provide End-User Services
1	Municipal ISP Res & Biz	City / Municipality	City / Municipality	City / Municipality	City / Municipality	City / Municipality
2	Municipal ISP Gov. | Anchor Inst.	City / Municipality	City / Municipality	City / Municipality	City / Municipality	City / Municipality (Note 1)
3	Last-Mile Open Access (Wholesale)	City / Municipality	City / Municipality	City / Municipality	City / Municipality	ISP(s)
4	Middle-Mile Open Access (Wholesale)	City / Municipality	City / Municipality	City / Municipality	ISP(s)	ISP(s)
5	Dark Fiber Provider	City / Municipality	City / Municipality	ISP(s)	ISP(s)	ISP(s)
6	Passive Infra Provider	City / Municipality	ISP(s)	ISP(s)	ISP(s)	ISP(s)

City Involvement Level in Network Operations

Note 1: Broadband service offered only for government buildings and anchor institutions

TeleworX

Value Proposition for ISPs

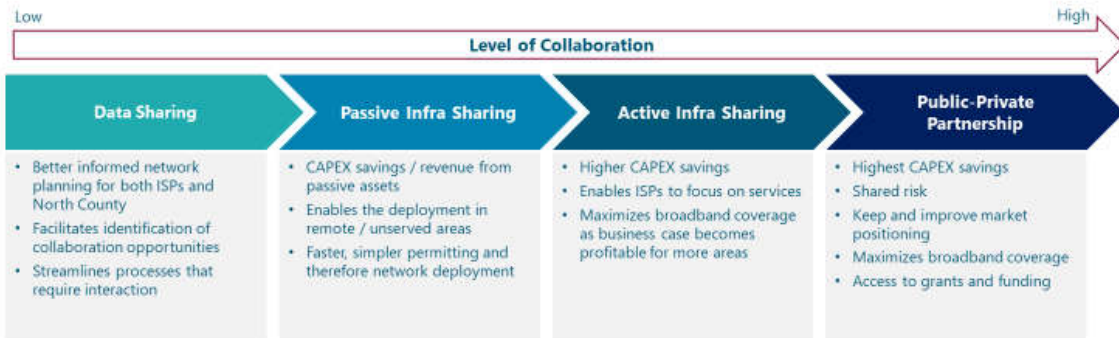Partnering with North County can bring various benefits to ISPs, depending on the level of collaboration.

Low ———————————————————————————————————— High

Level of Collaboration

Data Sharing	Passive Infra Sharing	Active Infra Sharing	Public-Private Partnership
• Better informed network planning for both ISPs and North County • Facilitates identification of collaboration opportunities • Streamlines processes that require interaction	• CAPEX savings / revenue from passive assets • Enables the deployment in remote / unserved areas • Faster, simpler permitting and therefore network deployment	• Higher CAPEX savings • Enables ISPs to focus on services • Maximizes broadband coverage as business case becomes profitable for more areas	• Highest CAPEX savings • Shared risk • Keep and improve market positioning • Maximizes broadband coverage • Access to grants and funding

ISP RFI Schedule

The ISP RFI schedule is set forth below considering an issuance date of November 15 and a deadline for submission on December 12.

ISP RFI Timeline							
	14-Nov	21-Nov	28-Nov	5-Dec	12-Dec	19-Dec	26-Dec
Task / Milestone	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
RFI Issuance & Distribution — Nov 15	◆						
Vendor Mgmt. & Query Addressing							
Submission Deadline					◆ Dec 12		
Response Evaluation & Collaboration Negotiations							

Appendix III. Public Forum Summary

Forums Scope, Objective & Participants

The following are the s, objective & participants of the public forum:

- Scope:
    - Why community participation is important to the development of a community broadband strategic plan.
    - Share what data is being collected and why.
    - How to access the data collection tools.
- Objective:
    - Public forums' objective was to bring community partners into the digital equity and inclusion conversation to determine how each organization directly works towards closing the digital divide.
- Participants
    - School district IT
    - People Self Help Housing
    - Dignity Health
    - San Luis Obispo County Behavioral Health
    - Library staff
    - Boys and Girls Club Staff

Key Findings

The most important aspects discussed during the Digital Equity Outreach Forums are summarized below:

1) Training

Public forums' objective was to bring community partners into the digital equity and inclusion conversation to determine how each organization directly works towards closing the digital divide.

2) Digital Equity Coalitions and Peer Programs

Digital equity coalitions, navigator programs, and peer programs are potential solutions to address most of the use and adoption issues.

3) Trust in Digital Platforms

People do not trust digital platforms due to privacy and security concerns but also due to negative experiences. It's important to ensure good first-time experiences and provide support.

4) Affordability

Broadband service cost is perceived as a barrier. In addition, there is no awareness regarding subsidies such as the Affordable Connectivity Program.

5) Access to Devices

Many people don't have access to computers, and they tend to rely on cell phones due to cost and lack of computing skills.

6) Access to Infrastructure

There are regions without access to adequate broadband infrastructure. Reliability is a common concern along with the need to speed up the deployment and access to fiber infrastructure.

## *Challenges in Broadband Access, Use and Adoption*

Lack of digital skills and access to devices are the main challenges to access broadband services in both Cities.

	Atascadero	Paso Robles
Digital Skills	• Primary training needs are around how to use a computer and digital platforms. • There is concerns regarding privacy, and security due to the lack of technical skills. • Older generations are more challenged	• Training is required at the basic level (e.g., how to use a computer), but also for specific users such as teachers, parents, and elders. • Bi-lingual training education is required. • Motivation to use digital services is lacking in some sectors of the population. In-person meeting might be required
User Devices	Telehealth or digital education platforms are better suited for computers; however, it is not affordable to everyone to own a computer	
Quality of Service	• Online services not always work as intended given the lack of reliability of the broadband service.	• Reliability of services is a concern.

	• If the first experience is bad, it is very unlikely that the user tries to use the service again. • Access to better, faster broadband can improve quality of life.	• The acceptance of the technology is complicated when there is no understanding about how to use it and how it benefits the community
Accessibility & Affordability	• Cost of broadband services is considered high. • People's Self-Help Housing (PSHH) is able to serve but may not have the capacity to assist with the ACP sign-ups. • There's a need to simplify pole access and permitting to facilitate the access to fiber infrastructure.	• Cost of broadband services is considered high. • Cost of expanding infrastructure. • There have been issues getting fiber from the East to the West due to the crossing with HWY 101.

Closing the Digital Divide

Preliminary solutions and initiatives to close the digital divide were identified during the Outreach Forums:
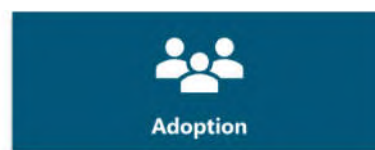
Training:

- Training programs in partnerships with schools.
    - Computer usage, digital navigation, cybersecurity, service platforms.
    - Provide the parents with guidelines about how to use education platforms for kids and manage online kids safety.
    - Build trust around digital services.
- Development of contents considering language, and age.
- Digital Equity Coalitions.
- Peer-support and family advocates.

