Comprehensive Broadband Plan

January 2023

County of San Diego

Land Use and Environment Group (LUEG)

Acknowledgements

County of San Diego

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Executive summary

The San Diego region is approximately 2.9 million acres in size and is one of the most biodiverse in the U.S., ranging from coastal to desert and agricultural to mountainous environments. It is made up of 18 incorporated cities, with the County of San Diego (County) representing the unincorporated areas of the region. The unincorporated area accounts for 2.2 million acres, with its own vast and varied geography and biodiversity. It is the second largest municipality in the region by population, and geographically nearly as large as the states of Rhode Island and Delaware combined. The County has land use jurisdiction over 772,239 acres, or 35%, of the unincorporated area with a population of over 500,000 residents.

The County provides a range of services to residents and visitors across the entire region. Eighteen sovereign tribal nations across 19 reservations make up 124,000 acres of the unincorporated area.[1] The remaining unincorporated areas are part of State and Federally owned lands and military installations, including Marine Corps Base Camp Pendleton. The County does not have land use jurisdiction over Tribal land or State and Federally owned land. While each community has its own unique characteristics, a common thread across all of them is a steadily increasing reliance on internet access. The past few years have brought a near-universal desire for broadband internet connectivity, but there is still much to be done before the goal of universal access is achieved. The pandemic has pushed several important aspects of life into the virtual space – from distance learning to remote work to telehealth – however, an estimated 37,000 households in the unincorporated area of San Diego (approximately 106,000 people)[2] do not have wired (i.e., fiber, cable, or DSL) broadband subscriptions (wired broadband technologies are often faster and/or more reliable than wireless technologies like satellite and fixed wireless, which rely heavily on distance and a clear line of sight for internet service quality). Different factors apply in different communities, but overall, this lack of subscriptions can be attributed to limited infrastructure availability, inaccessibility and/or unaffordability of plans or devices, or simply a lack of consumer interest. Research has shown that access to the internet is an economic driver with multiple academic studies demonstrating every dollar invested in broadband returns roughly $4 to the economy in benefits related to economic and workforce development, consumer savings, telehealth, or distance learning.[3] In addition, having connectivity networks throughout the region is critical for public safety – both for residents to get alerts in case of emergencies like wildfires, and for first responders to have and provide up to date information. Broadband is a priority for the County of San Diego and other jurisdictions in the region, and it will remain a priority for years to come – particularly as data and bandwidth needs increase and new infrastructure becomes available to help address them. With several funding opportunities being made available at the Federal and State levels (including the State's open-access middle mile program that will bring fiber infrastructure closer to underserved communities for multiple entities to use), the region has a rare opportunity to invest significantly in broadband infrastructure, to not just meet the needs of today but proactively address the needs of the future.

The County of San Diego's Land Use and Environment Group contracted with Guidehouse Inc., a consulting firm with experience in broadband and digital equity strategies as well as navigating Federal funding, to develop this Comprehensive Broadband Plan for the unincorporated area in order to identify opportunities and potential partnerships to increase internet access throughout unincorporated areas in the region. The development of this Plan had three main priorities:

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[1] University of San Diego "Indian Reservations in San Diego County" https://www.sandiego.edu/native-american/reservations.php

[2] Number of households multiplied by 2.86, the number of persons per household in San Diego region, per census American Community Survey 5-year data from 2016-2020

[3] Universities of Purdue and Tennessee, Chattanooga

1. Listen to stakeholders and communities so that their experiences would help inform the identified needs

2. Develop a plan that promotes digital equity through robust and affordable broadband infrastructure and digital literacy programs

3. Provide data to help inform the County and partners on how best to take advantage of current and future funding opportunities

This Plan outlines pillars and strategies for the County and partners to address those needs (specific pillars and strategies presented below) in the unincorporated areas of the region. While all communities can benefit from further investment in broadband, data/geospatial analysis, stakeholder engagement, and community inputs have shown that some areas have more urgent needs than others, and in many cases could benefit from focused initiatives by the County and its partners. Communities in need of infrastructure tend to be composed of community planning areas located in rural, desert, mountainous areas in northern and eastern parts of the region (e.g., Valley Center, Mountain Empire, Borrego). These "internet deserts" typically include households with lower incomes than their suburban peers. Based on a review of available pricing data,[4] residents within these communities without fixed residential broadband access often pay higher prices for lower speed internet access. Unincorporated communities that appear to have infrastructure but still face challenges related to adoption whether due to affordability, device access, or digital literacy include Spring Valley, Lakeside, Harmony Grove, La Presa, and Fallbrook among others. While these challenges have led to digital inequities, fortunately, many can be addressed and ameliorated through the collaborative efforts of organizations in the area (e.g., SANDAG, Tribes, local governments, the private sector). Partners are going to be essential for success because this is an immense and complex endeavor, and no single jurisdiction directly owns internet connectivity for the region. Universal broadband will not be solved in a few years, but this Plan lays out a blueprint for the County and partners to get started on planning to address short-term, immediate goals, and set their communities up for lasting, dependable connectivity solutions for the future.

A summary of the Plan is included below which details the overall vision, pillars, strategies, and key performance indicators for the County and its partners to consider as they move towards a more digitally equitable future. Additional details for the graphic may be found in later sections.

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[4] Pricing and speed data taken from BroadbandNow and internet service provider (ISP) websites

County of San Diego
Comprehensive Broadband Plan for the Unincorporated Area

Aspirational vision for County and partners to work towards: High speed, affordable, and reliable broadband internet for those that want it in the unincorporated area

3 Pillars to reach vision

1. Promote Expanded Infrastructure Availability	2. Encourage Broadband Adoption	3. Partner and Oversee

11 Strategies to activate pillars

1.1 Engage Internet Service Providers (ISPs) to partner for grant opportunities	1.2 Coordinate other infrastructure investments with public and private sectors	2.1 Continue to publicize the Affordable Connectivity Program (ACP)	3.1 Dedicate personnel to oversee unincorporated area efforts and apply for grants
1.3 Consider cellular, fixed wireless, and emerging technology to fill gaps	1.4 Streamline permitting	2.2 Coordinate digital navigator and technical assistance program	3.2 Create sustained stakeholder and community engagement channels
1.5 Continue and potentially expand public access points		2.3 Continue device distribution, loan, and recycling program	3.3 Measure program and outcome success

Key Performance Indicators to measure progress towards vision and regional digital equity

- **Availability** – Households with access to broadband speeds (100/20 Mbps or faster)
- **Reliability** – Internet downtime
- **Affordability** – ACP enrollment; avg $ / Mbps
- **Overall Adoption** – Broadband subscriptions

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List of abbreviations

Abbreviation	Definition
ACP	Affordable Connectivity Program
ARPA	American Rescue Plan Act
BIL	Bipartisan Infrastructure Law
CalFIRE	California Department of Forestry and Fire Protection
CalREN	California Research and Education Network
Caltrans	California Department of Transportation
CBOs	Community Based Organizations
CDT	California Department of Technology
CENIC	Corporation for Education Network Initiatives in California
CPA	Community Planning Area
CPSG	Community Planning Sponsor Group
CPUC	California Public Utilities Commission
CTY	County
DoD	Department of Defense
DSL	Digital Subscriber Line
DPW	San Diego County Department of Public Works
FCC	Federal Communications Commission
FTE	Full-Time Employees
FTTH	Fiber to the Home
FTTP	Fiber to the Premises
FWA	Fixed Wireless Access (a.k.a. Terrestrial Fixed Wireless)
GEO	Geostationary Equatorial Orbit Satellite
HH	Households
HPWREN	High Performance Wireless Research and Education Network
IA	Incorporated Area
IIJA	Infrastructure Investment and Jobs Act
ISP	Internet Service Provider
LEO	Low Earth Orbit Satellite
Mbps	Megabits per Second
NTIA	National Telecommunications and Information Administration
P3s	Public-Private Partnerships
QCT	Qualified Census Tract
ROI	Return on Investment
SANDAG	San Diego Association of Governments
SCTCA	Southern California Tribal Chairman's Association
SDG&E	San Diego Gas & Electric
TFW	Terrestrial Fixed Wireless (a.k.a. Fixed Wireless Access)
UAs	Unincorporated Areas

Internet Definitions

The internet essentially connects networks by wires (and can be wireless for a time) to allow them to communicate with one another
- All data is stored locally or in a **data center** (e.g., the cloud)
- Data can be parsed into bits and bytes (8 bits) and sent via fiber-optic cables through light pulses
- Fiber "**backbone**" connects data centers and internet exchange points, allowing networks to access one another (e.g., across oceans and countries)
- Fiber lines from internet exchange points and data centers connect to local communication huts and nodes, which is the "**middle mile**"
- Getting from a local node to the end user is the "**last mile**," and can be achieved through a variety of technologies

There are multiple **options for last-mile technologies** discussed in this Plan:

Fiber to the premises (FTTP): Fiber optic cable direct to building

Fixed wireless (e.g., microwave): Uses radio signals and relies on line-of-sight connection

Coaxial cable: Same infrastructure as cable TV

Copper wire / DSL: Same infrastructure as phone lines

Satellite: Typically, traditional GEO satellite technology; new LEO satellite technology is referred to explicitly as LEO satellite where applicable

TV Whitespace: Emerging technology utilizing unused spectrum between TV stations

Mobile / Cellular: 4G, 5G etc. cell towers and small cells

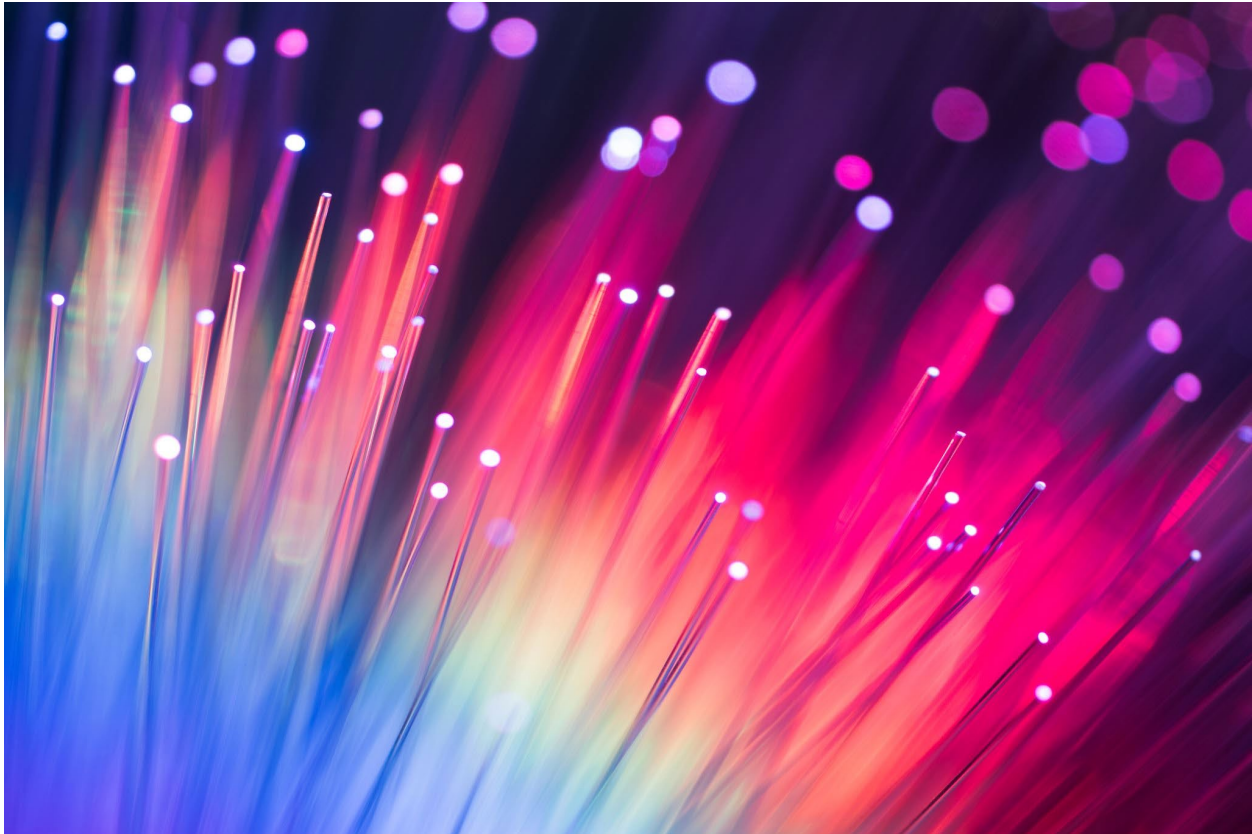Wi-Fi: Connects devices to router which is connected to internet

Table 1: Internet Access Technology Pros, Cons, and Speeds[5]

	Wired Broadband Technologies			Wireless Broadband Technologies			
Tech Type	Fiber Optic Cable (Fiber)	Coaxial and Hybrid Fiber Coaxial (Cable)	Digital Subscriber Line (DSL)	Terrestrial Fixed Wireless (TFW)	Low Earth Orbit (LEO) Satellite	Geosynchronous Equatorial Orbit (GEO) Satellite	TV White Space (TVWS)
Typical Residential Download /Upload Speeds[6]	250-1000 Mbps /250-1000 Mbps	10-500 Mbps /5-50 Mbps	5-35 Mbps /1-10 Mbps	5-50 Mbps /1-5 Mbps	90-100 Mbps /10-15 Mbps	10-25 Mbps /2-3 Mbps	<25 Mbps /<3 Mbps
Latency (i.e., lag)	10-12 milliseconds (ms)	13-27 ms	11-40 ms	30-40 ms	30-50 ms (distance to satellite)	500-600 ms (distance to satellite)	10-15 ms (in theory)
Pros	Fastest data transmission technology available Symmetrical download and upload speeds	Widely utilized in urban/ suburban areas Can use existing cabling	Uses existing telephone lines Widely available	Relatively low-cost to install Reasonable speeds, esp. in open flat areas	Potentially can cover remote areas	Widest coverage area	Long transmission range Non-line-of sight performance
Cons	High initial capital cost for builders	Asymmetric speeds	Lower speeds overall, esp. in rural areas	Relies on proximity and line of sight Requires available spectrum*	Relatively new and untested* Expensive for consumers	High latency Expensive for consumers "Soft data caps" after which speeds are throttled*	New tech Relatively slow speeds*

*Would potentially not qualify to meet "served" definition for Infrastructure Investment and Jobs Act (IIJA) funds. (From the NTIA: For the purposes of the BEAD Program, locations served exclusively by satellite, services using entirely unlicensed spectrum, or a technology not specified by the Federal Communications Commission (FCC) for purposes of the Broadband DATA Maps (new broadband availability maps in development), do not meet the criteria for Reliable Broadband Service and so will be considered "unserved.")

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[5] Sources: NTIA pre-NOFO 23-Mar-22 Webinar 1, HighSpeedInternet.com, BroadbandNow, Ookla Speed Tests, FCC Form 477 Data
[6] Speed sources: https://broadbandnow.com/guides/dsl-vs-cable-vs-fiber, https://www.ookla.com/articles/starlink-hughesnet-viasat-performance-q2-2021, https://broadbandnow.com/Fixed-Wireless, https://www.att.com/internet/fixed-wireless/, https://www.govtech.com/network/white-space-internet-could-connect-the-uss-isolated-places.html

Introduction and context

What is broadband?

Even though everyone may not be familiar with the term, broadband high-speed internet access has become a key aspect of daily life. Broadband enables Wi-Fi and is the number of bars of cell service we have on our phone. It allows people to reliably access and transmit information such as text messages, images, and sounds via the internet. In a world increasingly reliant on technology and data, broadband has become essential.

According to the Federal Communications Commission (FCC), broadband is high-speed internet access that is faster than the traditional dial-up access.[7] The FCC currently defines broadband speeds as minimum 25 megabits per second (Mbps) download and 3 Mbps upload speeds (25/3). Download speeds refer to how fast information can be retrieved from the internet to do things like stream movies and listen to music, whereas upload speeds refer to the speed information is sent from a device to the internet or other internet-enabled devices. Since the start of the pandemic, there has been a pressing need for faster upload speeds, as the use of webcams to videoconference for everything from work to school to telehealth has become more common. Because of increasing daily demands for internet bandwidth, there is a push to increase

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[7] "Getting Broadband Q&A*." Federal Communications Commission (FCC)*, 11 Mar. 2020, https://www.fcc.gov/consumers/guides/getting-broadband-qa

these minimum speeds. For example, the State of California recently established a minimum broadband speed goal of 100 Mbps download. The Infrastructure Investment and Jobs Act (IIJA), Federal legislation that has allocated approximately $65 billion for broadband, also defines broadband as 100 Mbps download and 20 Mbps upload (100/20), a definition that the San Diego Association of Governments (SANDAG) has since adopted. Even so, governments push for faster, more reliable broadband plans to continually increase this definition.

Higher speeds mean higher bandwidth for residents and businesses to operate. Where 25/3 may have previously been enough for a single person in a household, the average household consists of more than one person and thus, typically requires higher bandwidth. Imagining a household of four, two adults teleworking and two children conducting remote learning concurrently, they are likely to have video interruptions and less reliable service if they are receiving the FCC's minimum definition of broadband speeds. This is particularly true if all four members in the household are videoconferencing and must rely on their upload speeds. This is a scenario that is familiar for community members in the past few years. The increased need for broadband speeds seen across the country is reflected in the region, as residents included in the community engagement activities described in this report also described their frustration from dropped calls and interrupted connections. This Comprehensive Broadband Plan endeavors to identify the gaps in fast, reliable internet for households within the unincorporated area so that the County can begin working with partners to provide the necessary infrastructure and services for connectivity.

Why broadband? Why now?

Our world is moving towards a hybrid physical and virtual environment. As the flow and exchange of information requires increasingly larger amounts of data transmission, high-speed broadband has become a necessity for various aspects of daily life:

- Broadband access and adoption support **education** through distance learning and health through **telemedicine**.

- Broadband advances **economic development** by enabling online job searches, job creation, and access to the digital economy.

- Broadband supports **government services**, including through improved traffic lights, traffic management systems, and online access to public services.

- Broadband provides **public safety**, including disaster and emergency response. Because fire hazard severity is a concern across the region, broadband connectivity is crucial to ensure early and frequent communication during wildfire and other emergency events.

- Broadband can aid **sustainability** through smart, efficient technologies and reduce the number of cars on the road.

- Finally, broadband improves **quality of life** by providing access to entertainment like streaming services.

Further, the COVID-19 pandemic has pushed the need for digital equity to the forefront of policymakers' agendas. The response to the pandemic has required residents to remain connected and engage digitally, which has accentuated the disadvantages of unavailable, unaffordable, or unreliable broadband connections. Broadband was suddenly necessary to reliably attend school, work remotely, access healthcare, and connect with family and friends.

The unprecedented level of government funding through IIJA and the Federal American Rescue Plan Act (ARPA) that has become available for broadband investment during this time presents a substantial opportunity to address gaps and improve access in the unincorporated areas.

What is the Comprehensive Broadband Plan?

The County of San Diego's Land Use and Environment Group contracted with Guidehouse Inc. to develop this Comprehensive Broadband Plan. Guidehouse is a leading global provider of consulting services to the public and commercial sectors and has helped numerous state and local government entities with their broadband and Federal funding needs. Guidehouse worked with the County to develop this Comprehensive Broadband Plan to identify opportunities and potential partnerships to increase internet access throughout unincorporated areas in the region. The development of this Plan had three main priorities:

1. Listen to stakeholders and communities

2. Develop a plan that promotes digital equity through robust and affordable broadband infrastructure and digital literacy programs

3. Take advantage of current and future funding opportunities

Guidehouse collaborated with public and private entities to consider how they can contribute to creating equitable access across communities in the region, to identify gaps and opportunities, and to lay the foundations for a highly connected future that advances economic opportunity, environmental sustainability, educational attainment, health, public safety, and resilience. A full description of the methodology, including research and activities related to legislation and policy, market structure, infrastructure, and socioeconomic factors, is included in the next section. The Plan will help position stakeholders to successfully capture funding and form long-lasting, impactful partnerships.

Who are some beneficiaries from future broadband projects in the unincorporated area?

Table 2: Unincorporated area population data

Unincorporated area population data	
Total population	506K[8]
Total number of households (HH)	165K[9]
HHs without broadband internet subscription such as cable, fiber, or DSL	37K[10]

Given its large, rural nature and limited broadband access, the region's unincorporated areas (whose population is described in the table above) merit extra attention. Across the unincorporated areas of San Diego, approximately 37,000 households (22% of households in the unincorporated areas) lack access to a broadband internet subscription. This Comprehensive Broadband Plan intends to identify how to bridge gaps between residents and internet subscriptions. Potential rationales for why residents do not subscribe to the internet were identified in a survey of the community (see Graph 1 below).

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[8] SANDAG 2020 Estimates
[9] Ibid
[10] U.S. census American Community Survey 2020 5-Year Summary Estimates

Graph 1: Unincorporated Area survey respondents' reasons for not having home internet access

Most people surveyed (92%)[11] indicated that their reasons behind not maintaining an at-home internet subscription were a result of availability, reliability, or affordability concerns. The Comprehensive Broadband Plan and its implementation takes these into account to address the needs of the unincorporated area.

Challenges faced by these socially vulnerable populations

To better implement the recommendations featured in the Comprehensive Broadband Plan, the specific needs and barriers of unincorporated area residents are considered. Better understanding these needs included demographic analysis of socially vulnerable populations within the unincorporated area. Analysis was informed by existing research from SANDAG, geographic mapping of socioeconomic factors, and extensive stakeholder and engagement activities including focus groups, public workshops, and interviews with leaders and organizations that serve vulnerable communities. This analysis has led to the identification of five groups of constituents, as bolded in the text below, who are acutely impacted by lack of broadband access and are potential beneficiaries of this Plan.