Access & Affordability:

- Increase outreach and awareness regarding ACP and other subsidies for broadband service.
- Support for sign-up to subsidy programs (e.g., through PSHH and other community anchor institutions)
- Priority attention to regions with no broadband access due to lack of infrastructure
- Develop a plan for redundancy and resiliency of broadband infrastructure and online services.

- Facilitate permitting process for telecoms.

Adoption:

- Platforms improvement by establishing requirements regarding ease to use and the community needs.

- Improve broadband service and reliability at community anchor institutions providing online services.

- Funding programs for devices

- Increase awareness regarding ACP and other programs that may fund devices.

- Community Events and Incentives to use online services.

Appendix IV. GIS Views

FCC Unserved / Underserved location clusters

Atascadero – Unserved Location Clusters

Legend:
- 0% - 20%
- 20% - 40%
- 40% - 60%
- 60% - 80%
- 80% - 100%
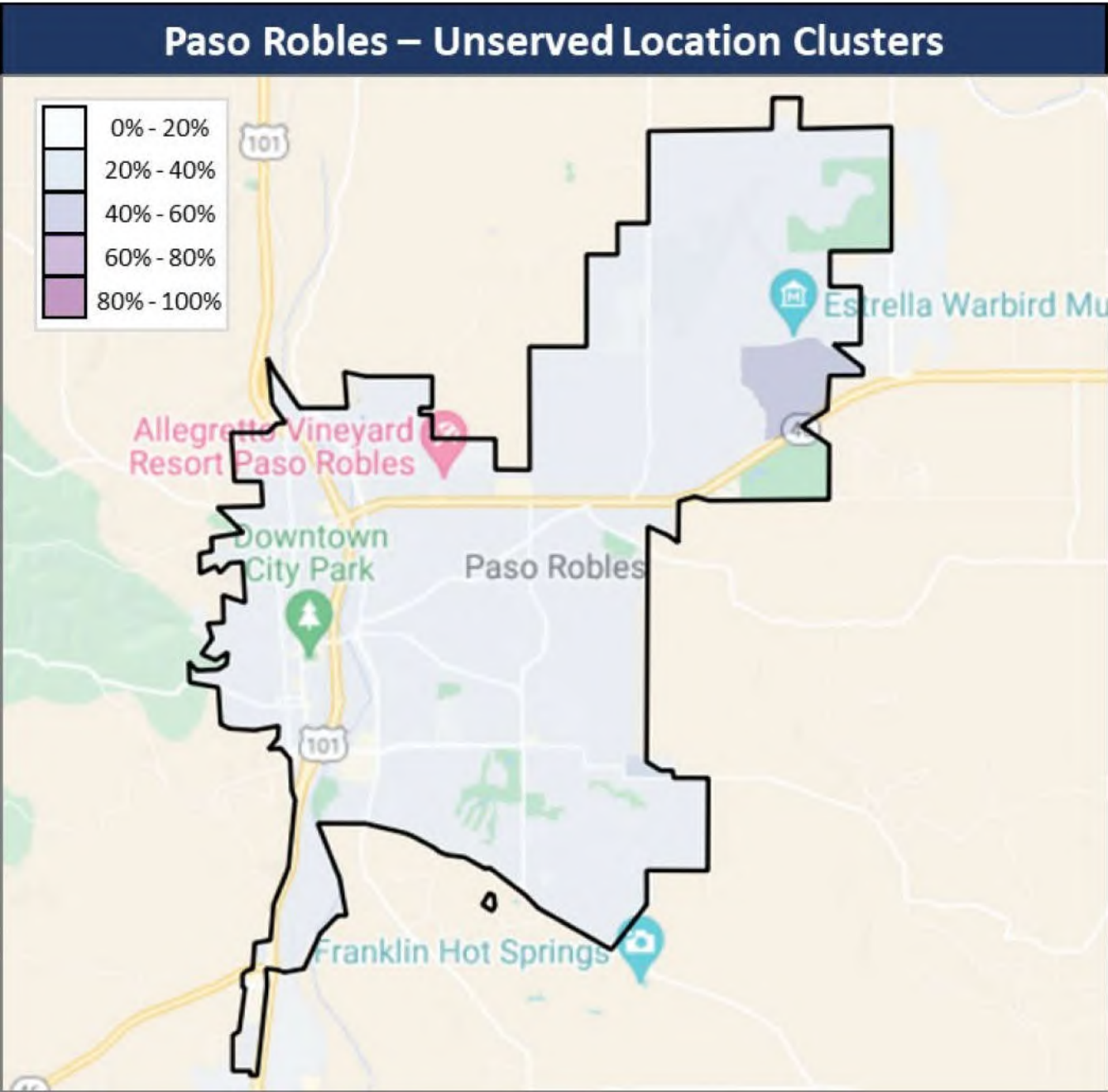
Paso Robles - Underserved Location Clusters

Legend:
- 0% - 20%
- 20% - 40%
- 40% - 60%
- 60% - 80%
- 80% - 100%
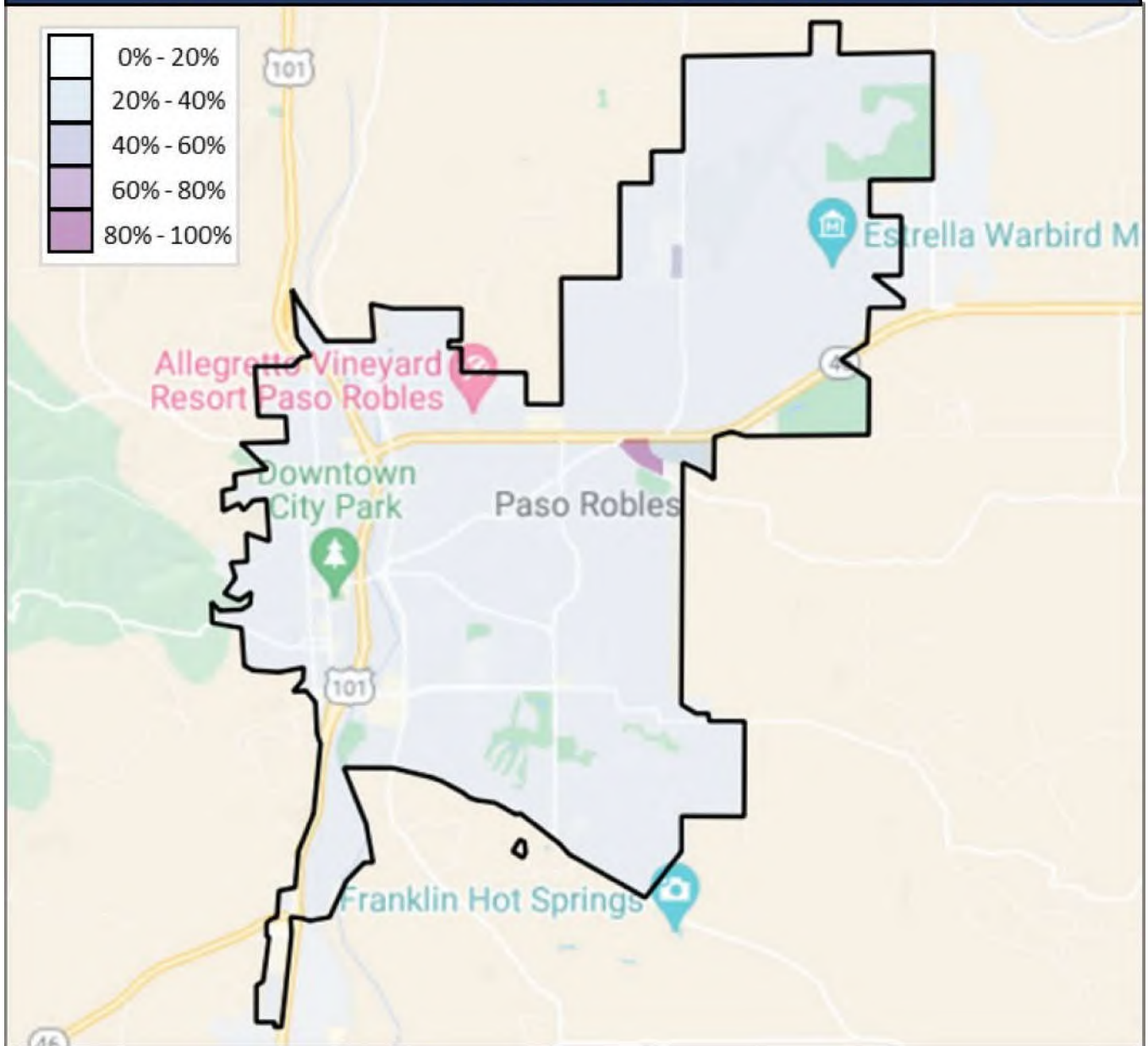
Atascadero - Underserved Location Clusters

Legend:
- 0% - 20%
- 20% - 40%
- 40% - 60%
- 60% - 80%
- 80% - 100%
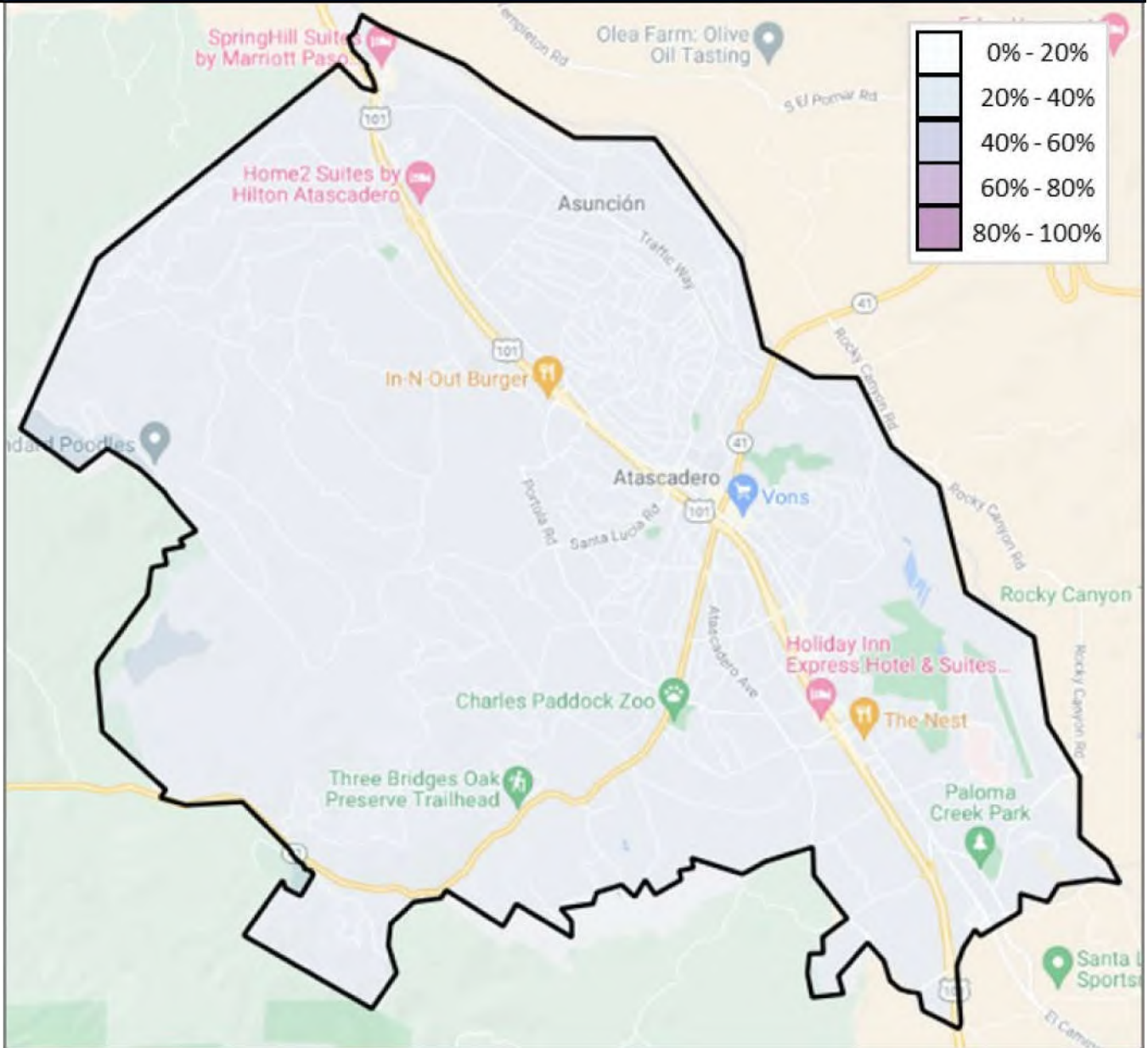
Distribution on served and underserved census blocks according to CPUC