Low-income students need internet and internet enabled devices to complete schoolwork but lack internet access due to cost of broadband subscriptions and devices. **Residents of tribal areas** experience low broadband availability, low advertised connection speeds, and high-cost plans. Businesses and **teleworking employees** in the unincorporated area struggle with strong, reliable connectivity to complete their day-to-day work. Areas with the most **non-English**/ less than "very well," English **speakers**, coincide with areas of lower broadband adoption and struggle to access online services and affordable offerings. In northeastern rural areas of the region, seniors make up 30-40+% of the population, and often lack access to internet, internet enabled devices, and struggle with digital literacy.

- Approximately 100,000 students in the San Diego region lack reliable internet access at home.
- About 4% of residents in the unincorporated areas speak English "not well" or "not at all."[12]
- Tribal areas in San Diego region reside in census tracts[13] with broadband adoption at or lower than 70%.

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[11] 522 of the 890 total survey respondents were identified as unincorporated area residents. Respondents were asked to provide their current location's zip code which was used to identify which respondents were located in an unincorporated area. Speed test data for unincorporated area respondents was identified by matching unique test IDs that could be confirmed as originating from a test conducted in a community considered to be an unincorporated area. If a response could not be verified to have originated from an Unincorporated area, then that response was not otherwise sorted and thus could have originated from any geographic region within the county. Total survey results for respondents that provided a zip code aligned to an unincorporated area, including answers to demographic questions, are provided in the appendix.

[12] https://datasurfer.sandag.org/download/sandag_census_2010_jurisdiction_unincorporated.pdf

[13] The census uses several different kinds of geographic units to present its data. The census geographic hierarchy consists of census blocks, within block groups, within census tracts, within places, within county subdivisions, within counties, within states. Census blocks are the smallest geographic entity measured by the census, while census tracts are mid-sized: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_5

- Nearly 17% of seniors in San Diego region do not have a computer with internet access.
- 39% of businesses and 42% of employees reported connectivity issues, according to a SANDAG report.

Ultimately, while the Plan is intended to identify ways the County and a network of partners (e.g., Internet Service Providers, SANDAG, the State, municipalities, etc.) can support all constituents within the County's jurisdiction, it is often helpful to have a better understanding of potential key groups of residents for which programs that are derived from this strategy could be focused.
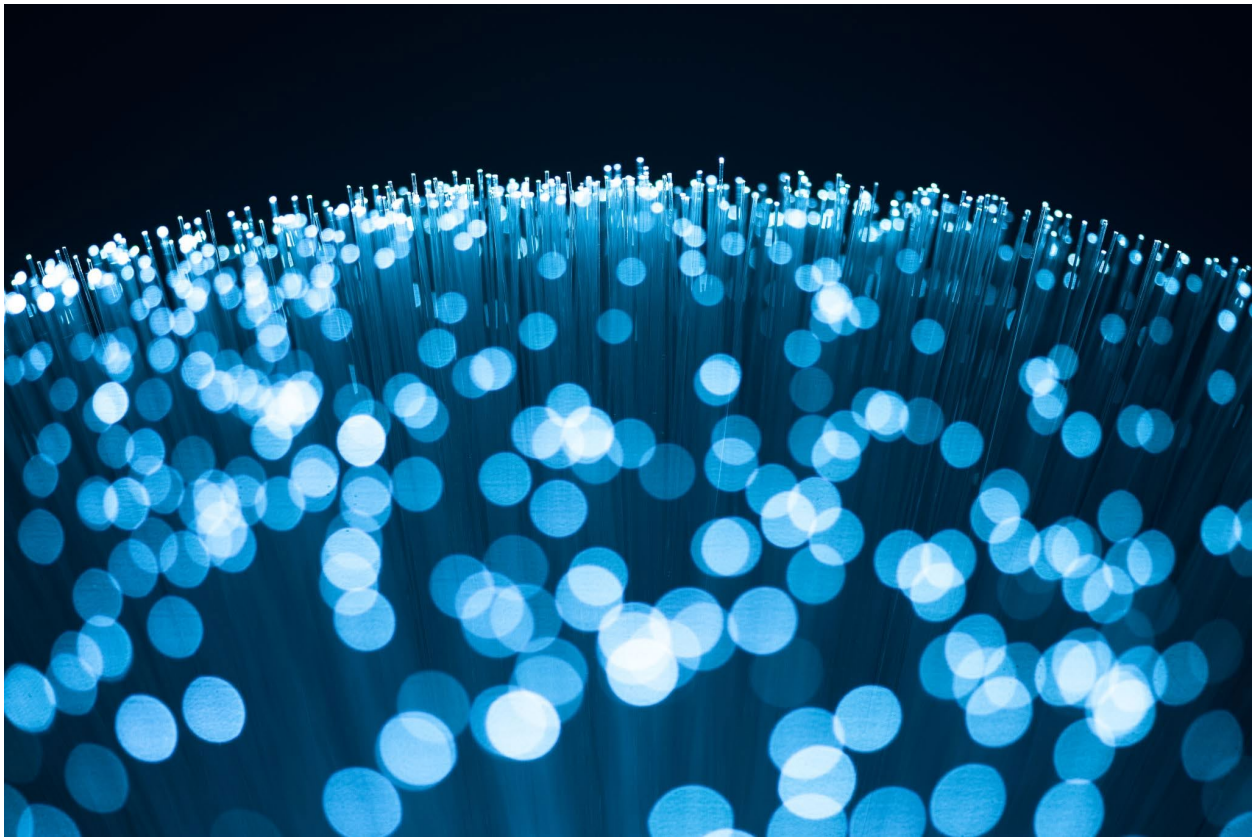
Methodology

While development of the Comprehensive Broadband required an analysis of infrastructure (especially the physical location of existing and potential infrastructure assets) and market structure (major players, market coverage, and pricing structures), digital inclusion requires a broader lens. The Plan was developed not just through required activities such as analysis of regional **legislation and policy**, **market structure**, and **infrastructure**; it also included an analysis of **socioeconomic factors** that shape the state of broadband in the unincorporated area, as well as stakeholder and community engagement activities that captured the current lived realities of the communities that the County serves. This framework informs the Plan (shown in Figure 1 below) to better understands gaps in **availability** of broadband infrastructure and improve internet subscription **adoption.**

Figure 1: Framework for approaching broadband
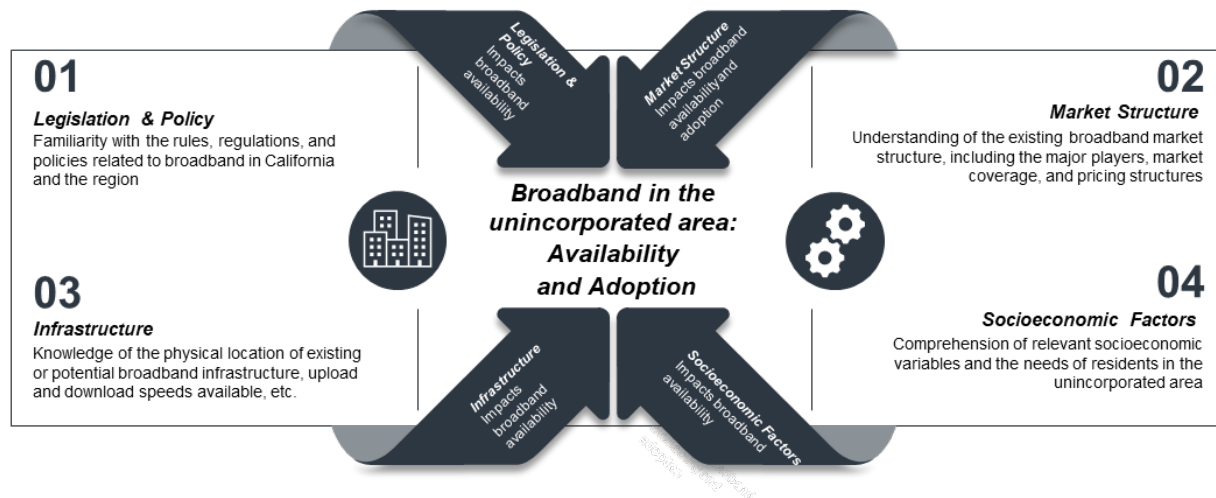
Objectives and overview

Guidehouse and the County developed the Plan through activities conducted in three phases:

Phase 1: **Kickoff and Data Gathering***, from January to March 2022*

Objectives of the initial **Kickoff and Data Gathering** phase were to understand the availability of datasets related to broadband and to adequately prepare for the project's extensive stakeholder engagement activities. This required meeting with members of the County's Broadband Steering Committee, who contributed relevant stakeholder contacts that would be used to schedule community engagement activities more effectively. The Broadband Steering Committee is comprised of information technology staff and administrators from relevant County departments, including the San Diego County Library, Department of Public Works, Planning & Development Services, Agriculture, Weights and Measures, Department of Environmental Health and Quality, the County Technology Office, the Department of Parks and Recreation, Health and Human Services Agency, the Sheriff's Department, Fire Authority, Office of Emergency Services, and the Land Use and Environment Group Executive Office.

To identify and evaluate current gaps and needs that would provide the basis for the final Comprehensive Broadband Plan, data from the FCC, Census Bureau, CPUC, and other sources of broadband-related information were mapped into geographically specific broadband need typologies. These were used to create a **Broadband Index**, which classifies census tracts based on the level of broadband access – determined by both availability and adoption attributes – that residents in each tract are estimated to experience. The table below provides additional detail into the types and sources of information used to conduct this analysis. Further detail on how the Broadband Index was developed can be found in the 'Additional Broadband Index Methodology' section in the Appendix.

Table 3: Geospatial data sources

Geospatial data	Source
Base layers with geographical features, streets, management districts and buildings	County-provided data
Consumer broadband access available at tract level	Public—FCC 477, CPUC Broadband Mapping Program data
Maximum advertised speed available at tract level	Public— FCC 477, CPUC Broadband Mapping Program data
Real speeds, various levels of geographic granularity	Public—Ookla Speedtest, M-Lab, BroadbandNow, Microsoft Airband
Access to fiber at tract level	Public— FCC 477, CPUC Broadband Mapping Program data
Internet subscription prices	Public—BroadbandNow
Demographics (income, age, household size, ethnicity)	Public—US Census
Community anchor institutions (e.g., schools, libraries)	Public—California Public Utilities Commission (CPUC)
Relevant street furniture (e.g., streetlights, telephone poles)	County-provided data
Location(s) of conduit and/or fiber	County-provided data
Cell towers and small cell locations	County-provided data

Phase 2: **Gaps and Opportunities Assessment***, from February to May 2022*

In the second phase of the project, we conducted interviews with stakeholders from partner government agencies and organizations, developed and introduced a website and survey, scheduled 12 in-person and hybrid community meetings, and invited approximately 175 community organizations to participate in focus groups. The findings from these research and stakeholder engagement activities were presented in a **Gaps and Opportunities Assessment**. The takeaways of this phase may be found in the **Insights for the Plan** section of this report.

Phase 3: **Report Writing and Presentation***, Summer 2022*

Finally, in the final **Report Writing and Presentation** phase, we used the findings from the Gaps and Opportunities assessment to inform solutions and shape the Comprehensive Broadband Plan. This led to pillars, strategies, and key performance indicators that the County and its partners can use to drive broadband adoption forward. These recommendations include an outline of stakeholders, expected impact, phases and milestones, costs, funding, and other dependencies. The Comprehensive Broadband Plan will also prepare stakeholders for funding opportunities and partnerships that will be critical to the Plan's implementation. The County will continue to solicit public feedback on the Plan upon release.

Timeline of activities

Strategy Development Activities
Stakeholder Engagement Activities

Phase 1: *Kickoff and Data Gathering*
Jan 2022 – March 2022

Research and gather relevant data and documentation related to broadband

Develop list of stakeholders

Map and analyze stakeholders to assist prioritization of interviews

Schedule and conduct interviews with internal stakeholders

Plan community engagement strategies and activities

Phase 2: *Gaps and Opportunities Assessment*
February 2022 – May 2022

Continue to research unincorporated area context

Develop broadband maps that synthesize datasets into geographically-specific broadband need typologies

Conduct leading practice research to identify lessons learned by comparable counties

Conduct interviews with stakeholders from partner government agencies and organizations

Develop and implement public broadband website and survey

Schedule and conduct online focus groups with community organizations and hybrid community meetings

Draft and present Gaps and Opportunities Assessment

Phase 3: *Report Writing and Presentation*
Summer 2022

Conduct interviews with utilities and private sector

Analyze responses from community and stakeholder engagement activities

Develop solutions universe and prioritization methodology

Draft recommendation scorecards that include impact, funding, resourcing, and critical dependencies

Develop Comprehensive Broadband Plan that prepares stakeholders for funding opportunities and partnerships

What stakeholders and communities are saying

As part of the development of this report, Guidehouse and the County conducted stakeholder and community engagement to obtain a better understanding of the real-life situations and sentiments felt by residents. We reached out to approximately 175 external organizations to participate in focus groups and facilitated 12 workshops across the unincorporated areas. Stakeholders included in this outreach represented a wide span of organizations including community planning groups and sponsor groups, library associations, school districts, Tribal governments, community collaboratives, labor, chambers of commerce, economic development corporations, and senior service organizations. Many of these organizations are potential contributors to future broadband initiatives. In addition to this outreach, we were also able to connect with communities through an online engagement platform and an online broadband survey that was translated into the eight languages most commonly spoken in the region and made available in paper form at San Diego County libraries. These resources were further distributed through additional communications to all identified stakeholders that were not able to join scheduled virtual focus groups or in-person workshops.

County departments have also been routinely meeting to discuss broadband efforts, and the County has been working closely with entities like SANDAG and Caltrans to ensure their efforts are aligned. These partners are already working on streamlining permitting processes and expanding middle mile infrastructure along State highways and will require further partnership with County departments.

While more engagement and ongoing collaboration will be required to implement the Plan, these stakeholder inputs will serve as a solid foundation for partners in the region to build upon. Throughout this process, we

heard rich stories, experiences, and inputs shared by the communities we engaged. The takeaways below highlight the themes of what we heard from surveys, focus groups, and community workshops.

The need for broadband is greater than ever

With the increase of online classes, meetings, and resources, more residents in the unincorporated areas find that they need higher bandwidth to fully participate in their communities. This is especially true for households supporting multiple children who often need to negotiate using limited speeds across multiple devices. With increases in broadband use, residents find themselves unable to access documents, join meetings, or, in some cases, even connect to the home internet service for which they are paying. Across all methods of community engagement, unincorporated area residents shared that their choices of ISPs that could serve their homes were limited, or at times, non-existent. Limited offerings, slow and intermittent service, and high prices result in residents relying on publicly available internet at County libraries for important daily tasks. We often heard of fully packed library parking lots late into the night as residents flock to the one area in their community with reliable internet service. Residents hope that such solutions could be expanded to more community anchor institutions (e.g., schools, public housing, or any organization that supports underserved communities) especially considering that library hours of operation are limited. Stakeholders also expressed a need for a public resource of accurate information on affordable plans and general broadband topics so that they can better understand what options are available and affordable for home use in their area. Focus groups shared some of the challenges that residents experience regarding broadband, including the need for digital literacy training, improvements for students accessing remote classwork, and the growth of populations in their areas.

> *"When the [local County] library is closed, the parking lot is still full…it's the best that there is [available]."*
>
> *– Spring Valley workshop participant*

As there is a recurring danger of wildfires in the unincorporated area, residents feel vulnerable knowing that limited broadband speeds or coverage affect their ability to be kept informed during emergencies (this is particularly relevant to mobile broadband). In cases where providers do not serve a particular area, some residents, who have the means to do so, have been able to provide a sizable one-time installation payment so that an ISP will bring service to their home.

Underserved populations need help fast

While some residents can use their means and capacity to navigate these challenges and access home internet plans, others are not able to do so. Even publicly available Wi-Fi at the nearest library branch can entail traveling several miles; a substantial burden to persons with limited mobility including elderly residents and persons with disabilities. While schools and libraries have been able to leverage funding and partnerships with community organizations to distribute devices and basic internet plans to school children and eligible low-income members of the public, stakeholders shared that, **for some households, the speeds associated with these plans are currently insufficient to facilitate adequate student participation in class**, especially in households with multiple children. We also heard of instances where households were provided hotspot devices but because the mobile cellular coverage in their area was poor, the hotspot devices did not work.

> *"We will have many more [wildfires], and our population is growing. [The] ability to communicate emergency information is critically important."*
>
> *– Public safety focus group participant*

Even if sufficient home internet speeds were more affordable and available and free public Wi-Fi was available in more community anchor institutions, residents would still have additional digital literacy barriers accessing broadband. About 17% of overall respondents to the broadband survey stated they were "**Very uncomfortable**" or "**Somewhat uncomfortable**" using devices to do **any** online tasks. This population might need additional assistance in using their devices or may need information on how to adjust their devices to

accommodate for their preferred language or visual impairment. County libraries have offered digital literacy classes to the public and have helped residents set up their first email addresses, reset passwords, and even fill out forms that format differently between mobile and full-screen devices. Community organizations, community planning and sponsor groups, and economic development councils expressed interest in partnering with the County to create or incorporate digital literacy programs that could meet similar needs.

The large, rural, mountainous geography of the east region poses challenges for broadband options

In addition to having to accommodate a significant rural population, broadband projects serving the unincorporated areas must also consider unique geographic barriers such as high-sloping, mountainous, non-developable land. This means that fiber connecting to residents' homes, a mainstay of broadband expansion plans, will likely not be a universally feasible solution (though still desired and worth pursuing). Alternative solutions to fiber-to-the-home like fixed wireless are affected by line-of-sight or capacity issues, which can prevent them from being successful. In focus groups, community leaders shared that they expect broadband solutions to include more than fiber due to these geographic realities.

Graph 2 Overall download speeds for residents of unincorporated areas

0 - 25 Mbps, 44.4%	25 - 100 Mbps, 40.2%	100+ Mbps, 15.4%

Despite these challenges, the County has been able to successfully leverage some select partnerships, assets, and resources to provide a minimum level of functionality in more remote unincorporated areas. Partners such as CENIC and HPWREN have worked with the County to create solutions to work around these geographic challenges. CENIC infrastructure provides publicly available Wi-Fi to all 33 library branches, and HPWREN's Area Situational Awareness for Public Safety Network (ASAPNet) provides emergency information. However, because these unique **solutions are limited to specific use cases**, they do not resolve the limited access to broadband in the region. County staff, in particular field inspectors, reported being slowed down or otherwise negatively impacted by insufficient connectivity in the east. Residents in remote areas frequently shared that Starlink, a low earth orbit (LEO) satellite service operated by SpaceX, was the only satellite provider that could give them sufficient quality of service; however, Starlink has a lengthy wait list for new customers and can still be relatively expensive.

Community Survey

In addition to stakeholder input, the Plan benefitted from direct feedback collected from community members through a broadband survey. The survey was leveraged to identify who does or does not have access to broadband internet and digital devices, in order to assist communities where access is lacking or service is otherwise insufficient. The survey contained questions related to experiences with internet services and usage, as well as demographics and an internet speed test. Speed tests revealed that 44% of residents who responded within the unincorporated areas experience download speeds slower than 25 Mbps, the minimum threshold considered by the NTIA to be required for regular home use. Reflecting the lack of fiber home internet options, only 4% of survey respondents shared that they are using fiber to access the internet at home, while 29% and 28% of respondents cited that they access the internet at home through a mobile data plan or cable modem, respectively. When residents can access the internet, they do so with a wide variety of devices. About 22% of residents cited that they use smart phones and laptop computers, respectively, while about 16% said they used desktop computers, tablets, and smart TVs,

> *"Wireless won't solve everything. Line of sight is needed. There's a lot of trees in the way."*
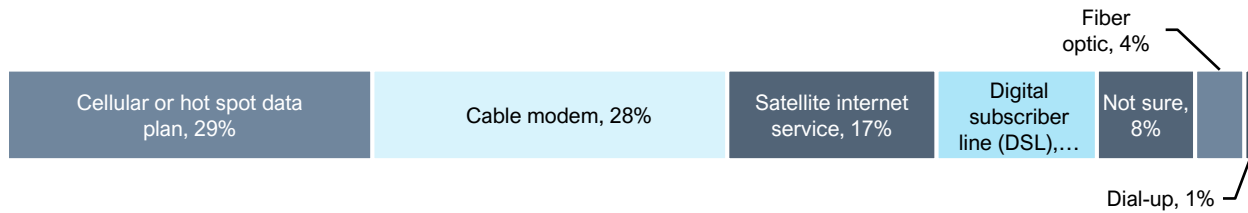> *– Wireless researcher and educator*

> *"We saw in the beginning of the pandemic [that] kids couldn't go to school. [They] didn't have technology or Internet [access.]"*
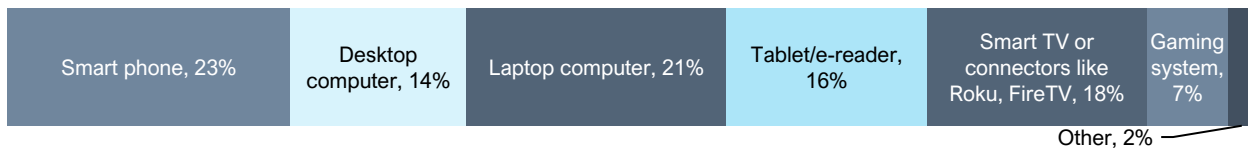> *– Board of Supervisors aide*

respectively. Some sample outputs from the survey are provided below in Graphs 3 and 4 with more complete results being found in the Appendix.