Atascadero

Legend:
- Served ≥ 25/3
- Unserved < 25/3
- Unpopulated
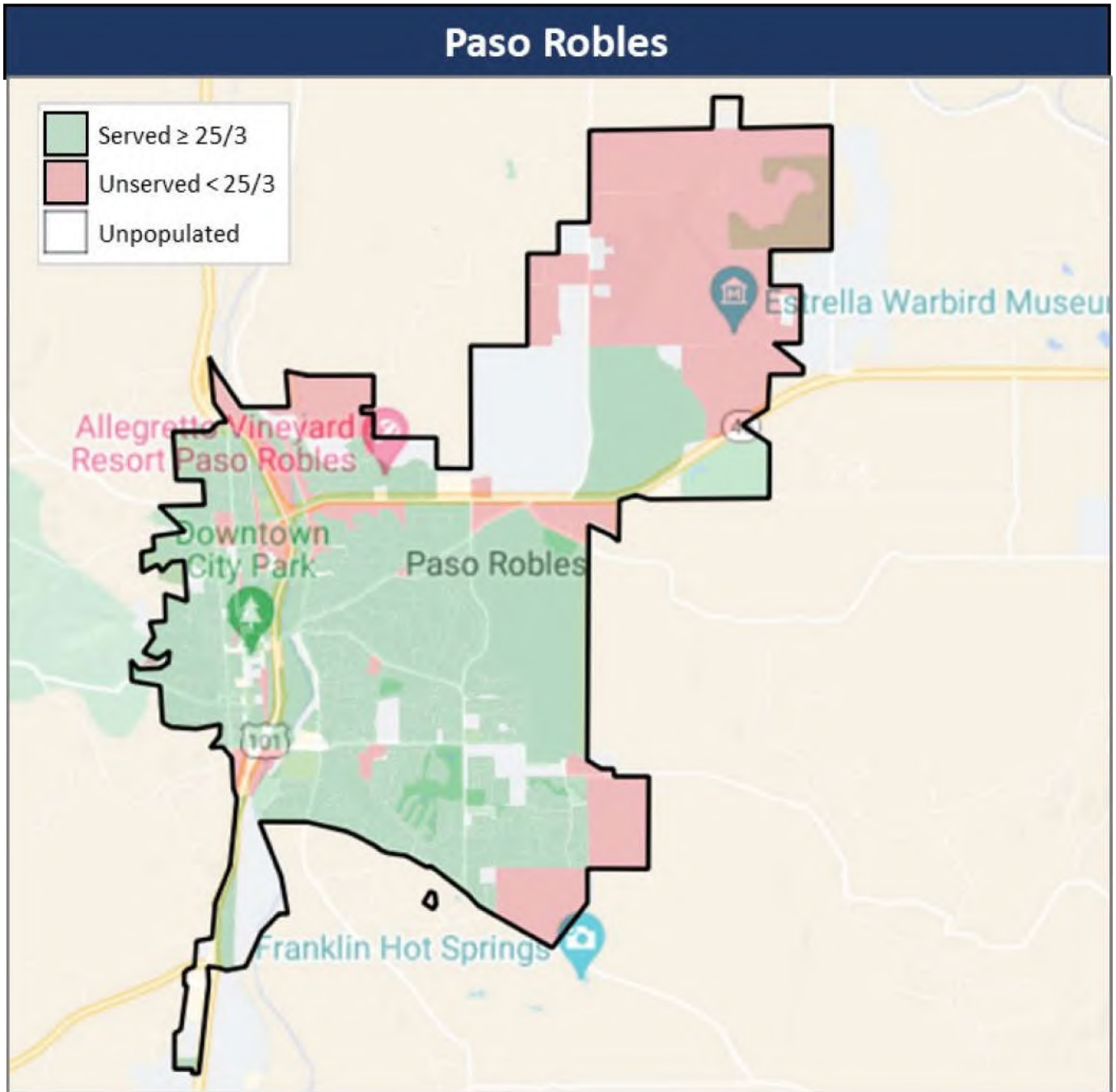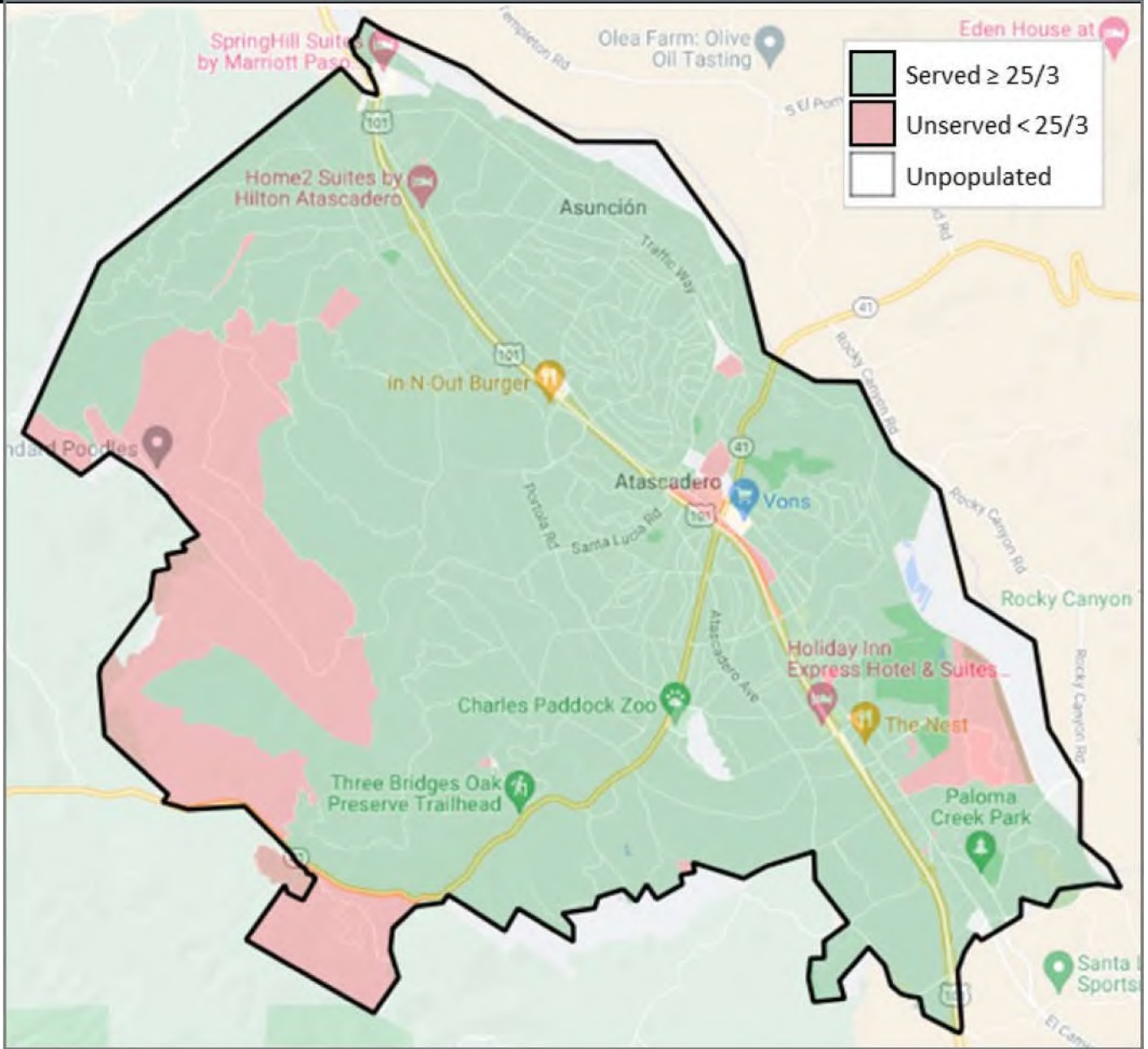
Served Status by Census block based on speed test data