Graph 3: How UA residents access the internet at home

Fiber optic, 4%

| Cellular or hot spot data plan, 29% | Cable modem, 28% | Satellite internet service, 17% | Digital subscriber line (DSL),… | Not sure, 8% |

Dial-up, 1%

Graph 4: Devices UA residents use to access the internet

| Smart phone, 23% | Desktop computer, 14% | Laptop computer, 21% | Tablet/e-reader, 16% | Smart TV or connectors like Roku, FireTV, 18% | Gaming system, 7% |

Other, 2%

Residents were also given an opportunity at the end of the survey to write in any additional comments that they wanted to share regarding their experience with accessing broadband in the unincorporated area. This is where they shared information related to how their service is intermittent despite high costs, how they lack options for providers in their area, and how solutions that may be available for some are financially out of reach for others in the community.

> *"Every couple of months [my service] is down for days at a time, so I have to also keep a cell data service at all times as a backup."*
>
> *– Borrego Springs survey respondent*

Discussions with internet service providers (ISPs)

To see how these community inputs could be integrated into existing initiatives, we also met with internet service providers to discuss their approach to broadband in unincorporated areas. With community needs as a first priority, we were able to learn how ISPs might be incentivized to expand their service to unincorporated areas that lack infrastructure and how and when they could be considered for partnerships. ISPs we interviewed shared their approaches and barriers to expansion, including partnering with SANDAG and Caltrans, their future goals for speed and costs for customers, and how they approach cost decisions for new projects.

ISPs noted that coordinating with "dig-once" efforts when an entity has already opened a roadway are worthwhile but can be challenging from a capital planning perspective. Streamlined permitting, very much in line with efforts being led by SANDAG, was frequently mentioned, including making vertical assets and lands available for utilization, particularly for wireless technologies. Regarding coordinating with SANDAG and Caltrans, ISPs recognized that if public entities had better access to proprietary information related to location of fiber, both parties would be able to coordinate more effectively, but that ISPs would need formalized assurances that their information was protected in those channels of communication.

Many ISPs expressed interest in potentially leveraging publicly owned middle mile (e.g., Caltrans middle mile initiative), but not all ISPs were necessarily onboard. Interested ISPs recognized that publicly owned middle mile efforts could positively impact the return-on-investment (ROI) equation for private last mile expansion in less population-dense areas.

Regarding their future plans, ISPs mentioned that they are eager to learn more about the community engagement feedback resulting from this Plan, as this information will help them align to customer demand as they seek to upgrade and increase their assets and offerings, including those related to time-specific plans tailored for expanding broadband access in rural areas.

Finally, ISPs noted that the expansion of broadband grants and programs could mean a change to their existing business models, but that they have not yet adjusted their decision-making models for determining the viability of a potential project. At the end of the day, all entities are aligned in the effort to expand broadband availability and adoption in the unincorporated area, and further collaboration is welcomed.

Insights for the Plan

We analyzed broadband gaps and opportunities in the unincorporated area of the region through four lenses: legislation and policy, market structure, infrastructure, and socioeconomics. These lenses inform an understanding of two dimensions of broadband access: broadband availability and broadband adoption. Broadband availability relates to the first-level digital divide, that is, whether someone has access to internet infrastructure. Adoption relates to the second order digital divide, which pertains to whether someone has the capacity (i.e., financials, skills) to take advantage of the internet to the extent that they require (e.g., for telehealth, business, social connectivity, etc.). That is to say, the availability aspect of broadband access measures the quality and reliability of internet access in a geographic area (e.g., *is broadband available at an adequate speed necessary for work, school, etc.?),* while the adoption aspect attempts to capture how well individuals can use the internet, taking its availability as a given.

Below, we highlight key findings from analyzing the issue of broadband accessibility in the unincorporated area of the region across its availability and adoption components using the four aforementioned lenses. Insights were further distilled into a consolidated measure of the state of broadband accessibility in the unincorporated areas of the region in the Broadband Index (Index). Using data from the FCC, CPUC, census, and other public sources, the Index combines socioeconomic, market structure, and infrastructure variables to construct two composite indices that assess the level of broadband availability and adoption across census tracts. These two indices are subsequently combined to provide a unified score on overall broadband accessibility in the unincorporated area.

Legislation and policy

We researched and analyzed legislation and policies relevant to broadband infrastructure and adoption to understand how the County and stakeholders can leverage or align with existing policies and goals.

The State's telecommunication policies promote bridging the digital divide and expanding broadband networks. To help bridge the digital divide, the State has removed restrictions limiting public owned options for broadband. As such, the County has the legal authority to construct, improve, maintain, and operate broadband facilities and to provide broadband services pursuant to statutory requirements. Moreover, the County and partners can align goals with several existing and relevant plans, outlined below:

	The County's goal to increase broadband accessibility aligns with legislation and policy initiatives in both the State and region
	[CA Executive Order N-73-20 (2020)](#) directed State agencies to pursue a **minimum broadband speed goal of 100 Mbps download speed** for infrastructure invements and program implementation, which is therefore used in the 2020 Statewide Broadband Action Plan and SANDAG's broadband definition (100/20 Mbps).
	The CA Broadband Council's [2020 Statewide Broadband Action Plan](#) outlines **key actions** to facilitate digital equity across the State that the County can **leverage** for broadband expansion, including for the expansion of the middle mile and last mile.
	SANDAG's [Regional Digital Equity Strategy and Action Plan](#) lays out a **roadmap** for improved broadband access and adoption in the San Diego region, noting high-priority areas in the eastern part of the region, which the County can **align** with for coordinated broadband expansion partnerships and efforts.
	The County's [Strategic Plan](#) identifies **County priorities**, which include **economic sustainability, economic opportunity, and health**. The Comprehensive Broadband Plan **advances** County priorities, including enabling remote learning, work, and telehealth.
	In alignment with the [Climate Action Plan](#), the Comprehensive Broadband Plan **offsets carbon emissions** by facilitating remote connectivity and services (e.g., remote learning, remote work, and telehealth).
	[The Regional Decarbonization Framework](#) provides technical and policy pathways to decarbonization in the medium-term to inform near-term policymaking in local governments. Broadband expansion supports the framework's goal of net zero carbon emissions for the San Diego region by 2045 by facilitating a reduction in Vehicle Miles Traveled.
	The County's [Operational Plan](#), like the Comprehensive Broadband Plan, is focused on helping **improve the lives** of all San Diegans. In 2021, the County allocated $10M of its ARPA allocation to broadband planning and infrastructure projects.

Market structure

Our analysis of the legislative and policy context showed how public entities and regulatory authorities impacted broadband availability and adoption. Another key factor to understand was what private broadband market conditions were like for the region. To analyze market structure, we broke down the existing regional broadband market along the following dimensions:

Who provides broadband services in the unincorporated area of the region? Which among them are major players?

What types of speeds are providers able to offer and at what prices? What is the extent of their service coverage?

How do providers connect their customers to high-speed internet? What types of transmission technologies do they have access to?

A high-level response to these questions is that the broadband market in the unincorporated area is **a blend of national and regional ISPs, public-private partnerships (P3s) and third-party initiatives** that provide unequal service levels across different areas. These service gaps are summarized visually in Figure 2 (located in the Appendix),[14] which shows unserved (<25 Mbps) areas in the unincorporated area across various levels of geographic granularity.[15] Five areas stand out:

> **Note on broadband availability-related data and insights from engagement activities**
>
> No broadband availability dataset is perfect. The FCC is working to improve its data maps on a more granular level which will impact Federal grant allocations, but that updated data is not expected until late 2022 with revisions occurring into 2023. We therefore highlight data across multiple sources to determine areas of consensus. Some communities (particularly Fallbrook) stressed challenges related to broadband infrastructure availability which is partially captured in the data but not to the extent described in the public workshop. Attendees at the Fallbrook workshop shared that they felt there were few available and reliable options, particularly depending on where they lived.

1. The Palomar Mountain range near Warner Springs and Los Coyotes Reservation.

2. Mexican border region along SR 94, encompassing of communities such as Potrero, Jacumba, Jamul, Dulzura, Tecate, Boulevard, Campo.

3. Desert communities in the east, like Borrego Springs, Ocotillo Wells, Ranchita, Banner, Shelter Valley.

4. Northern communities, including, but not limited to, Fallbrook, Rainbow, Bonsall, Valley Center.

5. East suburban communities such as Lakeside, La Presa, Ramona, and Spring Valley.

Next, we share more detailed findings regarding the who, what and how of the broadband market in San Diego's unincorporated area. Starting with key players, for fixed, non-satellite, consumer broadband, AT&T, Cox, and T-Mobile have the largest reported geographic coverage in the unincorporated areas and can be thought of as the region's major national ISPs. Other ISPs relevant for the unincorporated areas include

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[14] See Map Figure in Appendix; sources include BroadbandNow, CPUC, FCC 477, Microsoft Airband, Ookla, and M-Lab. Darker areas indicate spots where multiple sources of data have indicated that service levels do not satisfy the criteria for broadband.
[15] Data sources used to construct map use different metrics to define unserved geographies: California Public Utilities Commission (CPUC)->maximum advertised download speed in census block; BroadbandNow-> average MLab test download speed aggregated to zip code; Microsoft Airband-> broadband usage population less than 50% by zip code; M-lab ->median download speed, aggregated by client server location; Ookla -> median download speed by tile

regional providers like San Diego Broadband and Valley Center Wireless. It is worth stating that even among these major providers, wired service in unincorporated areas is quite limited. Providers claim to offer, or be able to offer, wired connections in fewer than half of census blocks according to FCC Form 477 data (referred to as "FCC 477") which highlight ISP advertised speeds, coverage, and technology by census block. It is known that FCC 477 overstates infrastructure availability because if a single location within the census block can be served, the entire census block is considered served; however, the dataset still provides a useful baseline understanding. The FCC is working to provide more granular and accurate data by November 2022.

"People [along the border] thought their Internet was good, cost was good, [but they were] paying twice as much with less coverage…"

– Regional broadband researcher

The table below summarizes key features of the unincorporated areas' top ISPs, as ranked by the percentage of unincorporated area census blocks in which they offer/are able to offer service. In this table, the top two spots go to satellite providers ViaSat and HughesNet. Their prevalence in the unincorporated area is important to note–our analysis of census data on computer and internet use found that the share of households using satellite in the unincorporated areas is 22x higher than it is in incorporated areas. However, the service quality satellite connections are able to provide will invariably be worse than other forms of fixed broadband due to inherent limitations in how traditional geostationary (GEO) satellite systems transmit information (for instance, their long distance from the Earth leads to high latency, which manifests itself as a slow connection for end users). As such, despite satellite providers having broad coverage, the ultimate priority should be to find ways to get unincorporated communities off traditional GEO satellite and onto faster, more reliable connections, whether that takes the form of fixed wireless, fiber, or other emerging technologies such as low Earth orbit (LEO) satellite internet (i.e., Starlink). Note: LEO satellite internet differs from traditional satellite technology in that the satellites providing service are closer to the Earth and therefore can reduce lag time between communications. However, the LEO satellite technology is still relatively new and not fully tested for a long duration of time.

Table 4: Top ISPs in the unincorporated area by census block coverage[16]

Provider name [1]	% Block coverage (UA)	% Block coverage (CTY)	Maximum advertised download speed	Maximum advertised upload speed	Technology (See pages 6-7 for a full breakdown of technology types)
ViaSat, Inc.	100%	100%	100 Mbps	3 Mbps	Satellite
HughesNet	98%	98%	25 Mbps	3 Mbps	Satellite
San Diego Broadband	72%	33%	100 Mbps	30 Mbps	Satellite or terrestrial fixed wireless
AT&T	46%	68%	1 Gbps	1 Gbps	Satellite or terrestrial fixed wireless, copper (DSL), Fiber
Cox	26%	45%	1 Gbps	1 Gbps	Cable
T-Mobile	20%	26%	25 Mbps	3 Mbps	Satellite or terrestrial fixed wireless
Valley Center Wireless	16%	7%	50 Mbps	50 Mbps	Satellite or terrestrial fixed wireless

On speeds and pricing, providers offer a variety of packages but access to affordable, quality, broadband may still be out of reach from some unincorporated area residents, particularly among low-income residents

[16] FCC 477 data

in rural areas. In the **eastern part of the region** for example, residents have fewer provider and technology options to choose from (i.e., only satellite), and the lack of competition/consumer choice **may make them more susceptible to paying more for worse internet.** Aggregated internet plan data on BroadbandNow found satellite internet plans in the unincorporated areas can cost upwards of $160/month,[17] which presents a disproportionate cost burden for low-income communities. Indeed, across the entire region, satellite-based internet plans that advertise being able to provide at least 100/20 speeds—in line with the California standard for broadband—cost the most on average of any plan option contained in BroadbandNow's internet plan data. These plans cost even more than cable and fiber plans that are generally understood to be more reliable and provide faster speeds.

Table 5: BroadbandNow internet plan price data for plans that advertise being able to provide greater than or equal to 100/20 speeds for addresses across San Diego region

Plan Connection Type	Count of Internet Only Plans	Average Cost Per Month
Cable	887	$91
Fiber	1064	$90
Fixed Wireless	639	$56
IPBB[18]	605	$55
Satellite	612	$150
All	**3807**	**$89**

As for transmission technologies offered by ISPs serving the unincorporated area, FCC 477 data indicates that that **fiber coverage** is generally **limited** to incorporated cities in the region and the unincorporated areas surrounding them. Wired transmission options tend to decrease moving east across the San Diego region, with large sections of the eastern part of the region only having satellite and/or fixed wireless options to choose from. Figure 3 in the Appendix depicts transmission technologies available by census block according to FCC 477 data.

The lack of reliable fixed broadband connections impacts consumer behavior: many unincorporated area residents depend more on cellular data plans for home internet access than they would if other methods were more reliable. Survey respondents in unincorporated areas were just as likely to report that they depend on their cellular or hot spot data plan to access the internet at home (29% of respondents) as they were to rely on cable modems (28% of respondents, survey sample size of 584 respondents for both percentages).

These survey results demonstrate that reliable cellular data coverage is just as important for unincorporated area residents to have as fixed broadband. With respect to cellular data, most of the unincorporated areas have coverage, with the most noticeable service gaps found northeast of the Los Coyotes reservation in the east. Despite the considerable level of coverage availability, minimum advertised speeds for all providers offering service (i.e., AT&T, Verizon, and T-Mobile) are low–far from meeting even 25/3 Mbps definitions for broadband, much less new State goals of 100/20Mbps. The proliferation of 5G and improving mobile connectivity is important. 5G is often considered as a potential enabler of several impactful technologies, including autonomous vehicles, telehealth, and distance learning, and is also an expanding force into the fixed broadband market. However, expanding 5G and mobile connectivity in general requires fiber backhaul within each of the unincorporated area communities. Backhaul connects mobile connectivity equipment to

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[17] BroadbandNow 2022, <https://broadbandnow.com/>. <https://broadbandnow.com/internet/broadband-pricing-changes>
[18] Internet Protocol Broadband- AT&T DSL based service offerings per the following source

the core network where data can be transmitted. Mobile ISPs spoken to appeared willing to work to streamline permitting, collaborate to prioritize buildout, and ultimately improve service.

Infrastructure

Taking stock of the infrastructure as it pertains to telecommunications assets is perhaps one of the more intuitive lenses through which to assess the state of broadband accessibility in the region. Collecting data on and mapping existing, planned, and potential assets provides a knowledge base for understanding the physical infrastructure available for broadband use in the unincorporated areas. Physical assets were categorized into four major classes: wired infrastructure, wireless infrastructure, network infrastructure, and potential infrastructure:

- **Wired infrastructure**: Existing and proposed publicly owned, and third-party owned fiber and cable routes (middle mile and last mile).

- **Wireless infrastructure**: Existing and proposed wireless communication infrastructure (e.g., cell towers, small cell installations, satellite technologies, public Wi-Fi access points, etc.).

- **Network infrastructure**: Publicly owned, or third-party owned assets that make up broadband networks (e.g., internet exchange points, data centers, etc.).

- **Potential infrastructure**: Assets not currently utilized for broadband but could be leveraged for this purpose in the future (e.g., towers, public buildings, streetlights).

The information collected in this section helps understand where broadband infrastructure exists across the region and will inform the specific projects as an output of the pillars and strategies recommended in the Plan. Broadband asset data collected from internal County stakeholders is also aggregated and synthesized in this section. A summary view of current and potential broadband infrastructure– wired and wireless–is shown in Figure 4 in the Appendix.[19] Findings from analysis of existing and planned broadband infrastructure are discussed in greater detail below.

> *"How do you make up for the missing infrastructure? For us, if there's more opportunity for backhaul options, there's more opportunities to provide."*
>
> *– ISP representative*

Wired infrastructure key takeaways

- Fiber assets are concentrated in incorporated areas: only 31% of census blocks that touch fiber in the region are located within unincorporated areas.

- In terms of County-owned fiber, some existing lines have been laid in population centers across some of the region's northern and eastern areas (Fallbrook, Ramona, Lakeside, Bonita). Lines are maintained mostly by the County's Department of Public Works (DPW) and used for traffic management. The County also leases fiber from AT&T and owns some fiber along State Route 67.

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[19] Figure data sources include County of San Diego Department of Public Works, California Department of Technology, SANDAG/SanGIS and CPUC

- State proposed middle mile network looks to connect rural communities and tribal reservations. Partnerships with organizations like SDG&E, CENIC, and Anza Electric can be considered to expand fiber into more rural areas.

- Incorporated areas have moderate fiber networks to expand on, with lines running north and east that could be used to reach key rural locations along Interstate 8.

- Fiber infrastructure is sparse in the unincorporated eastern areas covered by Districts 2 and 5 (with exception of Rail America network near southern border).

Wireless infrastructure key takeaways

- Areas such as the eastern part of the region and others that do not have wired infrastructure (like fiber and cable) rely heavily on highly localized fixed wireless providers.

- Cell towers are sparsely located across the eastern portion of the unincorporated area.

- Microwave service towers are distributed fairly evenly across the unincorporated area and can be used to provide last-mile services but are impacted by distance, line-of-sight to the end destination, and weather.

- Transmitters for Citizens Broadband Radio Service (CBRS) and Education Broadband Service (EBS) are equipment for wireless technologies that may also have last-mile use cases. This infrastructure is relatively sparse and predominantly located in incorporated areas.

Network infrastructure key takeaways

Network infrastructure is predominantly found in incorporated areas.

Internet exchange points: Data obtained from FiberLocator reports only one internet exchange point in San Diego region, located along the coast near Interstate 5 in the city of San Diego. Its location approximates the San Diego Network Access Point (SD-NAP), a neutral exchange facility maintained by the Enterprise Network Service team at UC San Diego's San Diego Supercomputer Center that provides connections to ISPs, CENIC, and other organizations.[20] Internet exchange points provide physical locations where networks from various entities can exchange and transmit data between one another.

Data centers: Data centers are clustered in the city of San Diego. Additional locations are more sparsely distributed across other municipalities (e.g., Carlsbad, Poway). FiberLocator does not identify any data centers based in the unincorporated area. Data centers host the data that effectively make up the internet. The closer a data center is to the network the less latency or lag time there is.

Potential infrastructure key takeaways

Infrastructure such as County-maintained road segments, building parcels, parks, transit stops, rail, transit routes, road flashers, road signal devices, road streetlights, and road traffic signals were inventoried to better understand how future broadband development projects can integrate these existing assets to better provide service. The spatial distribution of potential infrastructure assets is visualized in Figure 5 in the Appendix.

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[20] "Enterprise Networking." San Diego Supercomputer Center. https://www.sdsc.edu/services/ci/enterprise_networking.html

Community anchor institutions: Residents in the unincorporated areas identified that libraries and schools are critical points of connectivity for residents that, otherwise, would not have access to adequate broadband service in unincorporated areas.

County-maintained roads: DPW maintains around 2,000 miles of roads in the unincorporated area of San Diego. The County and partners can coordinate Dig Once opportunities with road capital improvement project (CIP) planning (particularly with SDG&E and ISPs). Existing initiatives like DPW's Multi-year Road Resurfacing Program look to resurface 100-150 miles of roads each year, which also present opportunities to lay wired broadband assets (particularly conduit and potentially dark fiber) and any supporting infrastructure it may require.[21] Dark fiber is fiber that has been laid but is not currently being used or "lit."

Street furniture: Street furniture such as streetlights, poles, kiosks, bus shelters, and traffic signals are more densely available in urban/suburban areas around the incorporated cities. Where they do exist in the unincorporated area, assets can be evaluated to determine whether they would be good candidates for mounting wireless/network infrastructure.

Public buildings and spaces: Parks, public spaces, government owned buildings also can present opportunities to augment where and how broadband infrastructure can be installed (particularly public access points and wireless and mobile infrastructure), and may offer lower barriers to infrastructure development (i.e., minimizing instances of navigating the rules and regulation around building on private property).[22]

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[21] "Featured CIP Capital Improvement Projects." Department of Public Works.
https://www.sandiegocounty.gov/content/sdc/dpw/engineering/Top_Capital_Improvement_Projects.html
[22] Figure data sources include SANDAG/SanGIS and CPUC

Socioeconomic factors

Another critical component of capturing the state of broadband access in San Diego's unincorporated area depends on developing a strong understanding of the socioeconomic context. Socioeconomic variables that impact broadband availability and adoption were analyzed based on desktop research (e.g., reviewing other government broadband plans and academic research).

Table 6: Population and households without broadband access (2020)[23, 24]

	Unincorporated area	Total region
Population	506K (2nd most populous municipality in the region)	3.3M (2nd most populous county in California, 5th in the US)
Households without broadband, such as cable, fiber or DSL	37K (23%)	221K (20%) (California: 3.2M (25%))

The table above highlights some summary statistics of the unincorporated area and how it compares to the overall region. Factors that have been found to associate with broadband access based on studies using survey and census data include population density, income, education, age, and race. Emerging factors in policy and planning research as determinants for access include employment status, English language proficiency, and disability status. High-level insights around the dynamic between socioeconomics and broadband accessibility include the following:

- **Several demographic characteristics that can negatively impact adoption coincide within the same census tracts, aligning with research on overarching socioeconomic disparities** between communities (e.g., areas where poverty levels increased overlap with areas of lower educational attainment and higher percentages of non-white populations).

- **Effective investment in broadband service improvements will need a tailored approach** depending on socioeconomic barriers and trends in different geographic areas. For example, an area with higher poverty and a higher percentage of households with limited English proficiency may need multilingual digital literacy programs or assistance with benefit applications. Alternatively, an area with a higher disabled population may have needs that relate more to mobility and access to ADA compliant resources and devices.

- **The unincorporated areas have a significant rural population overall, but areas of high population density are primarily based in urban census tracts.** This can have implications for funding eligibility, as certain grants (particularly rural development grants) have prerequisites for urban or rural status.

Further findings from analyzing broadband accessibility through the socioeconomic lens include the following:

- **Digital device ownership, income, education,** and **English language use** showed strong linear relationships with **adoption** and can serve as indicators of **broadband usage**, even in areas where ISPs appear to provide adequate service.

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[23] SANDAG Demographic and Socioeconomic Estimates, 2020
[24] U.S. census American Community Survey 2020 5-Year Summary Estimates

- Tracts reporting the **lowest subscription rates** are clustered in the south (see Figure 6 in Appendix for geographical visualization). Relatedly, unincorporated tracts with relatively **higher levels of poverty** are largely located in southern areas close to the incorporated area and border tracts, showing a relationship between income and adoption.

- On average, tracts in the unincorporated areas show **comparable broadband adoption levels** to incorporated areas, as measured by the Census Bureau's American Community Survey (ACS) **household internet subscription** rate variable (~91% for both).

- In the unincorporated areas, tracts around **rural population centers** such as Julian, Pala, and Boulevard reported **internet subscription rates below** region average.

- In the unincorporated area, tracts with **<80% subscription rates often intersect with tribal reservations** (e.g., Pala in the north, Campo in the east near the border).

We also investigated survey and speed test data through the lens of socioeconomics (see table below) and found that results support existing body of findings that age, income, and race can impact quality of access to internet service.

- **Income matters for having access to quality speeds:** Survey respondents making at least $100,000 a year recorded weighted average test speeds that were close to CA standard for broadband at about 93 Mbps down, 38 Mbps up (n =64). For respondents making less than $100,000 a year, weighted average test speeds were slower at around 58 Mbps down, 20 Mbps up. This aligns with sentiment that broadband speeds are available for the region's residents- if they can afford it.

  Respondents that speak languages other than English**, as well as respondents over the age of 65,** show **slightly slower connectivity** relative to sample average, as shown in Table 7 below.

Table 7: Speed test results from survey responses

Survey responses	Count of responses	Average download (Mbps)	Average upload (Mbps)
Language other than English	32	66	16
65+ years old	61	58	27
Sample average	174	72	33

Broadband Index: Quantifying broadband infrastructure availability and adoption

While analyzing the individual dimensions that contribute to broadband availability in the unincorporated area revealed valuable insights unique to these areas, there was also a desire to develop a unified measure of the state of broadband access in the unincorporated area. To achieve this, the project team constructed the Broadband Index (the Index). Using socioeconomic, market structure, and infrastructure framework variables, the team built two composite indices that assessed the level of **broadband availability** and **adoption** across all census tracts in the region. These indices are subsequently combined to develop a unified measure of **broadband access** for each census tract.[25] Census tracts were then classified into different "typologies" (e.g., high availability, low adoption) based on their index scores. When paired with other analyses, the resulting census tract typologies generated by the Broadband Index helped enable tailored, geographic-specific broadband solutions for unincorporated areas.

Table 8: Geospatial data sources

Geospatial data	Source
Base layers with geographical features, streets, management districts and buildings	County-provided data
Consumer broadband access available at tract level	Public—FCC 477, CPUC Broadband Mapping Program data
Maximum advertised speed available at tract level	Public— FCC 477, CPUC Broadband Mapping Program data
Real speeds, various levels of geographic granularity	Public—Ookla Speedtest, M-Lab, BroadbandNow, Microsoft Airband
Access to fiber at tract level	Public— FCC 477, CPUC Broadband Mapping Program data
Internet subscription prices	Public—BroadbandNow
Demographics (income, age, household size, ethnicity)	Public—US Census
Community anchor institutions (e.g., schools, libraries)	Public—California Public Utilities Commission (CPUC)
Relevant street furniture (e.g., streetlights, telephone poles)	County-provided data
Location(s) of conduit and/or fiber	County-provided data
Cell towers and small cell locations	County-provided data

Based on the Index, we find that tracts with the lowest levels of broadband adoption and/or availability span the unincorporated area. In Figure 7 below, a geographic visualization of the Broadband Index is presented. The visualization enables quick assessments of severity and type of need across different areas in the county. Blue areas are indicative of adoption barriers, red areas of availability challenges (separate visualizations that show only the availability/adoption indices can be found in Appendix map Figures 7a and 7b). Purple areas indicate that a census tract faces a mix of both types of need. The shade of each tract color corresponds to current levels of broadband access- darker represents lower access. For instance, the maroon region surrounding the unincorporated community of Descanso indicates that the census tract there has been classified as having low availability, medium adoption-type broadband access. From the visualization, we observe that census tracts with low access in the unincorporated areas of the county include communities such as Fallbrook, Spring Valley, Borrego Springs, Potrero, and Jacumba. These places, as well as smaller unincorporated communities surrounding them, should be prioritized. Next, we summarize additional takeaways derived from the Index.

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[25] A detailed description of the methodology used to construct the Broadband Index can be found in the Supporting research and analysis section of the Appendix

Figure 7: Broadband access, as measured through adoption and infrastructure availability by census tract in the unincorporated area
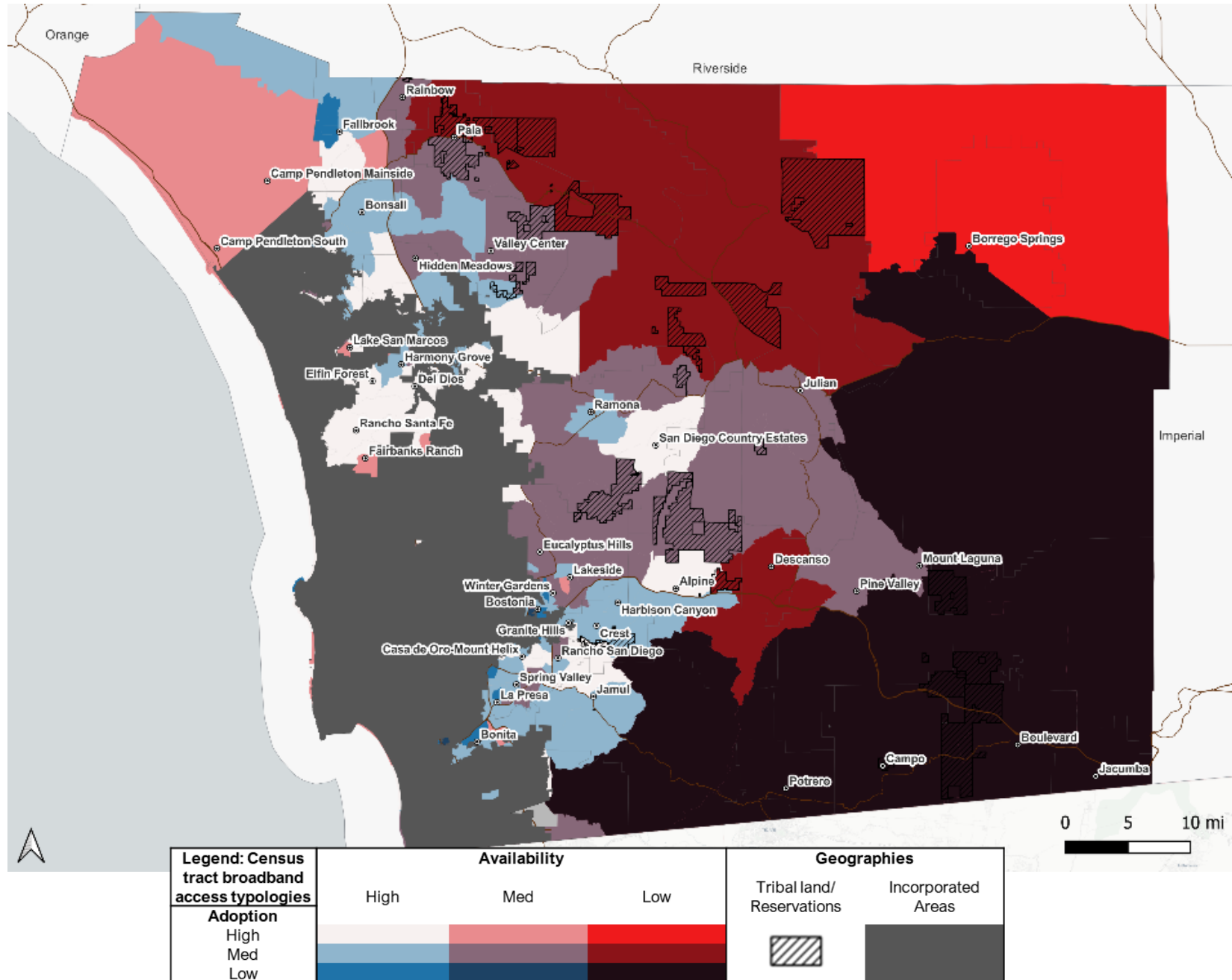
Spatial distribution of broadband access typologies. Tract typologies generated by the Index were generally consistent with expectation on the level of broadband availability and adoption in each area. For example, census tracts in the east were more readily classified as areas with low broadband availability. This aligns with infrastructure data provided by SANDAG on the presence of fiber within a given census block in San Diego region, [26] which indicated that existing fiber largely runs through the incorporated area. Figure 8 in the Appendix further depicts this concentration of fiber in unincorporated blocks bordering incorporated areas.[27]

Only 1% of all census blocks with fiber presence in the region lay within tracts classified as having low broadband availability (Graph 5).

Graph 5: Percent of census blocks with fiber in tract with given broadband availability level
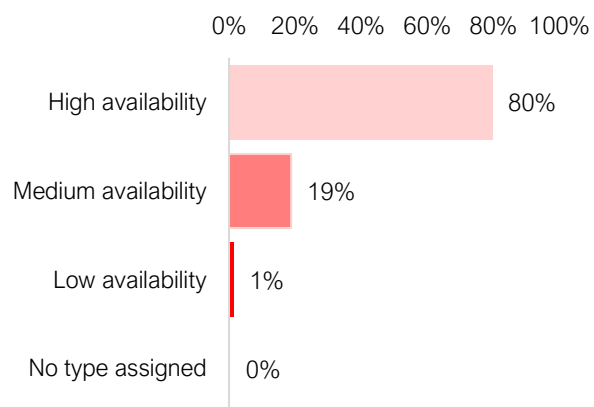
Outcomes similarly track against expectations with respect to how tracts were classified in the adoption index. Lower-income areas, as proxied by HUD Qualified Census Tract (QCT)[28] designations, were more likely assigned a low adoption typology. This trend is visualized in Figure 9 in the Appendix.[29] A census tract qualifies as a QCT if 50% of households with incomes below 60% of the Area Median Gross Income (AMGI) or have a poverty rate of 25% or more. In fact, 84% of QCTs were classified as having low broadband adoption. This is consistent with existing research on common barriers to broadband adoption in areas where high speed internet service is available, as well as survey data collected through project community engagement efforts that show that nearly 18% of survey takers who indicated that they do not have internet access at home because plans were too expensive.[30] [31]

One difference between the geographic manifestation of broadband availability and adoption in unincorporated areas is the weaker link between low adoption and the presence/absence of infrastructure. Whereas the classification of tracts as low availability generally increases moving away from the incorporated urban core, the distribution of tracts classified as low adoption follows no clear geographic pattern. While it is true that the Index contains tracts that have been classified as having low availability and adoption (e.g., east region tracts encompassing the border towns of Potrero, Campo, Boulevard, and Jacumba), there are also instances where an area ostensibly has reasonable access to infrastructure, as its availability type would suggest, but is still classified as having low adoption. We can find examples of this in census tracts around the

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[26] Note: census blocks highlighted on this map indicate that fiber passes through some portion of the block. Presence of fiber may be indicative of middle mile fiber or the segment of telecom networks that link the backbone to the local network. It does not necessarily indicate that fiber can be accessed by block residents.

[27] In Figure 8, Red shades denote broadband availability levels in a tract, as assessed by the Index. Darker shades of red indicate lower availability. Areas shaded blue represent tracts with fiber presence. Public fiber routes for traffic management and regional transportation are also depicted in yellow and pink lines, respectively.

[28] Low-Income Housing Tax Credit Qualified Census Tracts must have 50 percent of households with incomes below 60 percent of the Area Median Gross Income (AMGI) or have a poverty rate of 25 percent or more: https://www.huduser.gov/portal/datasets/qct.html

[29] Blue shades denote broadband adoption levels in a tract, as assessed by the Index. Darker shades of blue indicate lower adoption. Tracts outlined in red indicate that it is a QCT.

[30] https://www.pewresearch.org/Internet/2015/12/21/3-barriers-to-broadband-adoption-cost-is-now-a-substantial-challenge-for-many-non-users/
[31] https://www.educationsuperhighway.org/wp-content/uploads/Broadband-Adoption-Center-Whitepaper.pdf

most underserved communities (e.g., La Presa, Spring Valley) that are closer to existing fiber infrastructure than many other neighborhoods, but still struggle to demonstrate higher broadband usage.

Population characteristics of low access tracts in unincorporated area. About 18 census tracts—or about 15% of tracts in the unincorporated area—have an index typology of 'low' in availability, adoption, or both. About 80,000 residents live across these 18 tracts.[32] Two-thirds of the unincorporated area's population reside in tracts classified as having only moderate levels of access.[33]

Tracts classified as low access in the Index tend to be more rural and have populations with more diverse language speakers, lower educational attainment, more households in poverty than the average tract in the region.[34] The table below provides additional detail on the socioeconomic, market structure, and infrastructure variable attributes of census tracts of differing broadband access levels.

Table 9: Characteristics of tracts in the region by broadband access type

Attributes[35]	Low access	Medium access	High access	All tract average
Socioeconomic variables				
Percent households with limited English	58%	34%	23%	36%
Percent population age 25 or more with bachelor's degree or higher	12%	23%	35%	24%
Percent population in poverty	15%	6%	3%	7%
Ruralness, in terms of distance in miles to closest urban area centroid	17	13	10	13
Market structure variables[36]				
Percent population with access to 100/20 Mbps	93%	96%	99%	96%
Percent population with access to fiber	18%	20%	30%	23%
Percent population with access to more than 2 providers	3%	6%	11%	7%
Infrastructure variables				
Housing density (units/sq mile)	1,532	1,674	1,753	1,653

Combining analyses, informing gaps and opportunities. The Broadband Index grounds an analytical approach to prioritizing census tracts based on their infrastructure availability and adoption needs (see Appendix for full list of census tracts ranked by broadband availability/adoption need).

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[32] Analysis of census ACS 2020 5-year data. See supporting research and analysis section of the Appendix for source table and additional details

[33] Note on Broadband Index typology level classifications: The 'magnitude' of Index typologies is a comparative measure that ranks index scores received by each census tract in San Diego County relative to one another. Thus, there may be some instances in which the spread in the distribution of a variable used to calculate the Broadband Index is small but are still discretized into typology levels

[34] Access accounts for both availability and adoption. Access levels are determined based on the combined adoption and availability scores calculated for each sub-index. To determine access level (low, medium, high), Index scores were categorized into bins using one or more index scores received by the tract resulted in the attribution of the tract to the lowest bin in a Jenks natural break optimization of three levels

[35] Sources include census ACS 2020 5-year estimates, CPUC Broadband mapping program

[36] Analysis of CPUC Broadband Mapping Program provider-reported consumer fixed broadband coverage data. This data likely overestimates speeds and coverage offered to residents. Fixed providers file lists of census blocks in which they can or do offer service to at least one location, so may not accurately reflect what service provider and speed options are available

Another way of leveraging the outputs of the Broadband Index was to combine it with the results of other analyses to identify additional insights that could be leveraged in the development of the Plan. Figure 10 in the map figure appendix draws upon outputs from socioeconomic, infrastructural and Broadband Index tract classifications and combines them on a single visualization to show the type of broadband access that should be addressed (availability and/or adoption), the local socioeconomic context, and nearby fiber assets, existing and planned for a given community in the unincorporated areas. These attributes are displayed across three layers.

In the first layer, a bubble chart shows the type and magnitude of broadband need in a given unincorporated area census tract. The type of need for a given tract is based on the outputs of the Broadband Index and represented by the color of the bubble. There are nine possible typologies in total—ranging from high availability, high adoption type census tracts (colored light purple) that have low overall priority for broadband intervention activities to low availability, low adoption type census tracts (colored dark purple) that have high overall priority for broadband intervention activities. Between these two typology combinations are seven other combinations of availability/adoption typologies that each correspond to a color based on the red-blue bivariate scale used to capture the three levels (low, medium, high) for each sub-index type. In both cases, darker colors indicate lower levels of broadband adoption (blue) and/or availability (red). To approximate the magnitude of need, the size of each bubble in this layer was defined according to census ACS data on the number of households in a given tract without a wired broadband internet plan subscription. These values range between 200 – 1,000 households, with larger bubbles indicating that a greater number of households in that census tract are estimated to not have wired broadband internet subscriptions.

We can observe that the following areas in the region exhibit characteristics that are indicative of greater broadband need:

- In the eastern portion of the region, census tracts close to the Mexican border tend to be classified as having low broadband availability and adoption by the Index, in addition to having larger numbers of households without wired broadband subscriptions relative to other tracts that intersect with the unincorporated areas. These tracts encompass unincorporated communities such as **Potrero, Campo, Boulevard, and Jacumba**
- Across eastern census tracts more broadly, most of the unincorporated area's census tracts that are classified as low availability are located here, reflecting the distribution of broadband infrastructure, particularly fiber, that has been found to be clustered in and around the incorporated areas. These low availability tracts encompass and/or border unincorporated communities such as **Borrego Springs, Descanso, and Julian**
- In the north around **Fallbrook**, as well as the suburban east around **Spring Valley and La Presa**, census ACS data suggests that relatively higher numbers of households in census tracts do not have wired broadband subscriptions, similar to the outcomes noted for census tracts in the eastern part of the region. However, the low/medium adoption typologies assigned to these census tracts through the Broadband Index suggests that the type of broadband accessibility barrier is related to adoption issues rather than availability concerns

Overlayed on the first layer in this visualization, which captures the type and magnitude of need in a given unincorporated area census tract, is an infrastructure asset layer than shows existing and planned fiber routes/footprints in the region. Using data sourced from the County, the State of California, and SANDAG, this layer shows how existing fiber infrastructure primarily covers incorporated areas in the region, whereas planned fiber infrastructure seeks to extend coverage, at the middle mile network level, out into the eastern portion of the region along key road corridors such as Interstate 8, as well as State Roads 78, 79 and 94. When considered in conjunction with the bubble map (which indicates type and magnitude of need across the unincorporated area), the planned fiber asset locations help elucidate which communities have both large needs and are expected to receive infrastructure development investment support from the State, which is important information for regional stakeholders to account for as they look to plan/prioritize last mile projects.

The last layer depicted in Figure 10 contains geography definitions of QCTs and tribal reservation areas in the region. The former geography can be used in combination with the Broadband Index bubble layer to emphasize areas that may require concerted efforts from stakeholders to increase connectivity. Depicting the

geographic boundaries of tribal reservations shows how they are disproportionally impacted by the challenges of availability and adoption of broadband. When considered in the context of the planned fiber assets that are also mapped, it reminds stakeholders that some projects to expand broadband infrastructure in the region are expected to cross reservation land and thus benefit from coordination and collaboration with tribal entities in design and implementation.

Finally, a summarization of the outputs of the Index, broken down by supervisorial district, also accompanies map Figure 10 in the table below.

Table 10: Summarized outputs of Broadband Index for unincorporated area (UA) households (HH) by supervisorial district

Adoption	Availability	UA HH D1	UA HH D2	UA HH D3	UA HH D4	UA HH D5	UA Total HH
Low	Low	282	3,899	0	0	558	4,739
Low	Med	438	1,245	0	4	0	1,687
Low	High	3,120	2,774	0	1,358	7,331	14,583
Med	Low	0	1,069	0	0	2,012	3,081
Med	Med	1,852	18,814	36	5,559	9,733	35,994
Med	High	11,500	22,812	695	14,056	15,089	64,151
High	Low	0	0	0	0	578	578
High	Med	1,065	1,649	892	0	9,294	12,900
High	High	546	16,268	5,401	4,509	12,227	38,951
		18,802	**68,530**	**7,024**	**25,487**	**56,823**	**176,665**

What others are doing in this space

Where the assessment of the current state helped reveal gaps and opportunities within the unincorporated area, leading practices from different local governments across the country can offer ideas and potential initiatives to help equitably address them. Although most local governments recognize the goal of equitable broadband connectivity for their communities, their strategies and approaches to facilitating that goal have varying degrees of sophistication. For this analysis, ten peer governments were chosen based on a comparison of the twenty most populous US counties across multiple metrics, including population of the biggest city within the area. These governments were evaluated on their approach to broadband, particularly in terms of their legislation, goals, programs, partnerships, and investments. Based on this benchmarking analysis, four leading practices for successful broadband expansion were identified: infrastructure investments, pro-broadband policy, use of digital navigators and approach digital equity holistically, and strong partnerships and coalition. These four leading practices were then used to identify the relevant case studies below.