Atascadero

Legend:
- Served >100/20
- Underserved 25/3 to 100/20
- Unserved <25/3
- No Data
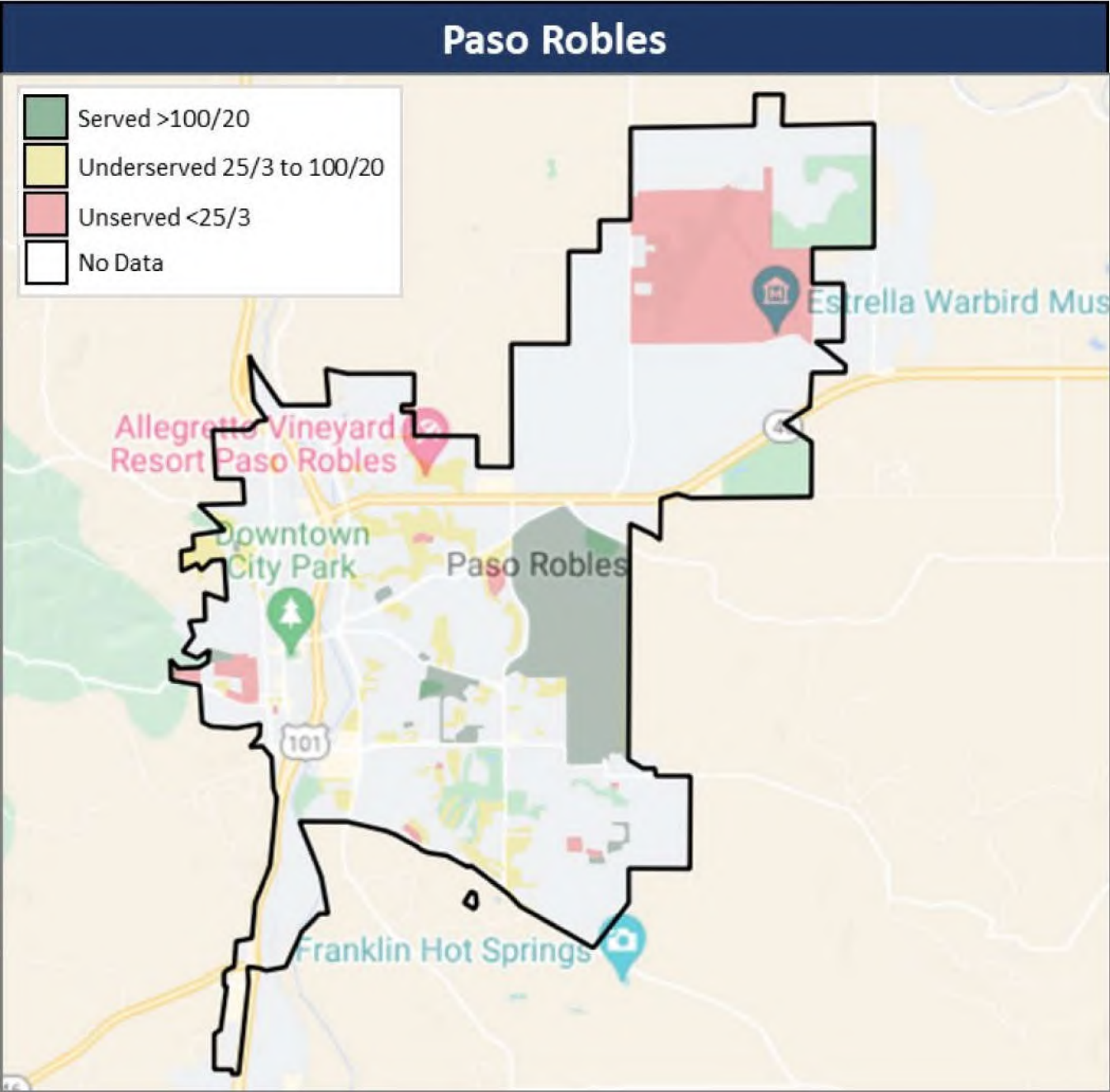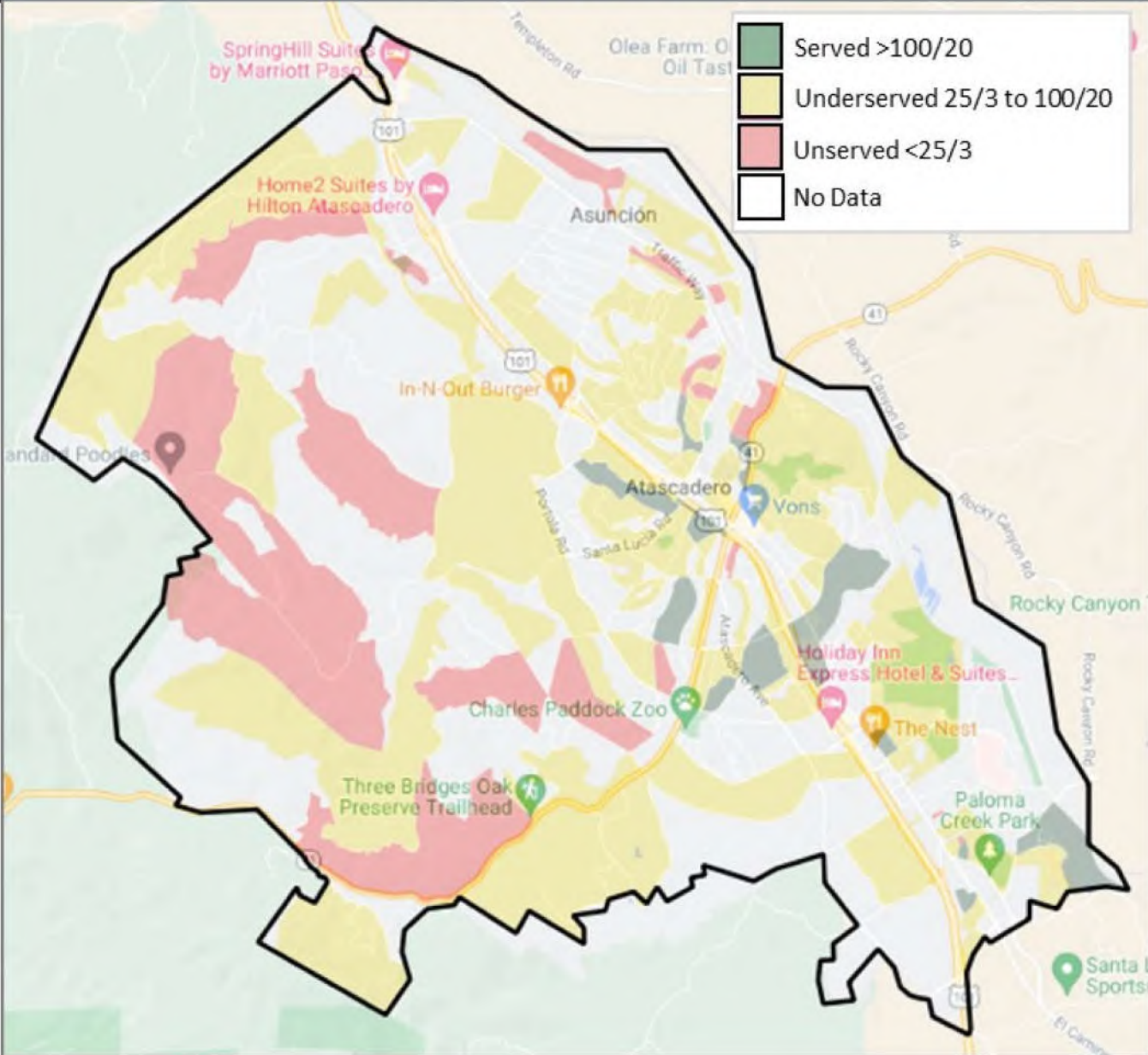
Disadvantaged Communities (Socioeconomic Vulnerability Index (SEVI))