Leading practices of comparable local governments

Bexar County Dallas, TX	**County of San Diego** San Diego, CA
City of New York New York, NY	**Dallas County** Dallas, TX
City of Philadelphia Philadelphia, PA	**Harris County** Houston, TX
Cook County Chicago, IL	**Maricopa County** Phoenix, AZ
County of Los Angeles Los Angeles, CA	**Santa Clara County** San Jose, CA
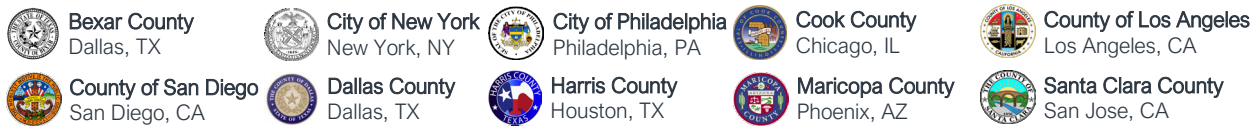
Leading practice: infrastructure investments

Investments in infrastructure or allowing or coordinating use of **existing assets** by private broadband operators

Private investment in broadband infrastructure is highly influenced by return on investment (ROI), which compares revenue generated to capital invested. Government investment can **increase infrastructure buildouts in low-ROI areas**, *either through solely public action or through public-private partnerships.*

The City of Philadelphia's Institutional Network (I-NET) Agreement with Comcast offers the opportunity to **replace and upgrade critical network infrastructure**, decreasing costs and improving speed and capacity. Comcast also provides **courtesy internet accounts** for city recreation centers without service.[37]

Dallas County partnered with CircleGx, Zyter, and Qualcomm to build and offer a **fixed wireless broadband network** called "Planted Circle" in economically underserved communities, with 80 LTE Citizens Broadband Radio Service (CBRS) towers planned for rolling activation by late 2023.[38]

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[37] "City, Comcast Business, Announce Agreement for Institutional Network: Office of the Mayor: Press Release." *City of Philadelphia*, 12 Dec. 2016, https://www.phila.gov/press-releases/mayor/city-comcast-business-announce-agreement-for-institutional-network/.
[38] "CircleGx, Zyter and Qualcomm Collaborate to Drive Digital Equity with Broadband Infrastructure in Dallas County Communities: Qualcomm." *Qualcomm*, 24 Oct. 2021, https://www.qualcomm.com/news/releases/2021/10/circlegx-zyter-and-qualcomm-collaborate-drive-digital-equity-broadband#:~:text=CircleGx%2C%20Zyter%20and%20Qualcomm%20Technologies,emergency%20services%2C%20businesses%20and%20more.

	Leading practice: pro-broadband policy

Legislation and policy that enables and encourages broadband expansion and competition in the marketplace

*Investment in broadband infrastructure can also be influenced by factors such as **availability of the existing network, regional competition between internet service providers,** and **ease-of-access construction and permit issuance** (e.g., Dig Once and lease agreements) – all of which can be streamlined and simplified through purposeful legislation and policy.*

The City of Loma Linda's Loma Linda Connected Community Program (LLCCP) includes the rollout of a city-wide fiber optic network, **City-administered broadband-service management** (much like traditional utilities like water and sewer), as well as **pro-broadband updates to building regulations** to ensure that development will be designed to meet the needs of future communication technologies.[39]

The City of South San Francisco's Public Works Department has implemented a **Dig Once policy** and an **Open Trench Notification policy**, which work together to help reduce the cost of broadband infrastructure buildouts by notifying all relevant telecommunications organizations when a project involving excavation is already underway, such that they can install their infrastructure without needing to dig again themselves.[40]

	Leading practice: use digital navigators and approach digital equity holistically

A holistic approach that addresses all barriers to broadband (e.g., implementation of digital literacy programs or broadband service discounts based on financial need)

*Gaining perspectives from the local community, advocacy groups, and other entities for the development of a broadband strategy plan helps **build consensus** and helps ensure **strategies** are **tailored and equitable**.*

The City of Dallas has partnered with the LULAC National Educational Service Centers, Inc. to administer a **Digital Navigators program**. This program provides a free laptop, internet access, digital skills training, and one-on-one coaching to participants. The city hopes to provide this service to at least 50 households.[41]

The City of Philadelphia has established a **Digital Navigator network** co-funded through multiple organizations and philanthropy. These organizations have established hotlines and other methods of contact for easy outreach and can connect residents to other service offerings.[42]

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[39] "Loma Linda Connected Community Program (LLCCP)." *City of Loma Linda*, https://www.lomalinda-ca.gov/services/l_l_c_c_p
[40] "City of South San Francisco." *Dig Once Policy*, https://www.ssf.net/departments/public-works/engineering-division/dig-once-policy.
[41] "Digital Navigators." *LNESC Dallas*, https://www.lnescdallas.org/digital-navigators.
[42] City of Philadelphia https://www.phila.gov/2021-02-10-the-city-of-philadelphia-announces-new-digital-navigator-organizations-and-highlights-the-programs-digital-support-services/#:~:text=Residents%20can%20reach%20a%20CLC,12%3A30%20p.m.).

	Leading practice: strong partnerships and coalition

Strong partnerships that include data sharing and active collaboration between municipal organizations, community-based organizations, and private partners

Stakeholders can work collectively to make the greatest impact through **shared programming or grant opportunities** *(e.g., partnerships with school districts or community-based organizations).*

The City of San Antonio partnered with a private company to install 30 kiosks throughout their downtown area to improve **Wi-Fi access in public spaces**. The kiosks provide free Wi-Fi, wayfinding, nearby activities and restaurants, and civic resources.[43]

Bexar County has partnered with 80 organizations to support different areas of **digital inclusion for key population segments**, with over 30 organizations offering free internet, 30 offering new or refurbished devices, 30 offering basic digital skills training, and others also offering technical support and 1:1 assistance. Bexar partnered with the nonprofit Southwest Research Institute, to Southwest Independent School System.[44]

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[43] "Interactive Kiosk Deployment Delivers Social Equity, Mobility, and Business Discovery." *The Atlas*, The Atlas, 21 Mar. 2022, https://the-atlas.com/projects/interactive-kiosk-deployment-in-san-antonio-no-cost-solution-using-interactive-kiosks.
[44] "Coalition and Digital Equity Plan Overview." *SA Digital Connects*, San Antonio and Bexar County Private-Public Community Collaboration, https://www.sadigitalconnects.com/plan.
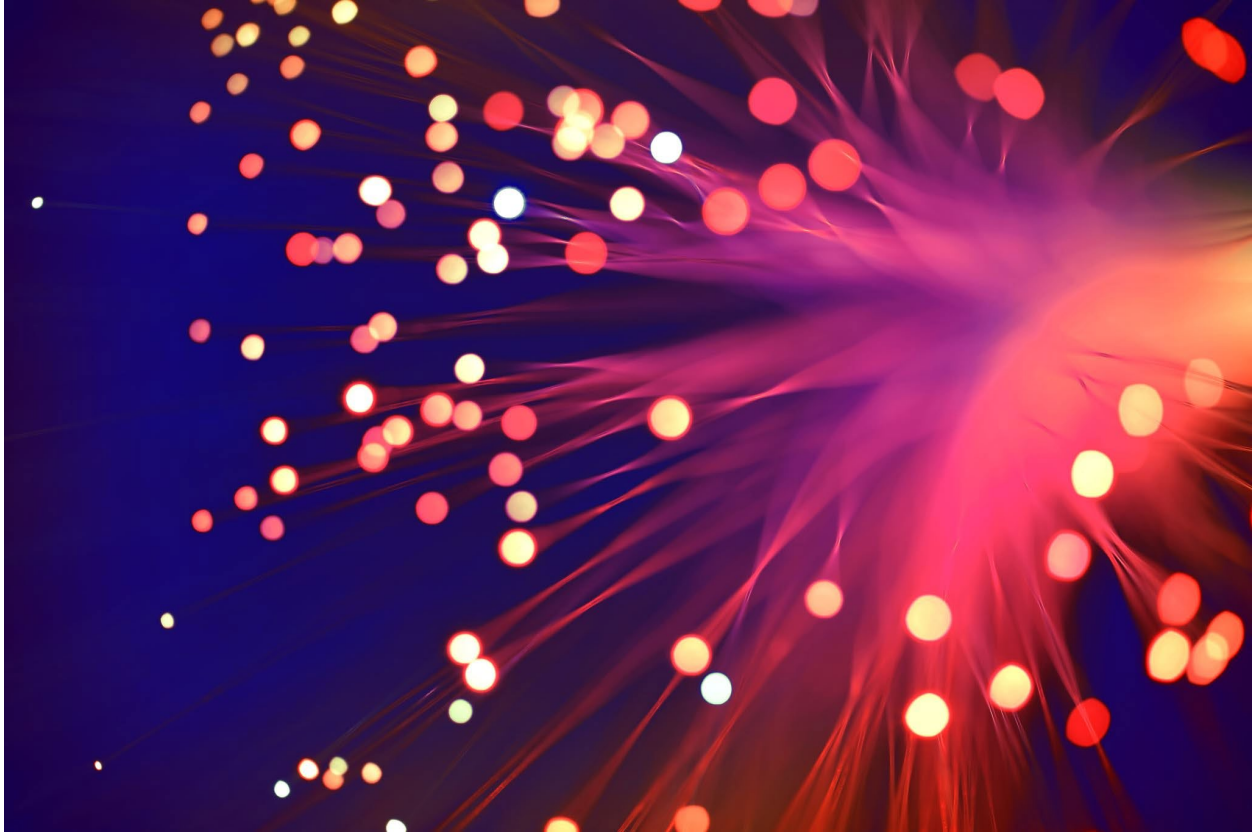
Comprehensive broadband plan pillars and strategies

Achieving universal broadband access and true digital equity is an immense undertaking that will take years, if not decades, to achieve. The challenges are complex, there are a variety of players, and it will all cost money. This Plan outlines an aspirational vision statement, 3 pillars, and 11 strategies towards achieving universal broadband access for the County and partners to consider. The Plan incorporates the findings and takeaways from the vast amount of leading practice research, geospatial mapping, data analysis, stakeholder engagement, and community inputs conducted since late January 2022. Summary and detailed information for each of the pillars is provided as part of the Plan. There are also Key Performance Indicators for each of the dimensions referred to in the vision, multiple of which are already collected in publicly available datasets (e.g., FCC, American Community Survey).

This Plan is intended to be a starting point for the region to work with the private sector, potentially expand its own infrastructure to support further private investment, and continue delivering digital equity adoption programs.

County of San Diego
Comprehensive Broadband Plan for the
Unincorporated Area

Aspirational vision for County and partners to work towards: High speed, affordable, and reliable broadband internet for those that want it in the unincorporated area

3 Pillars to reach vision

1. Promote Expanded Infrastructure Availability	2. Encourage Broadband Adoption	3. Partner and Oversee

11 Strategies to activate pillars

1.1 Engage Internet Service Providers (ISPs) to partner for grant opportunities	1.2 Coordinate other infrastructure investments with public and private sectors	2.1 Continue to publicize the Affordable Connectivity Program (ACP)	3.1 Dedicate personnel to oversee unincorporated area efforts and apply for grants
1.3 Consider cellular, fixed wireless, and emerging technology to fill gaps	1.4 Streamline permitting	2.2 Coordinate digital navigator and technical assistance program	3.2 Create sustained stakeholder and community engagement channels
1.5 Continue and potentially expand public access points		2.3 Continue device distribution, loan, and recycling program	3.3 Measure program and outcome success

Key Performance Indicators to measure progress towards vision and regional digital equity

- **Availability** – Households with access to broadband speeds (100/20 Mbps or faster)
- **Reliability** – Internet downtime
- **Affordability** – ACP enrollment; avg $ / Mbps
- **Overall Adoption** – Broadband subscriptions

Summarized Details for Each Pillar

Further details for each pillar may be found in the Appendix.

1.   Promote Expanded Infrastructure Availability

Description: In considering infrastructures to encourage, prioritize fiber long-term, use other technologies as stopgap

High Level, Order of Magnitude Cost Based on Case Studies: Around $100M to address availability needs. This initiative is a shared responsibility between public entities, municipalities, private sector providers, and other partners, who must all come together to invest. The cost is therefore intended to be spread across grants, the private sector, other public sector entities, etc.

Funding: Local Fiscal Recovery Fund, Enabling Middle Mile Program, BEAD, ReConnect Program, Community Development Block Grant, CPUC Programs (Infrastructure Grant, Local Agency Technical Assistance, Last Mile Federal Funding Account, Loan Loss Reserve Fund)

Key Next Steps: Identify projects with ISPs to pursue grant funding

Key Stakeholders: LUEG, DPW, PDS, ISPs, SANDAG, Caltrans, Tribes, SDG&E and other local governments

2.   Encourage Broadband Adoption

Description: Develop programs that address affordability, digital literacy, and devices

High Level, Order of Magnitude Cost Based on Case Studies: Around $15M to address adoption needs for several years. This initiative is a shared responsibility between public entities, municipalities, private sector providers, and other partners, who must all come together to invest. The cost is therefore intended to be spread across grants, the private sector, other public sector entities, etc.

Funding: Local Fiscal Recovery Fund, Affordable Connectivity Program, BEAD, Digital Equity Act Programs, Community Development Block Grant, CPUC Programs (Broadband Adoption, Broadband Housing)

Key Next Steps: Roll out digital navigator program, continue to spread awareness of Affordable Connectivity Program, and monitor success

Key Stakeholders: County Library, Community Planning and Community-Based Organizations, School Districts

3.   Partner and Oversee

Description: Establish a team of dedicated County personnel to pursue grants in coordination with regional entities and oversee progress

High Level, Order of Magnitude Cost Based on Case Studies: Around $6.6M to staff several resources for 10 years

Funding: Local Fiscal Recovery Fund, BEAD, Digital Equity Act Programs, Community Development Block Grant, CPUC CASF Broadband Adoption Account

Key Next Steps: Hire or work with a partner organization to establish a dedicated broadband team focused on the unincorporated areas

Key Stakeholders: LUEG, DPW, CTO

Partnership and business models

Partners' roles in proposed broadband projects

Enacting each of the strategies and pillars will require a village of stakeholders collaborating and coordinating resources. Luckily, there are already many entities working to improve broadband in the region that can be used as starting points for further partnership. Formalized partnerships between various entities including the County, other public sector entities, the private sector, local community organizations, and other organizations can help achieve the overall vision. This formalization can be through memorandums of understanding, data sharing agreements, joint trenching activities, and more.

Establishing a dedicated County team may prove beneficial because they can serve as dedicated points of contact for partners to coordinate with. Another value add of this type of broadband team is that it can provide sustained resources driving towards this initiative for the unincorporated area. Broadband infrastructure rollout will not be completely achieved in a year or even two. The magnitude of the task means that having a team proactively moving things forward, whether through forming partnerships with ISPs and/or applying for grants, could be very beneficial.

> *"We do want to hear from the County, and folks in the localities. What is the feedback? What do we need? We'd prefer to be driven by that need."*
>
> *– ISP representative*

Other governmental partners, including SANDAG and other Federal and State partners, could provide support and expertise on how existing broadband infrastructure, currently limited to specific use-cases, could be expanded to be available to more anchor institutions.

Table 11: Proposed roles matrix

Plan pillar	Partner roles		
	SANDAG and other governments	Private sector	Community based organizations
1. Expand infrastructure availability	Continue planned middle mile infrastructure development and seek to expand eligibility for use of research networks	Seek to partner on Federal funding opportunities and further infrastructure buildout	Provide community input and/or support for planned public-private partnerships
2. Encourage broadband adoption	Provide data and communications capacity to ensure successful roll out of plans	Expand existing lower cost internet plans to newly connected areas	Connect underserved residents with information and devices
3. Partner and oversee	Shared programming or grant opportunities	Coordinate with County broadband contacts on planned developments	Shared programming or grant opportunities

How stakeholders work together

While the State will likely be a source of funding and advisory support, most extensive partnerships will probably be at the local level. Therefore, the County and its partners can continue to use SANDAG's task force work towards infrastructure and adoption projects, particularly as grant applications open. While the focus is the unincorporated area, utilizing potential partners in (e.g., incorporated areas) for broadband asset sharing and sharing of leading practices will be important.

"[Caltrans] is working with the Broadband Council to implement the 'Broadband 4 All' program, and the action plan. [It all] builds on the work of the Broadband Council."

– Caltrans representative

As more broadband initiatives get underway that have relevance to the unincorporated area, the County's team roles might include:

"[SANDAG's] work, scope, and focus [is on] being a good partner. Getting any investment to the region is a win for all of us."

– SANDAG representative

- a **Program Manager**, responsible for managing the team and initiatives to drive programs as well as manage budget and grants.

- a **Technical Analyst** to assist the program manager with leading initiatives (especially through technical support).

- and a **Community and Stakeholder Engagement Specialist** that coordinates stakeholder engagement with community members, ISPs, other government entities, etc. to drive partnerships.

The County's broadband team would not be alone, as the County's already existing Broadband Steering Committee can mature into breakout groups with specific roles and expectations to offer support. The Broadband Steering Committee can also organize itself into teams, including: a **Planning and Strategy Committee** that sets direction, a **Technical Implementation Team** that advises on the technical rollout of solutions, and a **Program and Policy Implementation Team** that translates direction from the Planning and Strategy Committee into action. Finally, County partners, including community organizations and the private

sector, can join through cost sharing and project implementation. With local partners taking ownership of specific project segments, applications that the County submits for funding are more likely to be successful.

Planning and Strategy Committee – meet every 1-3 months

A Planning and Strategy Committee would continue to build on the stakeholder engagement initiatives that informed this plan. Because different priorities and concurrent initiatives regarding broadband exist in the region, broadband projects would benefit from organization and milestones to ensure that access progress continue to advance in the years to come. *Members: Members of existing Broadband Steering Committee*

Technical Implementation Team – meet every 1-2 months depending on project implementation (projects may require meetings every 1-2 weeks)

The Technical Implementation Team will be able to convene County and affiliated technical teams who focus on technical work required by projects. A Technical Implementation Team can review the technical plans of these solutions and then coordinate with County departments regarding existing infrastructure and assets that are required. In addition, the team would also be able to coordinate existing assets and infrastructure needed to expand unique technical solutions, like HPWREN, that may not otherwise be addressed by other private sector involved plans. *Members: Technical Analyst, County Departmental IT personnel, DPW, private sector ISP reps (as necessary for specific projects).*

Program and Policy Implementation Team – meet every 1-2 months depending on project implementation (projects may require meetings every 1-2 weeks)

Because each project should be further refined through a service design lens to put residents' needs front and center, a dedicated team is needed to coordinate with existing groups to roll out digital equity programs that specifically address these needs. *Members: Program Manager, Community and Stakeholder Engagement Specialist, and other County departments as relevant to the particular project (e.g., San Diego County Library for digital inclusion initiatives).*

Potential broadband business model

In addition to highlighting the governance aspect to implementing these recommendations, it may be helpful to understand the various broadband business models. US Ignite and Altman Solon have developed a whitepaper that outlines these models.[45] This whitepaper has been referenced in CPUC materials so it will be a helpful reference. The 5 identified models of Figure 11 are largely based on the spectrum of broadband infrastructure and level of local government involvement. The 5 models are:

Full municipal broadband – public entity owns, operates, and maintains middle mile and last mile broadband infrastructure as well as provides internet service to the end user.

Publicly owned privately serviced – public entity owns middle mile and last mile infrastructure and may also operate and maintain it. The private sector provides internet service to the end user.

Hybrid ownership – public entity owns predominantly middle mile infrastructure which the private sector can use to build, operate, and service last mile infrastructure.

Private developer open access – public entity allows a private developer to build the private developer's own open-access network, which multiple other service providers can rent or otherwise utilize to help deliver service to end users.

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[45] US Ignite. Altman Solon. 2020. "Broadband Models for Unserved and Underserved Communities" https://www.us-ignite.org/wp-content/uploads/2020/07/USIgnite_Altman-Solon_Whitepaper-on-Broadband-Models_FINAL_7-9-2020.pdf

Full private broadband – the standard model of today where the private sector owns, operates, and maintains middle mile and last mile broadband infrastructure as well as provides internet service to the end user.