Atascadero

Legend:
- <20%
- 20% - 50%
- >50%

City buildings and anchor institutions

Paso Robles

Legend — City Buildings:
- Airport
- Commercial/Industrial Hub
- Fire Station
- Government
- Library
- Museum
- Park Facility
- Railroad Station
- Residential
- Water Utility
- Zoo

Map labels: 101, Estrella Warbird M..., Allegretto Vineyard Resort Paso Robles, Downtown City Park, Paso Robles, Franklin Hot Springs

Atascadero

City Buildings

- ⬖ Airport
- 🏛 Commercial/Industrial Hub
- 🔵 Fire Station
- ◆ Government
- 🟦 Library
- ✳ Museum
- ★ Park Facility
- ☉ Railroad Station
- ▶ Residential
- ★ Water Utility
- ⬠ Zoo

Paso Robles

Anchor Institutions
- ⬥ Airport
- ⊙ CalFire Facility
- △ CDFA Fairgrounds
- ⬙ Commercial/Industrial Hub
- ☆ Court Houses
- ⬤ Fire Station
- ⬟ Future Buildout
- ✚ Healthcare Facility
- ⌒ Law Enforcement Facility
- ◼ Library
- ◢ National Shelter System
- ⬙ Radio Tower
- ▯ School
- ⊙ Wastewater Lift Station
- ★ Water Utility

Atascadero

Anchor Institutions
- ⬣ Airport
- ⦿ CalFire Facility
- △ CDFA Fairgrounds
- 🏺 Commercial/Industrial Hub
- ☆ Court Houses
- ⦿ Fire Station
- ⬠ Future Buildout
- ✚ Healthcare Facility
- ⬛ Law Enforcement Facility
- ◼ Library
- ◢ National Shelter System
- ⬛ Radio Tower
- 🏢 School
- ⊙ Wastewater Lift Station
- ★ Water Utility

City conduit and dark fiber in Paso Robles

Paso Robles

Legend:
- Current (10.1 miles)
- Grant Project + Conduit + FO cable (9.76 miles)
- Grant Project + FO Cable (4.44 miles)

California Middle Mile Broadband Initiative – Current Design for SLO County

Paso Robles

Legend: California MMBI

Appendix V. Analysis of State and Federal Funding Programs

Last Mile Federal Fund Account

The SB-156 established the Federal Fund Account (FFA)[85] to fund last-mile projects to connect unserved and underserved Californians in coordination with federal and state universal service programs. The FFA consists of a total pool of $2 billion and is being managed by the California Advanced Services Fund (CASF), with money from the ARPA program. Key features are summarized in Figure 59.
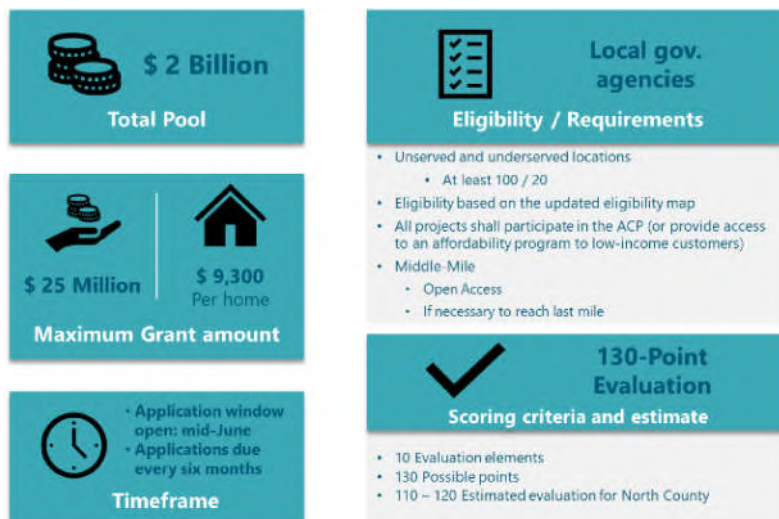
Figure 59. Last-Mile Federal Funding Account summary.

The Last-Mile FFA will fund costs related to the deployment of broadband infrastructure, backhaul leasing (up to 5 years), and upgrade of existing facilities. Eligible projects must cover areas containing households and businesses lacking broadband services (which includes underserved areas) focusing on disadvantaged communities.

Note: CPUC will publish a new eligibility map on March 31st, 2023.

Eligible entities include local governments, Non-telephone corporations, and entities with a Certificate of Public Convenience and Necessity (CPCN). Each entity can apply for up to a $25 million grant to serve the program's purpose with a limit of $9,300 per home. Based on FCC and CPUC data the maximum amount of funding would be approximately $1.5M for Paso Robles and $4.4M for Atascadero.

The CASF will use a 130–point evaluation that considers network technology, participation in the ACP, broadband need in the area, and whether the project proposes to leverage the statewide middle mile network. Based on this evaluation, Atascadero and Paso Robles are expected to score between 110 and 120 points.

---

[85] Last Mile Federal Funding Account

The window to apply to the Last-Mile FFA grant will be open by mid-June following the launch of a grant application portal.

CASF Broadband Infrastructure Grant Account

The CASF Broadband Infrastructure Grant Account is a $150 million per-year grant authorized by the SB-156 until 2032. This program intends to fund infrastructure projects to provide broadband access to unserved households. Figure 60 captures the key features of the program.
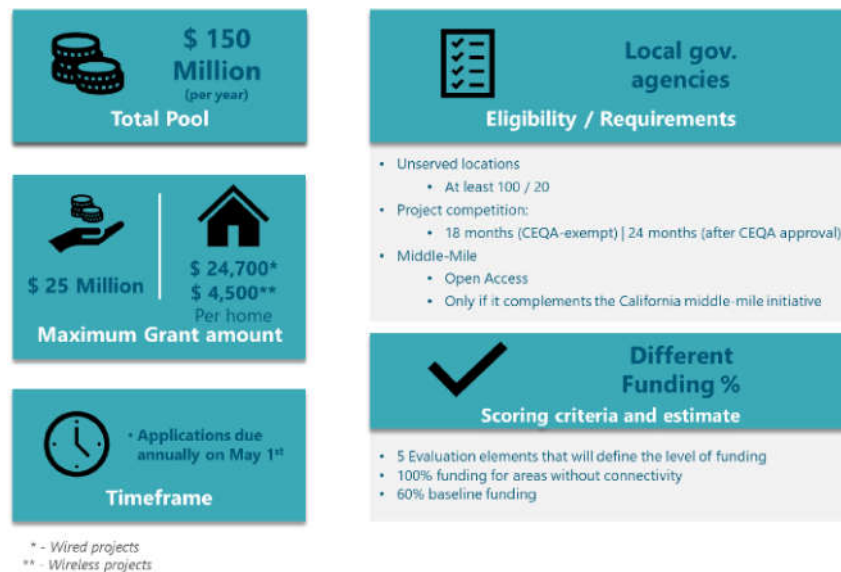

Figure 60. CASF Broadband Infrastructure Grant Account summary.

Eligible costs include those costs related to the deployment of broadband infrastructure, property or backhaul leasing (up to 5 years), and costs for upgrading existing facilities to provide interconnection.

Eligible projects must provide unserved locations with broadband service of at least 100 Mbps download and 20 Mbps upload. Eligibility will be determined based on the updated California Broadband Map to be published on March 31st.

Eligible entities are local governments, wireless carriers registered within CASF, non-telephone corporations, and entities with a CPCN.

The maximum cost per connected home is $24,700 for wireline technologies and $4,500 for wireless technologies. This translates into an estimated maximum grant amount of $3.9 million for Paso Robles and $11.6 million for Atascadero.

The funding criteria of the Broadband Infrastructure grant is based on funding all or a portion of the Broadband project. An applicant can get from 60% to 100% funding based on whether the project considers areas without connectivity, low-income areas, remote areas and whether existing infrastructure is leveraged for the project. On a first approximation, North County could anticipate receiving between 80% to 100% of the project submitted.

This grant accepts applications annually with a due date of April 1st. However, the application deadline has been extended to May 1st for 2023.

Loan Loss Reserve Fund

The Loan Loss Reserve Fund is a $750 million fund created by the SB-156 and operated by the CPUC to serve as credit enhancement for local governments and nonprofits deploying broadband infrastructure to borrow from financial institutions at more favorable terms. Key features of this program are captured in Figure 61.
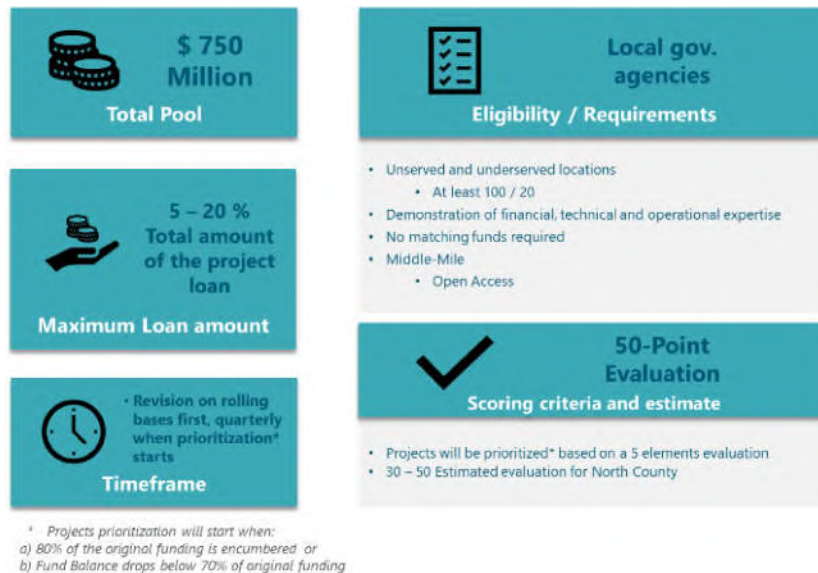

Figure 61. Loan Loss Reserve Fund summary.

Funds from the Loan Loss Reserve Fund can be used to pay debt issuance costs or the obtention of credit enhancements. The program includes coverage between 5-20% of the project loan amount in the event of default.

Eligible projects must be capable of offering at least 100 / 20 Mbps. Eligible entities must demonstrate financial, technical, and operational expertise.

Funds will be awarded on a rolling basis until prioritization starts. Prioritization will start when either 80% of the funding is encumbered or when the fund balance drops below 70% of the original funding. After that, unserved areas will be prioritized.

The scoring criteria of the Loan Loss Reserve Fund is based on a 50–point evaluation that considers the use of matching funds, pricing commitments, and broadband service needs in the area. As a first approximation, North County is expected to obtain between 30 and 50 points, which positions the Cities of Atascadero and Paso Robles in a good spot to apply for this grant.

Application to the Loan Loss Reserve fund can be submitted any time before prioritization starts, after that, applications will be accepted and reviewed on a quarterly basis.

BEAD Program

The BEAD program is a significant federal initiative managed by the NTIA to provide broadband infrastructure and reduce the digital divide in all the states and US territories. It is composed of infrastructure and digital equity funds. The focus of this section is on the infrastructure program.

The infrastructure program allocates $42.45 billion for broadband infrastructure planning and implementation. Each state will receive a minimum allocation of $100 million, and the NTIA will allocate the remaining funds based on the number of unserved locations and the ability of each state to provide broadband to unserved areas.

Therefore, the California Department of Technology (CDT) is conducting the development of the State Digital Equity Plan (SDEP) to detail how the BEAD funding would be used in the following 5 years. NTIA will distribute the funds to the states and US territories based on the submitted plans. Once the funds are assigned to California, the CPUC will manage BEAD funds through various programs, establishing the rules and guidelines for applications.

Figure 62 summarizes the estimated timeline for the BEAD infrastructure program. As shown, BEAD funding won't be available until 2024. Therefore, it is possible that infrastructure deployment projects will be already in progress. However, it is recommended that the Cities keep up to date with the status of BEAD in case additional funding is required for remote unserved areas.
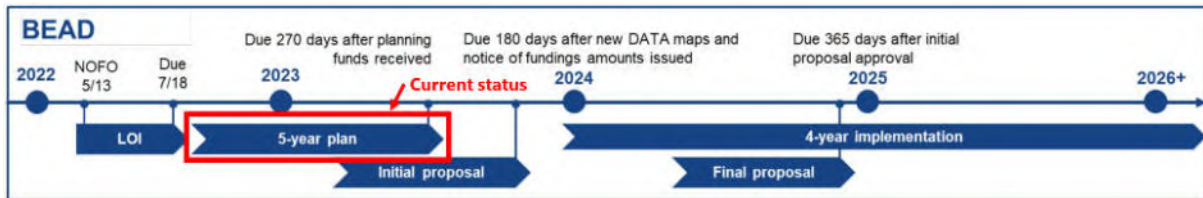

Figure 62. BEAD infrastructure estimated timeline[86].

---

[86] Internet for All: Working Planning Guide

Acronyms

ACP	Affordable Connectivity Program
AMI	Area Median Income
ARPA	American Rescue Plan Act
ASH	Atascadero State Hospital
AUSD	Atascadero Unified School District
BEAD	Broadband Equity, Adoption, and Deployment
BIL	Bipartisan Infrastructure Law
CAPEX	Capital expenditure
CASF	California Advanced Services Fund
CBA	California Broadband for All Action Plan
CBRS	Citizens Broadband Radio Service
CDCR	California Department of Corrections and Rehabilitation
CDT	California Department of Technology
CETF	California Emerging Technology Fund
CMTS	Cable Modem Termination System
CPE	Customer Premises Equipment
CPUC	California Public Utilities Commission
CTCAC	California Tax Credit Committee
DOCSIS	Data Over Cable Service Interface Specifications
DSL	Digital Subscriber Line
DSLAM	DSL Access Multiplexer
ECHO	El Camino Homeless Organization
EDA	Economic Development Administration
EIA	Energy Information Administration
ELL	English Language Learners
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FTTH	Fiber-to-the-Home
FWA	Fixed Wireless Access
Gbps	Gigabits per second
GDP	Gross domestic product
GIS	Geographic Information System
HDPE	High-density polyethylene
ICT	Information and Communication Technology
IIJA	Infrastructure Investment and Jobs Act
ISP	Internet Service Provider
IT	Information Technologies
K12HSN	K-12 High Speed Network
LATA	Local Agency Technical Assistance
LEO	Low Earth Orbit
Mbps	Megabits per second
MMBI	Middle Mile Broadband Initiative
MNOs	Mobile Network Operators