Figure 11: Broadband business models from US Ignite and Altman Solon

Infrastructure Ownership and Service Value Chain

Own Rights of Way, Utility Infra.	Own Middle Mile	Own Last Mile	Operate Infrastructure	Service Customer
Ownership of Rights of Way, poles, ducts, conduits, etc.	Buildout and ownership of middle mile network	Buildout and ownership of last mile network	Management and operation of network (e.g., if there's a fiber cut, party responsible *to fix it)*.	Services provider that provides end service to resident (and bills them)

Increasing County Involvement →

Remaining minimally involved in broadband delivery most often an option for large counties able to attract strong private partners

Counties can also take a more active role across the value chain, which may sometimes be necessary if private partners cannot be attracted

County Main Business Model Options for Broadband Expansion

		Own Rights of Way, Utility Infra.	Own Middle Mile	Own Last Mile	Operate Infrastructure	Service Customer
1	Full Municipal Broadband	Public Entity	Public Entity	Public Entity	Public Entity	Public Entity
2	Publicly-owned, Privately-Serviced	Public Entity	Public Entity	Public Entity	Public Entity / Service Provider	Service Providers (One or Several)
3	Hybrid Ownership	Public Entity	Public Entity	Service Providers (One or Several)	Service Providers (One or Several)	Service Providers (One or Several)
4	Private Developer Open Access	Public Entity	Private Developer	Private Developer	Private Developer	Several Service Providers
5	Full Private Broadband	Public Entity	Service Providers (One or Several)	Service Providers (One or Several)	Service Providers (One or Several)	Service Providers (One or Several)

The Comprehensive Broadband Plan lends itself predominantly to the Hybrid Ownership model. This is due to the fact that Caltrans is already going to be owning large swaths of middle mile that cut through vital sections of the unincorporated area. The County and its partners can work with ISPs to determine at the specific engineering project-by-project level, whether Caltrans' proposed middle mile will do enough to shift the providers' return on investment equation to be more favorable for buildout in unserved and underserved areas (see Appendix for district-by-district analysis and prioritized census tracts). If further infrastructure is needed, public sector entities can consider laying in conduit and fiber through Public Works departments to continue to lower the cost for investment for the private sector.

In looking at the other models:

- Full municipal broadband – requires the County to have extensive capital and workforce capabilities in order to fully serve the network end to end. This is likely cost prohibitive.

- Publicly owned, privately serviced – for the County to implement and own last mile infrastructure will also be cost prohibitive, particularly in regions as large and rural as the unincorporated area.

- Private developer open access – this model would be nice to have because the private sector would be providing the majority of the investment but seems unlikely due to the inherently rural nature of the unincorporated area. The equation may change for a private developer if the denser incorporated areas were included in the network, but this requires an interested private developer with ISPs interested in serving off that potential network.

- Full private broadband – this model is the current state which has led to market gaps. Caltrans' middle mile initiative is helping shift the State from this baseline model to the hybrid ownership path.

Costs

High level, order of magnitude costs based on case studies were developed for each of the pillars of the Plan. Costs are summarized in this section with additional detail coming in the Appendix.

Pillar 1 – Promote Expanded Infrastructure Availability

- **High Level, Order of Magnitude Cost Based on Case Studies:** Around $100M to address availability needs in the unincorporated area. This initiative is a shared responsibility between public entities, municipalities, private sector providers, and other partners, who must all come together to invest. The cost is therefore intended to be spread across grants, the private sector, other public sector entities, etc.

- **Rationale:** The essence of this pillar is encouraging the expansion of broadband middle and last mile infrastructure (particularly fiber, as it is considered a "future-proof" technology, i.e., one that carries enough capacity and supports fast enough speeds to remain effective even as internet needs grow over the years) to communities that are currently in need. Using infrastructure variables, the Broadband Index determined which census tracts have low, medium, and high broadband availability. Households with high broadband infrastructure availability were determined to not need infrastructure buildout assistance while those with medium availability were assumed to require about 50% of the assistance as those with low availability. The estimate of the cost to address the infrastructure needs is based on the recent funding announcements from the NTIA's Broadband Infrastructure Program. Twelve of the fourteen total awardees were included in the analysis (the two

exclusions were North Carolina and Michigan because amount of private investment was not identified). Using the total award from the NTIA in addition to private investment dollars, total costs for each of the projects was identified. These total costs were combined with the number of premises (i.e., locations) each project covered (typically last mile fiber but sometimes also including middle mile fiber with two cases of last mile wireless) to establish the cost per premise. The median cost per premise across all examples was then scaled to the estimated number of households with broadband availability needs. Additional detail for the numbers of this costing may be found in the Appendix.

Pillar 2 – Encourage Broadband Adoption

- **High Level, Order of Magnitude Cost Based on Case Studies:** Around $15M to address adoption needs in the unincorporated area. This initiative is a shared responsibility between public entities, municipalities, private sector providers, and other partners, who must all come together to invest. The cost is therefore intended to be spread across grants, the private sector, other public sector entities, etc.

- **Rationale:** In a similar vein as pillar 1, pillar 2 is based on case studies and the number of households classified as low or medium adoption. Each of the counties in the US with a top 10 most populous city was reviewed for broadband adoption programs. These programs can vary in size and scope (e.g., some particularly focus on students, others on devices and hotspots), but all are focused on broadband adoption. The costs for each program in addition to the number of households being addressed led to a cost per household ratio for several case studies. The median cost per household was scaled to the region's unincorporated area needs to determine the order of magnitude cost. Additional detail for the numbers of this costing may be found in the Appendix.

Pillar 3 – Partner and Oversee

- **High Level, Order of Magnitude Cost Based on Case Studies:** Around $6.6M to staff a broadband team for the region for 10 years.

- **Rationale:** This pillar is effectively a cross-cutting one to manage and oversee progress of the other pillars. A team of broadband-focused staff members would be the primary cost of this pillar. It was challenging from desktop research to identify number of personnel and titles for comparable teams in similar jurisdictions, but three roles were identified as being helpful to keep momentum for broadband going: a Program Manager, a Technical Analyst, and a Community and Stakeholder Engagement Specialist. Salaries for each position were based on current San Diego County job postings and multiplied by 10 to estimate a 10-year duration. Additional detail for the numbers of this costing may be found in the Appendix.

Funding overview

While the undertaking to expand broadband access to all residents in the unincorporated area is not a small effort, both in capacity and required resources, there are ample funding opportunities at both the Federal and State levels to take advantage of to bring this Plan to life. The current funding landscape could make up to **$14.2 billion in funding** available to the region, with **$7.5 billion** in direct funds that the County may apply to once made available.[46]

The County has already allocated $10 million to address broadband-specific needs from its $648 million ARPA Local Fiscal Recovery allocation in 2021. ARPA grants will prove to be a flexible funding source that the County can consider using towards essentially all pillars of the Comprehensive Broadband Plan, from environmental reviews to infrastructure expansion and standing up a dedicated team.

Funding opportunities that the County is an ineligible entity to apply for can still be potential sources of funding for other partnering entities, such as the State of California, which often repackages grants into State-wide programs that benefit cities and counties such as San Diego County, tribal entities that the County plans to work with, ISPs, and other community-based organizations. For example, as the State of California establishes its broadband plan and digital equity initiatives, the County may be eligible to receive some of

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[46] $7.5 billion includes federal and state funding opportunities that the County can apply for as a directly eligible entity. The $14.2 billion estimate includes both federal and state funding opportunities that the County may receive as a directly eligible entity, may receive as a sub-recipient, or that the County can benefit from as a result of State investment.

> *"With the grants and programs, we're trying to make sense of it…We've had the same business model for decades, and we're thinking 'is this a good time to change that?'"*
>
> *– ISP representative*

their Broadband Equity, Access, Deployment (BEAD) and Digital Equity Capacity Grant funds as a sub-grantee in order to begin implementing activities in accordance with the State's proposed initiatives. Additionally, the State of California's Open-Access Middle Mile Network will allocate $3.25 billion to build out middle mile infrastructure, part of which will span across the San Diego region. Ultimately, these sources of funding all have a tieback to the region and can still push broadband forward to benefit residents, whether it comes directly from the County or not.

The sankey diagram listed below (Figure 12) tracks the most prominent current and upcoming broadband funding sources. Often, State-wide funding programs have a Federal nexus, meaning that the source of the funds are derived from Federal programs and are appropriated and re-packaged by States with supplementary State funds. The sankey diagram helps visualize how the State of California appropriated its ARPA grants to broadband programs and the different programs that arose out of the Bipartisan Infrastructure Law (BIL). The diagram also communicates what types of broadband activities each program is open to accepting while also distinguishing which programs would be applied for directly from the federal government, as opposed to applying to the State of California once the State has determined how to appropriate its formula grants.

Figure 12 Sankey diagram of broadband funding (note that the BEAD allocation is not finalized and likely will lead to more than $100M for California)
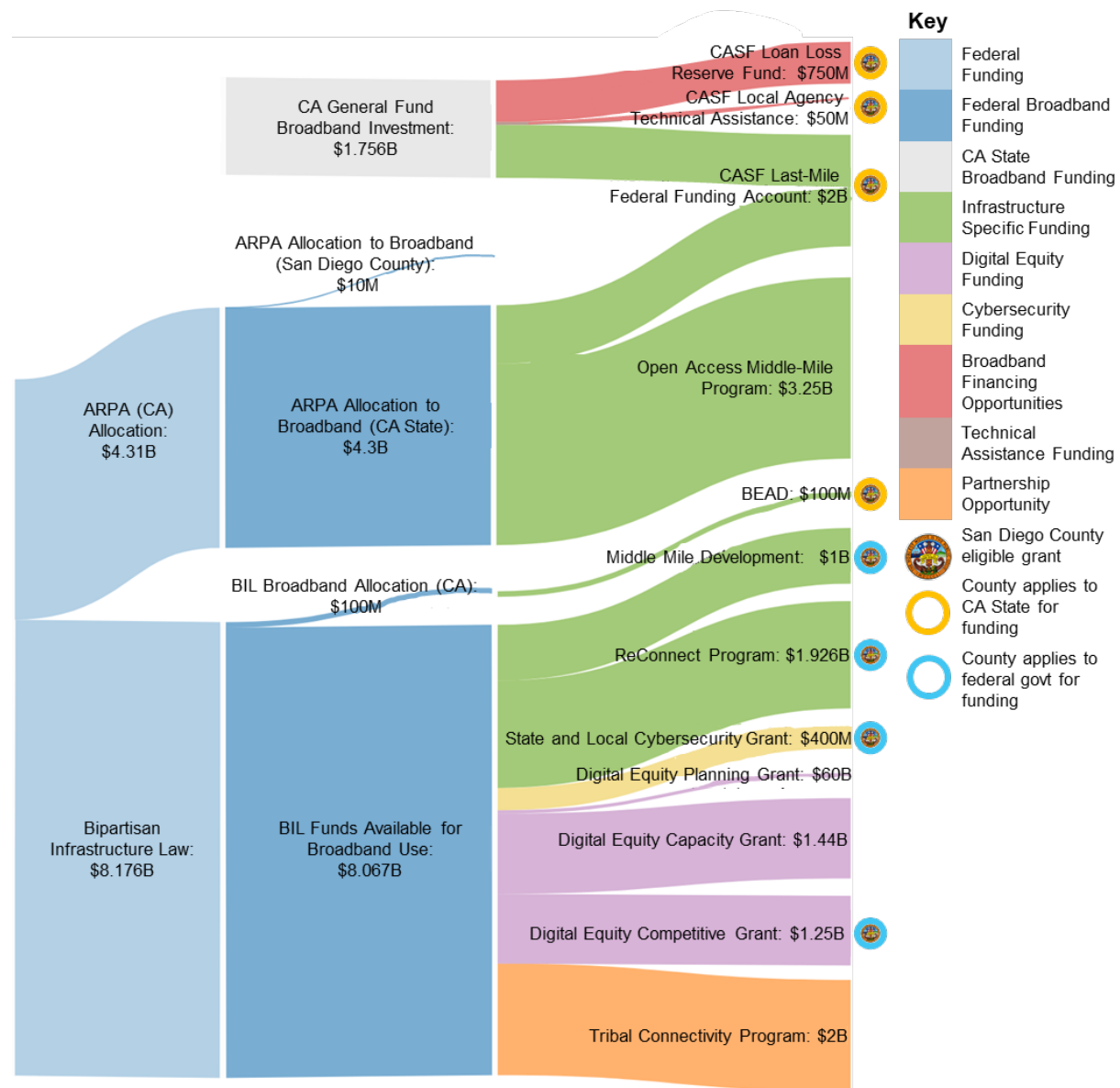
These funding opportunities would assist the implementation of all pillars of this Plan and include the following types of broadband initiatives:

- **Infrastructure expansion** (i.e., last-mile and/or middle mile infrastructure, engineering design, permitting, environmental reviews, construction, improvement and /or acquisition of facilities and equipment, personnel costs, and staff and consultant salaries).

- **Digital adoption** (i.e., digital literacy training, digital navigator programs, technical assistance helplines, device loan and giveaway programs, computer lab investments, dedicating resources to a broadband team).

- **Digital equity** (i.e., digital equity strategic planning, community engagement with key populations, multi-lingual outreach, internet plan subsidies and affordable broadband subscription and options).

While these opportunities are not eligible for the County to directly apply for, there will be opportunities for the County to benefit from the funds in some way. As the State of California establishes its broadband plan and digital equity initiatives, the County may be eligible to receive some of their Broadband Equity, Access, Deployment (BEAD) and Digital Equity Capacity Grant funds as a sub-grantee to begin implementing activities in accordance with the State's proposed initiatives. Additionally, the State of California's Open-Access Middle Mile Network will allocate $3.25 billion to build out middle mile infrastructure, part of which will span across the San Diego region.

> *"We're starting off with SR 76, 78, 79, 77, a few hundred miles. Now we need people to do last mile projects off that."*
>
> *– Caltrans representative*

Taking advantage of State planning and resources

Due to the nationwide focus on expanding broadband access, both the Federal government and the State of California have taken significant strides towards broadband expansion. Broadband access requires a multitude of different considerations, from middle mile and last-mile infrastructure to Wi-Fi access in public spaces, internet plan and device subsidies, and technical assistance to help those who struggle with using the internet. Fortunately, the State has dedicated significant resources towards addressing one of the most expensive components of expanding broadband access: infrastructure buildouts. Caltrans, working alongside other state agencies, has been coordinating middle mile infrastructure planning to build out an 8,700-mile network of fiber optic cables through California, through a $3.25 billion investment.[47] This is a great start to connecting the State to valuable fiber infrastructure.

While a part of this network will span through the unincorporated area of the San Diego region and cover gaps in the area's middle mile infrastructure, it will likely not be enough to cover all the area's needs. Fortunately, there are funding opportunities available to build out middle mile and last-mile infrastructure, while also facilitating digital adoption initiatives to address other barriers to broadband access. Even though the State of California has owned the effort to coordinate the Statewide open access middle mile network, it has left the rest up to local governments while offering State financial resources to help spur these last-mile investments, network equipment, digital literacy, internet plan subsidies, and more. The remainder of the San Diego region's infrastructure gaps can be further built out by BEAD funds. While BEAD funds will be allocated directly to the State, they will still likely be available to the County once the State decides how it chooses to allocate its appropriation.

Much of these financial resources will come through California grant accounts funded by both Federal and State sources, primarily managed by the California Public Utilities Commission.

Federal funding opportunities

In addition to existing and emerging broadband oriented State funding opportunities, States and local governments will soon be able to tap into several Federal opportunities from the National Telecommunications and Information Administration (NTIA) as a result of the $65 billion allocated to broadband through the Infrastructure Investment and Jobs Act. Consequently, a series of opportunities will soon be available to San Diego County both directly as an applicant and as a potential subgrantee to the State of California. These opportunities will span a wide

> *"Clearance requirements within the trench…cost associated with [that]…a formal joint-trench agreement… Those are the types of things we'd need to be coordinating on pretty closely."*
>
> *– ISP representative*

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[47] "Middle Mile Broadband Initiative." California Department of Technology. https://middle mile-broadband-initiative.cdt.ca.gov/

range of activities, from infrastructure expansion to digital adoption and digital equity initiatives, thereby enabling the County to make strides towards all its strategic endeavors. This also highlights the need for full-time resources spent on competitive application preparation to support the County's attractiveness and capabilities as a potential grantee.

Importance of Public-Private Partnerships (P3s)

While there are a significant number of funding opportunities to take advantage of, extending broadband access to all of the unincorporated area will take a lot more than just funding: in order to best utilize this money and stretch every dollar to its maximum potential, partnerships will be one of the region's most effective tools. These partnerships are especially encouraged by Federal and State funding opportunities, as they allow entities to expand their capacity.

Public vs Public-Private Partnerships

While inter and intra-government partnerships (e.g., with regional government associations like SANDAG or neighboring tribal governments) will be essential to ensuring priorities are aligned and efforts are not duplicated, partnerships between the government and private entities will be crucial. Partnerships with Community Based Organizations (CBOs), for instance, will be relevant as the region looks to conduct outreach to hard-to-reach communities for digital literacy trainings, community engagement, and other necessary communication. The most major type of P3, however, will likely be between the government and ISPs: with their specialized resources and broadband expertise, ISPs can help fill in the gaps in the exact places the region needs.

Partnerships with Internet Service Providers

ISP priorities are generally driven by one primary metric: return on investment (ROI). ROI is a ratio between the net income of an investment and the capital originally put into that investment – in other words income versus cost. In the world of broadband, the potential income from a region is often limited by factors such as residents' ability to afford coverage at different price levels, and housing density (if houses are spread out far from each other, then each mile of coverage serves fewer customers and thus brings in less revenue). Thus, remote and rural areas are often the least-served areas due to their relatively low potential ROIs.

Since ISPs have historically not invested in these areas, the biggest expenditure when it comes to current broadband expansion is usually the cost of new infrastructure. Governments can address this either through funding given to ISPs for infrastructure development, or through direct government buildouts of infrastructure that is then operated by ISPs through various public-private partnership types, including:

1) **Management and Operating Contracts:** These contracts between public entities and private and/or nonprofit partners are considered P3s when they are performance-based, long-term (3 yrs. – 5 yrs.), and involve significant investments with fixed fees collected by the contractor (in this case the ISP).[48]

   Funding alignment: Federal funding can be leveraged for these projects when local governments are comfortable with subsidizing networks with a longer ROI timeline. Along with Leases/Affermages (see list item 2 below) and Concessions (see list item 3 below), Management and Operating Contracts are some of the most optimal funding structures for local governments due to shared risk, financing, and use of private sector efficiency and expertise.

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[48] "Management/Operation and Maintenance Contracts." PUBLIC-PRIVATE-PARTNERSHIP LEGAL RESOURCE CENTER, ppp.worldbank.org/public-private-partnership/agreements/management-and-operating-contracts.

Case study: Westminster, Maryland was a small town that struggled with delivering high-quality internet. Local officials were interested in developing a publicly owned, open-access network. The city designed, constructed, and owned the network and chose Ting, a new entry business, to manage and lease the fiber. The city agreed to a partnership with Ting in which the private entity would manage the network for a period of ten years. Ting obtained a temporary period of exclusive rights to sell services with the long-term goal of the network becoming open access.[49]

2) **Leases and Affermages:** In Leases and Affermage Contracts, third parties oversee operations and maintenance of infrastructure, programs and/or services but do not contribute funding. ISPs collect their revenue through service contracts with customers instead of receiving fixed fees from the government. In a lease, the ISP pays a regular fixed fee to the government, regardless of how much or little revenue is earned from customers each cycle (this is high-risk/high-reward for the ISP). In an affermage, the ISP retains all revenue up to the amount of its operating fee, after which all surplus revenue is given to the government (this is high-risk/high-reward for the government).[50]

Funding alignment: These partnerships are common in broadband P3s and encouraged by Federal funding opportunities. Along with Management/Operating Contracts (see list item 1 above) and Concessions (see list item 3 below), Leases and Affermages are some of the most optimal funding structures for local governments due to shared risk, financing, and use of private sector efficiency and expertise.

Case study: The Massachusetts Broadband Institute built and now owns, a 1,338-mile, $71.6 million fiber network that provides broadband services to western and north central Massachusetts. MBI chose Axia, an international broadband Next Generation Network company, to manage and maintain the network. Axia offers wholesale services to broadband service providers for a long-term contract and will invest in the ongoing operations of the network. Additionally, as part of the agreement, Axia will continue to maintain the fiber-optic network to ensure ongoing operability and efficiency.[51]

3) **Concessions:** These P3 contracts are similar to Leases and Affermage contracts but are more output focused, involving asset or program development and long-term operations. There are a few forms around the world.[52]

Funding alignment: These partnerships are common in broadband P3s and encouraged by Federal funding opportunities. Along with Management/Operating Contracts (see list item 1 above) and Leases/Affermages (see list item 2 above), Concessions are some of the most optimal funding structures for local governments due to shared risk, financing, and use of private sector efficiency and expertise.

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[49] Successful Strategies for Broadband Public-Private Partnerships. ilsr.org/wp-content/uploads/downloads/2016/08/PPP-Report-2016-1.pdf.
[50] "Leases and Affermage Contracts." PUBLIC-PRIVATE-PARTNERSHIP LEGAL RESOURCE CENTER, ppp.worldbank.org/public-private-partnership/agreements/leases-and-affermage-contracts.
[51] "MBI Announces Agreement with Axia NGNetworks USA." MBI, 14 Dec. 2012, broadband.masstech.org/press-releases/mbi-announces-agreement-axia-ngnetworks-usa.
[52] "Concessions Build-Operate-Transfer (BOT) and Design-Build-Operate (DBO) Projects." PUBLIC-PRIVATE-PARTNERSHIP LEGAL RESOURCE CENTER, ppp.worldbank.org/public-private-partnership/agreements/concessions-bots-dbos.

Case study: Despite its proximity to Silicon Valley, a purely private investment from the likes of Comcast or Google were unlikely. To bring in next generation gigabit internet service, Santa Cruz partnered with a local, long-time service provider, Cruzio. Through the partnership, the City will build, own, and maintain the fiber optics through a $52 million investment. Cruzio would then light, operate, and provide retail gigabit service to customers.[53] Additionally, Cruzio will help the City manage financing risks by covering 80% of the City's funding shortfalls if revenues do not cover the City's costs.