MoU	Memorandum of Understanding
NPV	Net Present Value
NSLP	National School Lunch Program
NSOL	Northstar Online Learning
NTIA	National Telecommunications and Information Administration
OAN	Open Access Network
OLT	Optical Line Terminal
ONT	Optical Network Terminal
PG&E	Pacific Gas & Electric Company
PON	Passive Optical Network
POP	Point-of-Presence
PPP	Public Private Partnership
PRHA	Paso Robles Housing Authority
PSHH	People's Self-Help Housing
QOZ	Qualified Opportunity Zone
RCRC	Rural County Representatives of California
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Quotation
SDEP	State Digital Equity Plan
SEVI	Socioeconomic Vulnerability Index
SLA	Service Level Agreement
TDMA	Time-Division Multiple Access
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WDBSLO	Workforce Development Board of San Luis Obispo County
WIOA	Workforce Innovation and Opportunity Act

Definitions

Digital Equity – A condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy.

Digital Divide – The gap between those with affordable access, skills, and support to effectively engage online activities and those without. As technology evolves, the digital divide prevents equal participation and opportunity in all parts of life, disproportionately affecting people of color, Indigenous peoples, households with low incomes, people with disabilities, people in rural areas, and older adults.

Digital Inclusion – Refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use ICTs. This includes five elements:

- Affordable, robust broadband internet service.

- Internet-enabled devices that meet the needs of the user.

- Access to digital literacy training.

- Quality technical support; and

- Applications and online content are designed to enable and encourage self-sufficiency, participation, and collaboration.

- Digital Inclusion must evolve as technology advances. Digital Inclusion requires intentional strategies and investments to reduce and eliminate historical, institutional, and structural barriers to technology access.

Broadband Adoption – Is traditionally defined as residential subscribership to high-speed internet access. Adoption is connecting low-income residents to the internet at home with digital literacy proficiency. Adoption overcomes 3 barriers:

- Cost – for both the internet service and the appropriate computing device

- Relevance – outreach in -language and in-culture by "trusted messengers" referred to as "Digital Navigators" is essential to explain to unconnected low-income households how they will benefit from being connected with at-home internet.

- Digital Literacy – targeted households will not subscribe to internet services or acquire a device they don't know how to use it or the internet.

- Successful adoption involves:
    - Understanding the benefits of being connected online at home.
    - Become aware of available, affordable internet service options.
    - Acquire an affordable device for connecting to the internet.
    - Learn foundational skills of digital literacy.
    - Select and sign up for home internet service.

Digital Navigators – Trusted guides who assist community members in internet adoption and the use of computing devices. Digital navigation services include ongoing assistance with affordable internet access, device acquisition, technical skills, and application support.

Digital Inclusion Ecosystem – A combination of programs and policies that meet a geographic community's unique and diverse needs. Coordinating entities work together in an ecosystem to address all aspects of the digital divide, including affordable broadband, devices, and skills. Indicators of a robust Digital Inclusion Ecosystem:

- The existence of programs and policies addressing all aspects of the digital divide.

- Affordable and subsidized broadband service options that meet the community's needs.

- Affordable and subsidized device ownership programs that meet the community's needs.

- Multilingual digital literacy and digital skill training that meet the community's needs.

- Hardware and software technical support.

- Digital navigation services to guide residents to the above services.

- Collaboration: Entities providing local digital inclusion services, policymakers, advocates, social service providers, and community leaders co-create solutions in partnership with the community.

Unserved and Underserved – These terms relate to Deployment and describe the availability of broadband infrastructure. Unserved means there is no available Internet infrastructure. Underserved means that the available Internet infrastructure is inadequate (generally not reliable or fast enough to support prevalent consumer applications, especially remote learning and telehealth).

- [Unserved is defined in State law and CPUC regulations as locations with less than 25 Mbps download and 3 Mbps upload (25/3 Mbps). Given that the State and CPUC standards for deployment are >100/20 Mbps, Underserved can be considered locations between 25/3 Mbps and 100/20 Mbps.]

Unconnected and Underconnected – These terms relate to adoption and describe the status of a home connection to the Internet. Unconnected means that a household has no home Internet connection (regardless of whether or not there is availability or access to broadband infrastructure). Underconnected means that a household is connected to the Internet only by a smartphone.

- 2021 Statewide Survey found that 15% of California households are digitally-disadvantaged — 9% are Unconnected (not online at home), and 6% are Underconnected (have only a smartphone); 29% of low-income households are disproportionately disadvantaged, with 18% Unconnected and 11% Underconnected. The 2023 Statewide Survey on Digital Equity will update these figures and measure progress over the last 2 years.]

Bandwidth – Capacity of a broadband connection, often a synonym for data transfer speed.

Broadband Service – The term "broadband service" means any technology identified by the Secretary (Secretary of Agriculture) as having the capacity to transmit data to enable a subscriber to the service to originate and receive high-quality voice, data, graphics, and video[87].

---

[87] 7 U.S. Code § 950bb

Broadband over Powerlines (BPL) – Delivery of broadband over existing low and medium-voltage electric power distribution networks, with speeds comparable to DSL and cable modem.

Cable Modem – Provides broadband through some coaxial cables delivering television.

Community Anchor Institution – A public school, a public or multi-family housing authority, a library, a medial or healthcare provider, a community college or other institution of higher education, a State library agency, and any other nonprofit or governmental community support organization[88].

Connection speeds:

- Kilobit/Kilobyte – Kilobits per second (Kbps) is a measure of dial-up speed, where one Kb = 125 bytes. Kilobyte (KB) means 1,000 bytes and measures storage capacity or data size.

- Megabit/Megabyte – Megabits per sec (Mbps or Mb) is a measure of transmission speed, with a 1Mb connection able to transfer 1MB (megabyte/MB) of data in 8 seconds. A megabyte is a measure of the size of computer files or capacity. 1MB = 1,000 KB.

- Gigabit/Gigabyte – Gigabit is a unit describing data transfer speed, usually per second (Gbps). Gigabyte describes the size of computer files and capacity. 1GB = 1,000 MB (megabytes)

Dark fiber – "Unlit" or unused optical fiber available in fiber optic communication.

Devices that Connect to the Internet:

- Computer

- Tablet

- Smart phone

- Gaming consoles

- Smart televisions and appliances, i.e., Alexa, Google Nest, Ring, etc.

- Point of sale devices

- Smart City applications, i.e., water meters, traffic cameras, air quality sensors, etc.

Incumbent service provider – Entity that, as of the application's submission date, is providing broadband service to not less than 5 percent of the households in the service territory in the proposed application[89].

Internet of Things – Network of objects, remotely controlled, with embedded electronics and sensors that share data. It can be anything from a smart thermostat to an internet-connected refrigerator.

---

[88] 47 U.S. Code § 1721

[89] 7 U.S. Code § 950bb