4) **Joint Ventures:** This model encompasses any partnership where two or more parties (i.e., the government and one or more private parties) sustain the joint management and/or ownership of an asset, project, or program.[54]

Funding alignment: Joint Ownership is less common than the first three models (i.e., Management and Operating Contracts, Leases and Affermages, and Concessions) and can pose difficulties for eligibility for Federal funds that require public ownership.

Case study: The town of Holly Springs, NC initiated a partnership with Ting Internet to expand broadband to the community. In 2013, the town designed, engineered, and constructed its own backbone fiber network which it then leased to Ting. Ting then completed the last-mile network for its subscribers.[55]

Looking forward: next steps for the San Diego region

The above are just a few examples of the types of P3s – ultimately, if the goals of both the government and private entity align, a partnership will likely help each advance their goal more efficiently. In the coming months after the publishing of this Broadband Plan, leaders in the region may consider actively looking to form long-lasting partnerships to rapidly build up capacity to pursue funding opportunities, facilitate infrastructure expansion, and begin implementing the Plan's strategy.

Timeline of upcoming funding opportunities

A significant number of funding opportunities will be released throughout 2022 and 2023. In order to maximize funding for initiatives outlined in the Comprehensive Broadband Plan, the County and its partners should consider how they may generate compelling and competitive application responses.

Many states and municipalities across the country are ramping up their plans to expand broadband access. Keeping this looming competition in mind, the following is a selection of priority grants to pursue, chosen considering where competition can be limited, and funding received as soon as possible:

- *CPUC CASF Local Agency Technical Assistance:* This is a State-based grant with less competition than Federal programs that can serve as an early source of funding to begin exploring priority infrastructure expansion projects.

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[53] "City of Santa Cruz." City Newsroom, www.cityofsantacruz.com/Home/Components/News/News/1923/.
[54] "Joint Ventures / Government Shareholding in Project Company." PUBLIC-PRIVATE-PARTNERSHIP LEGAL RESOURCE CENTER, ppp.worldbank.org/public-private-partnership/agreements/joint-ventures-empresas-mixtas.
[55] Successful Strategies for Broadband Public-Private Partnerships. ilsr.org/wp-content/uploads/downloads/2016/08/PPP-Report-2016-1.pdf.

- *CPUC CASF Infrastructure Grant Account:* This is a State-based grant with less competition than some Federal programs that can be specifically used to install infrastructure, particularly for any projects planned that will use CPUC CASF Local Agency Technical Assistance funds*.*

- *CPUC CASF Broadband Adoption Account:* This grant limits competition to only California eligible entities and offers the flexibility of multiple rounds of funding, allowing easier access to resources for digital adoption and digital equity initiatives.

- *Digital Equity Competitive Grant:* While a little way ahead, the Digital Equity Competitive Grant allows the region to pursue its digital equity initiatives once programs have been planned out and partnerships with Community Based Organizations (CBOs) have been established.

The funding opportunities will require appropriate resources to ensure timely, effective application responses that will secure funds and maximize the impact of initiatives outlined in this Plan. The County can work with its partners to put forward applications that serve the unincorporated area.

Planning for broadband funding

Broadband funding applications for both infrastructure and non-infrastructure initiatives require considerable capacity, especially considering that there are a number of applications available and a number that will be released later in 2022, 2023, and beyond.

Funding applications typically require detailed information about proposed projects, such as project descriptions, timelines, budgets and narratives, forecasts on the number of households and community anchor institutions served, proposed partners, and a source of cost-share funding. Some applications require engineering-level project analysis to be conducted in advance. County staff or partners responding to applications should manage and track funding opportunities, spearhead outreach and partnerships, and begin to put together the required materials needed for applications. The timeline below highlights the priority applications and indicates which programs the County is eligible to apply to directly (but can work with others to submit an application), and which the State will lead with future subgrant opportunities.

Next steps

The years following the pandemic have highlighted that much of the remote capabilities we turned to from remote work to remote schooling and telehealth, are here to stay. We recognize that the effort to expand fixed and mobile broadband access to all of the San Diego region's unincorporated areas is a need, not a want. We have identified next steps for consideration by the County and its partners. It is partly informed by an urgency in recognizing that residents need to stay online, while factoring in other considerations such as the time-consuming nature of applying for grants and supporting the buildout of broadband infrastructure. The County can continue to coordinate with regional partners on behalf of the unincorporated area to make progress with partnering entities (particularly ISPs for last-mile infrastructure buildout). Progress over the coming months may take the form of partnering on several grant applications. These next steps span the next few years, but it should be noted that the effort to universally expand broadband adoption will eventually call for further action than these initial priorities.

Our suggested timelines for initiatives aligned under each pillar are as follows:

How we suggest **promoting expanded infrastructure availability.**

Overarching strategy	Phase 1	Phase 2			Phase 3							
	'22	2023			2024				2025+			
	4	1	2	3	4	1	2	3	4	1	2	3	4

1. Promote Expanded Infrastructure Availability

1.1 Engage Internet Service Providers (ISPs) to partner for grant opportunities
- Engage ISPs (especially last-mile fiber and cable providers) to form projects
- Apply for grants
- Manage grants and project buildout

1.2 Coordinate other infrastructure investments with public and private sectors
- Use SANDAG's task force to test support for shared broadband assets
- Participate in regional operating model and agreements
- Support technical feasibility study
- Incrementally build out middle and last mile site connections (e.g., in coordination with State middle mile)

1.3 Consider cellular, fixed wireless, and emerging technology to fill gaps
- Engage these wireless ISPs
- Support their buildout through streamlined policies and processes while longer-term infrastructure is deployed

1.4 Streamline permitting
- Solicit inputs on permitting policies and processes (e.g., Dig Once)
- Potentially draft updates using SANDAG templates

1.5 Continue and potentially expand public access points
- Identify all locations of all current related initiatives in region (public Wi-Fi, device loans, and giveaways)
- Set up public Wi-Fi if not already available
- Connect to County-owned or partner-owned infrastructure where possible to potentially save on telecommunications costs

How we suggest **encouraging broadband adoption.**

Overarching strategy		Phase 1					Phase 2							
		'22	2023				2024				2025+			
		4	1	2	3	4	1	2	3	4	1	2	3	4
Encourage broadband adoption	2.1 Continue to publicize the Affordable Connectivity Program (ACP)	Continue marketing ACP with SANDAG and CBOs													
		Track and monitor enrollment													
			Conduct community outreach to understand enrollment gaps				Seek to address gaps							
	2.2 Coordinate digital navigator and technical assistance program		Work with partners to gauge community needs for regional digital literacy trainings				Identify region long-term digital navigator resource or resources for region							
			Identify organizations across region providing technical assistance and training				Market and promote programs to populations that tend to lack subscriptions							
	2.3 Continue device distribution, loan, and recycling program		Continue rollout of device program with Emergency Connectivity Funding				Work with CBOs to expand device distribution, loan and recycling programs							
			Market and monitor results											

How we suggest **partnering and overseeing development.**

Overarching strategy		Phase 1					Phase 2							
		'22	2023				2024				2025+			
		4	1	2	3	4	1	2	3	4	1	2	3	4
Partner and oversee	3.1 Dedicate personnel to oversee unincorporated area efforts and apply for grants	Identify personnel and onboard if needed					Oversee grants as well as overall implementation of Plan for unincorporated area							
		Apply for grants												
	3.2 Create sustained stakeholder and community engagement channels	Keep engaging SANDAG task force for potential project partners					Establish recurring communication points with community and stakeholders to update progress							
		Engage potential partners outside of task force (and onboard if relevant)												
	3.3 Measure program and outcome success	Establish KPIs (e.g., those listed in Plan) and tracking mechanisms					Ongoing tracking and reporting to measure success							

Appendices

Additional project details

Pillar 1. Promote expanded infrastructure availability

CHALLENGE

Private ISPs have historically been the primary provider of internet services to residents and businesses nationwide, including in San Diego's unincorporated area. As they are businesses, they are motivated to determine where they build infrastructure based on return on investment (ROI) goals. There are several factors that are considered in these goals, including cost to install infrastructure, cost of operations and maintenance, size of market, and likelihood of customer adoption. This has unfortunately led to infrastructure gaps in sections of the unincorporated area, particularly those that are rural, sparsely populated, mountainous, or all the above. These areas are un(der)served and have been excluded from futureproof broadband infrastructure like fiber. This pillar provides several strategies for infrastructure expansion in these areas to bridge these gaps as well as potentially reduce the County's own telecommunications costs.

DESCRIPTION

This pillar tackles the availability challenge. It prioritizes fiber but recognizes that it will take time to roll out and may not be feasible everywhere due to it being cost prohibitive. Ensuring a base level of network coverage through cellular, fixed wireless, and emerging technologies like low Earth orbit (LEO) satellites or TV white space throughout the region is a shorter-term solution to address urgent needs but will not be as future proof as fiber. TV white space is an emerging last-mile technology that uses TV signals to provide internet access. This base level of network coverage can be supplemented through additional public access points (i.e., public Wi-Fi) for constituents in need to be less dependent on public libraries and their parking lots when libraries are closed.

1.1 Engage Internet Service Providers (ISPs) to partner for grant opportunities – As grants from the Federal and State government become available, the County and partners can work with ISPs in the development and design of projects. As it will likely be cost prohibitive for the County to fully roll out last mile infrastructure to every household, it would be helpful to work with ISPs. ISPs that are already active in the area may be interested in expanding their reach, particularly with the help of grant dollars. Ideally the public sector would be able to retain some control management and ownership of any infrastructure that is built, but that is dependent on the private partner.

1.2 Coordinate other infrastructure investments with public and private sectors– the State is developing an ambitious middle mile fiber project that can provide a robust, open-access network for any organization to take advantage of. This effort can help expand fiber needed in rural areas, as the majority of ISP-owned fiber routes are currently concentrated in urban areas. The County's Department of Public Works has some dark fiber available in a few areas, but it is not ubiquitous throughout County maintained roads. Dark fiber is fiber that has been laid but is unused. The County's publicly owned fiber can be greatly expanded at lower costs due to roads being opened for other reasons (i.e., a Dig Once policy). The County already has a Pavement Cut Policy that can be expanded and synced with the capital planning of other entities and utility providers (e.g., SDG&E). Construction protocols will also need to be synced between entities, which likely means that microtrenching, an increasingly common technique, may be required. All that said, laying in conduit and fiber on its own will not be enough. Those lines will need to connect to a network and eventually be connected to last mile end users to be effective.

In other jurisdictions, the private sector is still the primary entity that lays and lights fiber. Laying of public fiber should not happen in isolation. The County and its partners can continue to engage ISPs to identify where ISP plans would be furthered by additional available fiber infrastructure. Therefore, as potential fiber gets laid,

there is an interested ISP in using it. A solicitation may become necessary to garner responses and find a suitable ISP partner or partners.

The County is not the only public entity that owns fiber in the region. The High-Performance Wireless Research and Education Network (HPWREN) and the Corporation for Education Network Initiatives in California (CENIC) are two educational networks that own and operate fiber to serve the public. Public assets like this can be banded together through peering agreements to further densify the available fiber in the region to provide last-mile services from. Peering agreements let two entities route data between their two networks. SANDAG is already looking into the groupings of these types of public fiber assets across different entities, and it could be worthwhile for the County to continue working with them and municipalities with fiber to explore the feasibility of linking these networks and adding more use cases. We have heard from ISPs about the challenge of accessing fiber, particularly in the eastern portions of the region, so making it available would allow those companies to better serve communities. The general principle is that the closer fiber is to the customer, the better speeds they will have. Additionally, providing this infrastructure in an open-access model can encourage competition as well as generate some revenue for the County and its public partners by leasing fiber strands to one or multiple private companies. However, infrastructure owners should be wary of trying to impose fees that are so high that they impede the original goal of attracting service providers.

1.3 Consider cellular, fixed wireless, and emerging technology to fill gaps – there may still be areas that have urgent needs and cannot wait for grant projects. This strategy works in concert with strategy 1.4 streamlining policies to work closely with providers already serving the area, particularly local fixed wireless ones, and collaborating to improve their services. This helps local businesses while also helping the community get access to better speeds. Another common topic heard during the community engagement was the desire for more emerging technology like LEO satellite service (i.e., Starlink). The speeds are fast and reliable, but there is relatively high capital and monthly costs, and most residents report the waitlist takes at least a year. It may be another company worth entering discussions with to determine if a partnership can be made to expedite orders to the region and fulfill immediate needs. Finally, cellular coverage does have some dark spots in the unincorporated area, as none of the major providers has ubiquitous coverage. Improving the density of fiber in strategies 1.1 and 1.2 should create more opportunities for the proliferation of 5G as it is reliant on fiber for backhaul.

1.4 Streamline permitting – Permitting is commonly cited as a barrier to private sector broadband infrastructure expansion. SANDAG has committed to developing regional permitting standards and guidelines that expedite broadband infrastructure development in unserved and underserved communities, including standardizing agreement templates and digital permitting templates. This will help the County in identifying opportunities to simplify construction permitting, transition paper-based approvals to digital processes, expedite expansions, share vertical assets and lands for use (e.g., for wireless providers).

1.5 Continue and potentially expand public access points – another avenue to provide immediate support while fiber is being implemented is to offer more public Wi-Fi. We heard time and again about the dependency of a few community members on the Wi-Fi provided by libraries. Any place where constituents gather can be turned into a public Wi-Fi point if that area/building itself has a sufficient connection. Potential sites include parks, schools, community centers, and other community anchor institutions (e.g., fire stations). These Wi-Fi connections can be provided in dedicated public access rooms, or even in parking lots, which allow a large number of community members to access the internet from their own cars. Public access points are not a full replacement for home internet access, but for those without reliable service, it can be helpful to have a place to go just in case (and at all times of the day).

JUSTIFICATION

While ISPs may be willing to expand service, Return on Investment economic considerations, operational risks, and burdensome local rules and regulations may prevent them from doing so. The County and partners

can encourage ISP service expansion by pursuing grants to reduce costs and working closely with them to understand what they need to continue expanding.

For instance, to get started on service expansion, right-of-way permit costs are an initial investment to consider for providers:

Cellular Facility Fee Estimate range from a few hundred to a few thousand:

- Wireless Telecommunications Facility - Login $3200; OTC (over the counter) $1600
- Small Cell Wireless Facility or 5G Wireless Facility - $315
- Cell Site Modification to an Existing Facility - $1200

For a small cell wireless facility in the right-of-way, the following fees and deposits apply:

- Permit Fee: $179
- Inspection Deposit: $350 up to 5 facilities, + $100 each additional
- Annual Fee: $268 per facility (if installed on County facility such as streetlights)

STAKEHOLDERS

Potential stakeholders include internet service providers (local and national), municipalities (i.e., incorporated cities), regional governments (e.g., SANDAG; Imperial and Riverside), residents, and businesses.

CONSIDERATIONS

There are a variety of models the region could take to support infrastructure development. On middle mile buildout for instance, depending on successful advocacy efforts, the County and its partners can consider various financing approaches (from fully public sector owned to various forms of public-private partnerships that split roles and responsibilities between public entities and private partners) and operating models (e.g., offering services directly to consumers, leasing bandwidth to ISPs who offer services to public) These may include:

- Additional conversations with ISPs are needed to understand their financial and operational considerations, the role the public sector might play to help mitigate risks, and potential partnership and project opportunities.
- Solicitations may be required in order to contract with an ISP. Solicitations may be able to draw in ISPs from outside region. Service level agreements (SLAs) that detail minimum standards ISPs must provide to customers may be included in solicitation.
- SANDAG has started testing idea for shared broadband assets, especially among broadband entities. This model likely requires further stakeholder engagement to market test support as well as a technical feasibility study to explore use cases, potential to use other networks, potential savings due to reduced telecommunications costs, and future network architectures (e.g., a middle mile fiber ring that could connect community anchor institutions, provide network resiliency, and act as a connection point for private last mile buildouts). Agreements with other entities that own fiber infrastructure may be needed for shared network.
- Minimizing buildout costs where possible by connecting new infrastructure to existing infrastructure, particularly through network sharing agreements with other public entities.
- Costs (e.g., equipment, labor, permitting, maintenance / operations, replacements / repairs) may vary widely by project location, topography, and size.
- Conduit and buried fiber construction have higher costs than aerial fiber installation.
- SANDAG's existing efforts can inform changes to permitting, Dig Once, and Joint Trenching policies.

- Grants do not need to be the only way the region works with ISPs to expand broadband infrastructure. A fixed wireless ISP voiced a need for fiber and vertical assets (e.g., towers) from which to place equipment. These could be assets provided or facilitated by the County or its partners in order to roll out some stopgap infrastructure faster than the grants.
- Initiatives (especially construction ones) may be able to prioritize local businesses to stimulate the region's economy. If additional skilled or trained labor is required, it could be valuable to work with community colleges or other academic institutions to develop credentialing programs.

PRIORITY AREAS

Infrastructure expansion is expected to have greater impacts in census tracts that were classified as low availability in the Broadband Index. These tracts (outlined in yellow in Figure 13 later in Appendix) and listed in the table below tend to encompass communities located in rural, desert, mountainous areas in northern and eastern portions of the area, overlapping with planning areas like North Mountain, Desert, and Mountain Empire.

Table 12: Priority areas for improving broadband availability

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband	Consumer ISPs
191.08	Rainbow, Pala-Pauma, North Mountain, Fallbrook	med_adopt+low_avail	937	81,867	53.4%	Accel Wireless, Airpeak Wireless, AT&T California, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
209.03	Julian, Pala-Pauma, North Mountain, Desert, Ramona, North County Metro	med_adopt+low_avail	1,084	53,750	57.4%	AT&T California, Frontier Communications Corporation, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC., Zito Media
210.01	Desert, Central Mountain, Mountain Empire, North Mountain	low_adopt+low_avail	731	49,031	44.3%	AT&T California, Canyon Wireless, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC., Zito Media
210.02	Desert, North Mountain	high_adopt+low_avail	578	122,500	19.2%	AT&T California, GeoLinks, HughesNet, Viasat Inc, VSAT Systems, LLC., Zito Media
211.01	Central Mountain, Alpine, Mountain Empire, Jamul-Dulzura	low_adopt+low_avail	1,658	63,045	55.2%	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.
211.02	Central Mountain, Mountain Empire, Desert	low_adopt+low_avail	956	42,579	75.6%	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.
212.02	Central Mountain, Alpine, Jamul-Dulzura	med_adopt+low_avail	1,061	79,639	50.8%	AT&T California, Cox Communications, HughesNet, MountainMesh, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.
213.02	Alpine, Crest-Dehesa, Jamul-Dulzura, Otay	low_adopt+low_avail	1,395	106,500	65.8%	AT&T California, Cox Communications, HughesNet, MountainMesh, One Ring Networks, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.

COSTS

High Level, Order of Magnitude Cost Based on Case Studies: Around $100M to address availability needs. This initiative is a shared responsibility between public entities, municipalities, private sector providers, and other partners, who must all come together to invest. The cost is therefore intended to be spread across grants, the private sector, other public sector entities, etc.

Rationale: The essence of this pillar is encouraging the expansion of broadband middle and last mile infrastructure (particularly fiber because it is considered a future proof technology) to communities that are currently in need. Using various infrastructure variables, the Broadband Index determined which census tracts have low, medium, and high broadband availability. Households with high broadband infrastructure availability were determined to not need assistance while those with medium availability were assumed to require about 50% of the assistance as those with low availability. The estimate of the cost to address the infrastructure needs is based on the recent funding announcements from the NTIA's Broadband Infrastructure Program.[56] Twelve of the fourteen total awardees were included in the analysis (the two exclusions were North Carolina and Michigan because amount of private investment was not identified). Using the total award from the NTIA in addition to private investment dollars, total costs for each of the projects was identified. These total costs were combined with the number of premises each project covered (typically last mile fiber but sometimes also including middle mile fiber with two cases of last mile wireless) to establish the cost per premise. The median cost per premise across all examples was then scaled to the estimated number of unincorporated area households with broadband availability needs, in order to determine an estimated top-down, order of magnitude cost for San Diego county's unincorporated area.

Total Unincorporated Area household availability need for order of magnitude costing: 33,689 households

Calculated median cost per premise from NTIA Broadband Infrastructure Program Awardees: $2,854

Estimated top-down, order of magnitude cost to address availability need: $96,164,618

Table 13: Project cost benchmarks

NTIA Broadband Infrastructure Program Awardee	Total Cost	Contribution % (listed for each contributing entity)	Financing Information	Project Type	Total Premises	Cost Per Premise
Acadiana Planning Commission, Louisiana	$35,263,502			Last Mile FTTP	25,965	1,358
NTIA	$29,940,612	85%	Grant, Direct			
Private ISP Investment (assumed to be private ISP investment instead of public funds)	$5,322,890	15%	Private			
Elko County, Nevada	$18,375,002			Last Mile FTTP	5,758	3,191

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[56] https://broadbandusa.ntia.doc.gov/broadband-infrastructure-program-awardees

NTIA Broadband Infrastructure Program Awardee	Total Cost	Contribution % (listed for each contributing entity)	Financing Information	Project Type	Total Premises	Cost Per Premise
NTIA	$7,350,000	40%	Grant, Direct			
Private ISP Investment	$11,025,002	60%	Private			
Logan County, West Virginia	**$25,126,779**			**Last Mile FTTP**	**13,272**	**1,893**
NTIA	$19,678,779	78%	Grant, Direct			
Private ISP Investment	$5,448,000	22%	Private			
Lumpkin County, Georgia	**$12,795,448**			**Last Mile FTTP**	**5,654**	**2,263**
NTIA	$8,154,539	64%	Grant, Direct			
Private ISP Investment	$4,640,909	36%	Private			
Huntingdon County, Pennsylvania Note: number of individuals provided, used US Census to convert to households	**$22,736,861**			**Last Mile Fixed Wireless**	**11,417**	**1,992**
NTIA	$20,463,175	90%	Grant, Direct			
Private ISP Investment	$2,273,686	10%	Private			
Sabine County, Texas	**$17,398,574**			**Last Mile FTTP**	**5,414**	**3,214**
NTIA	$12,700,959	73%	Grant, Direct			
Private ISP Investment	$4,697,615	27%	Private			
Scott County, Kentucky	**$18,426,999**			**Last Mile FTTP**	**5,638**	**3,268**
NTIA	$3,123,999	17%	Grant, Direct			
Private ISP Investment	$15,303,000	83%	Private			
The ConnectMaine Authority	**$33,638,916**			**Last Mile FTTP**	**11,746**	**2,864**
NTIA	$28,097,295	84%	Grant, Direct			
Private ISP Investment	$5,541,621	16%	Private			
The State of Mississippi	**$36,329,248**			**Middle Mile and Last Mile FTTP and Wireless**	**12,769**	**2,845**
NTIA	$32,696,323	90%	Grant, Direct			
Private ISP Investment	$3,632,926	10%	Private			
The Missouri Department of	**$67,346,994**			**Last Mile FTTP**	**13,437**	**5,012**

NTIA Broadband Infrastructure Program Awardee	Total Cost	Contribution % (listed for each contributing entity)	Financing Information	Project Type	Total Premises	Cost Per Premise
Economic Development						
NTIA	$42,241,491	63%	Grant, Direct			
Private ISP Investment	$25,105,503	37%	Private			
The North Carolina Global TransPark Authority	**$29,985,800**			Last Mile FTTP	19,007	1,578
NTIA	$29,985,800	100%	Grant, Direct			
Private ISP Investment (not provided)	$ -	0%	Private			
The Washington State Department of Commerce	**$37,057,483**			Middle Mile and Last Mile FTTP and Wireless	7,456	4,970
NTIA	$30,000,000	81%	Grant, Direct			
Private ISP Investment	$7,057,483	19%	Private			
The Government of Guam Department of Administration	**$12,911,686**			Middle Mile and Last Mile Wireless	10,000	1,291
NTIA	$12,770,692	99%	Grant, Direct			
Private ISP Investment	$140,994	1%	Private			
Michigan State University	**$10,500,000**			Middle Mile and Last Mile Services	16,499	636
NTIA	$10,500,000	100%	Grant, Direct			
Private ISP Investment (not provided)	$ -	0%	Private			

Note: Premises include households, businesses, and community anchor institutions

RISKS

Unwillingness to pursue low-ROI expansions – High probability risk (i.e., higher probability of arising)

- Pursue grants or use incentives to mitigate investment concerns (e.g., agreement for County and partners to build middle mile and ISP to build last mile).
- Include ISPs in opportunities for Dig Once planning (e.g., County will be digging here, ISP can lay conduit and fiber at reduced costs).
- Provide discounted conduit / fiber leasing to ISPs that invest in a joint middle mile build.

High capital cost of public sector infrastructure expansion – High probability risk (i.e., higher probability of arising)

- Leverage regional partners to enter shared services model.

- Use Dig Once planning to install open-access middle mile more efficiently.

- Incrementally expand, prioritizing low / no access regions for connectivity.

- Incorporate operational savings into expansion calculation.

Existing major ISPs opposed to infrastructure being built that is not theirs – Medium probability risk (i.e.,

medium probability of arising)

- Engage ISPs to highlight how increased access to infrastructure benefits all ISPs equally, and that current

  market leaders can take advantage of the same opportunities.

BENEFITS

Extending broadband infrastructure availability through grants, public infrastructure, and streamlined permitting has been shown to:

- Incentivize ISPs to pursue further projects (e.g., encourage future ISP investment near new middle mile connections).
- Potentially spur economic development.
- Achieve savings when multiple categories of customers can be supported, e.g., community anchor institutions and residential customers.
- Improve digital equity for community institutions (e.g., public housing) who do not have access to affordable high-speed internet.
- Potentially reduce County and partner telecommunications costs by internalizing a portion of spend on infrastructure buildout/asset acquisition.
- Increases customer choice when it comes to service providers, access technologies, and speeds.
- Increases market competition and possible lower consumer costs.
- Reduces unnecessary construction and excavation through establishing a "Dig Once" policy that bolsters the County's existing Pavement Cut Policy with specific guidelines on organized installation of fiber/conduit at times of excavation.

SELECT CASE STUDIES

Rural fiber installation in Mono, Inyo, and Kern County, CA[57]

In 2013, a $120M middle mile fiber project known as Digital 395 was completed in the Eastern Sierra localities of Mono, Inyo, and eastern Kern County, California. The Digital 395 initiative laid 624 miles of fiber, connecting some three dozen communities to the fiber backbone route that had been installed along Highway 395. Financed through state and federal funding opportunities, the project built an "open access" network capable of delivering broadband speeds in some of the state's most rural, mountainous, and hard-to-build areas. The carrier-neutral network allows any service provider to interconnect on a non-discriminatory, equal basis. As a result, service quality for residents in the region greatly improved. For instance, more than 92% percent of Mono County residents now have access to Gigabit broadband.

Fixed wireless for students in McAllen, Texas[58]

By using the Citizen Broadband Radio Service (CBRS) spectrum, McAllen provided free fixed wireless access to students through a partnership with Frontera Consulting, a company with experience helping local governments roll out wireless internet access. At the time of the rollout, more than 25 percent of the city's 140,000 residents lived below the poverty line. Although students received wireless devices, some were still without access to in-home broadband. In Hidalgo County, where McAllen is located, 99 percent of residents had access to broadband, but the city had an adoption rate of only 37 percent, largely due to families' inability to pay. To implement the network, the city used the unlicensed CBRS spectrum to avoid congestion in the 5GHz unlicensed band. The city hired local workers to install a system of base stations to connect to more than 1,000 outdoor Wi-Fi access points for widespread internet coverage. The city also implemented the plan on a 60-day timeline, to provide service by the time schools opened.

Wi-Fi on Wheels for students in Coachella Valley, California[59]

Some students in rural Coachella Valley live below the poverty line and do not have access to Wi-Fi at home, making it difficult to learn online. The Coachella Valley School District has initiated Wi-Fi on Wheels by adding Wi-Fi to district school buses so that students can work on their commute to school. Additionally, the district parks the school buses in areas where disadvantaged underserved students live so that they can access this free Wi-Fi while at home. The network of parked buses covers the entire district, 1,250 square miles, and has helped to increase the graduation rate and overall student engagement. A community-based bond measure passed in 2021 funded the project.

[57]"Broadband Access." Mono County. https://monocounty.ca.gov/Broadband#:~:text=In%202013%2C%20a%20%24120m,Inyo%2C%20and%20eastern%20Kern%20Counties; "Broadband task Force: High-Speed Internet is Essential for all Counties." National Association of Counties. https://www.naco.org/sites/default/files/documents/NACo-Broadband-Task-Force_8-6.pdf
[58] "McAllen, Texas Bridges the Digital Divide with Shared Spectrum CBRS Services from Federated Wireless and Cambium Networks." Federated Wireless, 22 September 2020. https://www.federatedwireless.com/news/mcallen-texas-bridges-the-digital-divide-with-shared-spectrum-cbrs-services-from-federated-wireless-and-cambium-networks/
[59] "Coachella Valley USD launches WiFi on Wheels." USAT CORP, 8 October 2020. https://usatcorp.com/wifi-on-wheels-coachella-valley-usd/.

Cox Communications partners with Yavapai County, Arizona to expand broadband network infrastructure[60]	Yavapai County recently announced a partnership with Cox Communications to expand broadband access in its jurisdiction. The county is committing $20M of its American Rescue Plan Act (ARPA funds to the project, with public (i.e., local municipalities) and private partners (i.e., Cox) contributing as well. The expansion is expected to add more than 100 miles of network infrastructure to reach more than 3,000 underserved residents. Cox's partnership with Yavapai County is one manifestation of a larger push by the provider to commit more than $400M dollars between 2022 and 2025 to increase symmetrical gigabit connections across the country.61
Public private partnerships in Guilford County, North Carolina aim to bring high-speed internet to rural communities[62]	County commissioners in Guilford County recently agreed to spend up to $1.1M of the County's ARPA funds to support three projects to build direct-to-home fiber-optic internet. Private partners such as AT&T, NorthState, and Brightspeed have pledged to contribute up to an additional $2.3M to support the county as it looks to apply for state grants for expanding access to technology in rural parts of North Carolina. If awarded state funding, Guilford could receive another $8M in matching funds, resulting in potentially more than $10M of funding to increase broadband availability for rural areas in its jurisdiction.
Public-private collaboration increases rural connectivity in Elko County, Nevada[63]	Located in northeastern Nevada, Elko County is among the state's most rural jurisdictions. Elko's some 49,000 residents are spread out over a land area of more than 17,000 square miles. With only about three residents per square mile, the county does not appear to be a market that ISPs would typically look to expand service in. As such, Elko County has turned to P3 models of development to get residents better connectivity. In collaboration with local provider CC Communications, Elko County has announced a last-mile broadband installation project around Spring Peak, one of the county's unincorporated communities. The project is expected to bring high-speed internet to 5,568 unserved households, 169 businesses, and 21 anchor institutions at a price point of $18.37M. Elko County and its telecom partner CC Communications have agreed to split costs 60-40%. CC Communications will finance 60% of the project, while Elko County will contribute the remaining 40%. Elko's funding comes from a $7.3M grant from the National Telecommunications and Information Administration's (NTIA) Broadband Infrastructure Program.

[60] "Sedona City Council Talks Broadband." Red Rock News, 4 November 2021. http://www.redrocknews.com/2021/11/04/sedona-city-council-talks-broadband/?mc_cid=a5ef54fac0&mc_eid=632478a065
[61] "Cox investing millions in nationwide broadband network expansion projects to reach underserved communities." Cox, 2 June 2022. https://newsroom.cox.com/2022-06-02-Cox-investing-millions-in-nationwide-broadband-network-expansion-projects-to-reach-underserved-communities
[62] "Guilford County commissioners agree to spend 1.1. million in federal rescue plan money to help boost high-speed internet in rural areas." Greensboro.com, 22 April 2022. https://greensboro.com/news/local/govt-and-politics/guilford-county-commissioners-agree-to-spend-1-1-million-in-federal-rescue-plan-money-to/article_cea8f728-c262-11ec-9247-731093832646.html
[63] "Department of Commerce's NTIA Awards $277M in Grants to Expand Broadband Infrastructure." US Department of Commerce. https://www.commerce.gov/news/press-releases/2022/02/department-commerces-ntia-awards-277m-grants-expand-broadband;
"Communities." Elko County, Nevada. https://www.elkocountynv.net/communities.php;

Pillar 2. Encourage broadband adoption

CHALLENGE

While internet availability and the presence of key infrastructure is a significant barrier to internet adoption, there are other major hurdles that residents in the unincorporated area face. Affordability proves to be a major challenge to overcome in the unincorporated areas, particularly where broadband subscription costs are higher. Residents are not always aware of resources like the Affordable Connectivity Program (ACP), which offers an up to $30/month subsidy for qualifying households[64] (up to $75/month for households on qualifying Tribal lands), as well as a one-time discount of up to $100 to purchase a laptop, desktop computer, or tablet from participating providers if they contribute $10-$50 toward the purchase price. Although $30 subsidies may not be enough to fully cover monthly subscription costs, they can certainly help. Additionally, the rapid pace at which the internet and technology is advancing can often become too complicated and difficult to navigate for those who are not considered digitally literate. Consequently, digital literacy is a critical skill for unincorporated area residents to have in order to fully participate in civic engagement activities and as of late, necessary tasks such as remote learning, working, and telehealth. The digital equity gap has further exacerbated inequities throughout the pandemic, leading at-risk populations to fall further behind in the learning curve and others unable to fully participate in the digital economy as remote work opportunities continue to expand. Unless efforts to increase digital literacy are undertaken alongside other major efforts to expand broadband infrastructure, increasing digital adoption will prove to be a major challenge.

DESCRIPTION

The third pillar emphasizes the importance of promoting broadband adoption by addressing the barriers that go beyond the availability of infrastructure. These challenges are more socioeconomic in nature and typically tend to disproportionately impact low-income families and demographic groups who may struggle with navigating the internet. The intention is that once the appropriate infrastructure is set in place to roll out broadband services, all families and residents in San Diego county's unincorporated area can use it.

2.1 Continue to publicize the Affordable Connectivity Program (ACP) – While the ACP is an incredible resource for qualifying low-income households, many do not know about it. There is already a push in the region to spread awareness through SANDAG's Get Connected campaign, of which the County is a partner along with 211 San Diego and others. Since May 2022, the County has ensured there was enhanced focus for providing information to unincorporated area residents, and others in the region. Departments placed fliers and posters in customer common areas, lobbies, and service counters, while County staff who interact with community members out in the field provided fliers in person. As part of Summer Movies in the Park hosted by the County Department of Parks and Recreation, Get Connected advertisements were included in the reels that played before movies and the Registrar of Voters assisted with placing ACP information into filler pages of voting guides for the upcoming 2022 election. To ensure unincorporated area residents were informed of the ACP and other resources available through Get Connected, the County sent a direct mail postcard to every household within unincorporated area zip codes in October 2022. Continuing to raise awareness of the ACP to help alleviate the financial burden of a broadband subscription will ensure eligible households are aware of the program and facilitate enrollment to make it easier to sign up where possible. These efforts can be supplemented with leading practices outlined in the National Association of Counties (NACO) Outreach Toolkit, and resources in the FCC's ACP Consumer Outreach Toolkit, that leverage successfully proven initiatives across the country that have enrolled thousands, while tailoring them to address the unique needs of local residents.

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[64] For more information on ACP eligibility, see: https://www.fcc.gov/acp

2.2 Coordinate digital navigator and technical assistance program – The internet is a wide, ever-growing realm where the possibilities are endless. However, if residents are not able to properly navigate the internet, they cannot take full advantage of its capabilities such as growing small businesses, enrolling in important government services, applying for jobs, communicating with doctors, maintaining, and developing social circles, and much more. Several small-scale programs have been created to meet this need, including weekly technology help "drop-ins" at participating San Diego County libraries, and digital literacy trainings offered by the San Diego Futures Foundation, held at several location in the city of San Diego. Rolling out a county-wide digital navigator program and technical assistance hotline that prioritizes underserved areas would help extend these efforts to more residents who need them. The intention of these programs is to proactively teach residents how to use the internet, their technology devices, and serve as a resource when they need assistance.

2.3 Continue device distribution, loan, and recycling program – As devices have become slimmer and savvier, it is also noticeably evident that they have gotten prohibitively more expensive. For residents who struggle to pay for bills and basic necessities, this is a significant barrier to broadband adoption. While there are more devices available through schools and libraries, thanks to the FCC's Emergency Connectivity Fund, there are also unused devices that households have since replaced with upgraded and more advanced devices. Getting these surplus devices to students and households that do not have sufficient access to the internet at home requires a plan. Supporting and furthering device recycling programs, like the San Diego Futures Foundation device recycling program, can help achieve the ambitious goal of all households in the unincorporated area having a computer.

JUSTIFICATION

Digital adoption initiatives are needed to help bridge the gap to harder to reach, low-income, and non-English speaking communities. In doing so, the County can address non-infrastructural barriers that prevent constituents from obtaining access to reliable, high-speed internet by addressing such needs from financial assistance to device giveaways and training.

STAKEHOLDERS

Potential stakeholders include the California Public Utilities Commission, regional associations such as SANDAG, San Diego Workforce Partnership (SDWP), County and other local libraries, as well as relevant Community Based Organizations that conduct community engagement with underserved populations, including connecting communities with digital literacy training and digital devices.

CONSIDERATIONS

Some considerations to keep in mind for this broadband adoption pillar include:

- The County has already started coordinating marketing of the ACP as well as providing devices through the Emergency Connectivity Fund. Much of this pillar is intended to monitor the success of those programs for possible expansion.

- Key metrics of ACP can be tracked. Work with partners (e.g., 2-1-1 San Diego) to identify the number of residents enrolled in ACP program and the number of eligible residents not enrolled using data collected from benefits tracking programs. The California Emerging Technology Fund (CETF) and the Geographical Information Center at Chico State Enterprises (CSE) have developed an ACP enrollment tracker to assist with this endeavor.

- Because the ACP is still relatively new, it would be helpful to better understand process pain points for individual users and how the process might be facilitated (e.g., coordination with other social service programs, use of digital navigators, automatic enrollment).

- Existing CBOs are likely already doing digital equity work and have established relationships with their communities. These will likely be great partners for the region due to their expertise and connections with local communities and demographics. CBOs already providing technical assistance and training

programs can be asked whether they can be scaled or applied to other populations not currently engaged. They can also be resources to gauge ongoing community needs for internet enabled devices and interest in digital skills training and one-on-one coaching as well as determining priority communities.

- Continue with regional partners such as SANDAG to market programs such as the ACP.
- The San Diego County Public Library system is a trusted community institution that is already frequented by residents that struggle with reliable internet access all over the unincorporated area and will be a valuable partner in rolling out programs intending to expand internet access.
- Setting goals to measure the progress and reach of these broadband adoption initiatives will be important to gauge success and evaluate whether populations in need are being reached.

PRIORITY AREAS

The digital literacy initiatives introduced in the previous section should be first applied in lower income communities in unincorporated county. The high costs associated with high internet subscription and technology devices are barriers to broadband adoption. As such, internet subsidies, device loans and giveaways, along with digital navigators and digital literacy training can be successful initiatives to secure household access to the internet and enable them to use it. The identified areas include census tracts (outlined in yellow in Figure 14 later in the Appendix) around the Fallbrook, Spring Valley, and Mountain Empire planning areas. Additional details regarding the census tract priority areas are presented in the table below.

Table 14: Priority Areas for Improving Broadband Adoption

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband	Consumer ISPs
32.07	Spring Valley, Sweetwater	low_adopt+ high_avail	1,745	$ 106,848	30.8%	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
122	County Islands[65]	low_adopt+ med_avail	438	$ 49,559	34.1%	AT&T California, Cox Communications, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
122	Spring Valley, Valle De Oro	low_adopt+ high_avail	1,222	$ 73,363	34.8%	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.
139.07	Spring Valley	low_adopt+ high_avail	1,315	$ 49,205	27.5%	AT&T California, Cox Communications, HughesNet, San Diego Broadband, Viasat Inc, VSAT Systems, LLC.
165.02	Lakeside	low_adopt+ high_avail	1,719	$ 60,705	24.2%	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
165.04	Lakeside	low_adopt+ med_avail	1,245	$ 48,916	29.8%	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.
167.06	Lakeside	low_adopt+ high_avail	895	$ 95,467	24.7%	AT&T California, Canyon Wireless, Cox Communications,

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[65] Lincoln Acres

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband	Consumer ISPs
						HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
189.03	Fallbrook, Pendleton-De Luz	low_adopt+ high_avail	1,611	$ 56,569	26.3%	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
189.04	Fallbrook, Pendleton-De Luz	low_adopt+ high_avail	1,870	$ 51,331	30.3%	AT&T California, Charter Communications Inc, HughesNet, Ranch Wifi, LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
189.05	Fallbrook	low_adopt+ high_avail	1,846	$ 59,280	25.4%	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
189.06	Fallbrook, Pendleton-De Luz	low_adopt+ high_avail	1,915	$ 67,208	26.7%	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
210.01	Desert, Central Mountain, Mountain Empire, North Mountain	low_adopt+low_avail	731	$ 49,031	44.3%	AT&T California, Canyon Wireless, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC., Zito Media
211.01	Central Mountain, Alpine, Mountain Empire, Jamul-Dulzura	low_adopt+low_avail	1,658	$ 63,045	55.2%	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.
211.02	Central Mountain, Mountain Empire, Desert	low_adopt+low_avail	956	$ 42,579	75.6%	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.
213.02	Alpine, Crest-Dehesa, Jamul-Dulzura, Otay	low_adopt+low_avail	1,395	$ 106,500	65.8%	AT&T California, Cox Communications, HughesNet, MountainMesh, One Ring Networks, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.

COSTS

High Level, Order of Magnitude Cost Based on Case Studies: Around $15M to address adoption needs. This initiative is a shared responsibility between public entities, municipalities, private sector providers, and other partners, who must all come together to invest. The cost is therefore intended to be spread across grants, the private sector, other public sector entities, etc.

Rationale: In a similar vein as pillar 1, pillar 2 is based on case studies and the number of households classified as low or medium adoption. Each of the counties in the US with a top 10 most populous city was reviewed for broadband adoption programs (not all counties had an identified adoption program with costs). These programs can vary in size and scope (e.g., some particularly focus on students, others on devices and hotspots), but are all focused on broadband adoption. The overall costs for each of the programs, alongside the number of households addressed by each program, allowed us to calculate a cost per household ratio for several case studies. The median cost per household calculated across these case studies was then scaled to account for San Diego county's unincorporated area needs in order to estimate an order of magnitude cost for a similar project.

Total Unincorporated Area household adoption need for order of magnitude costing: 31,514 households

Median cost per household addressed by adoption measures: $484

Estimated top-down, order of magnitude cost to address adoption need: $15,263,978

Table 15: Project cost benchmarks

	Adoption Measures Description	Adoption Measures Spend	Households Addressed	Cost Per HH Addressed
County of Los Angeles, CA	Device lending, digital literacy, job training, public Wi-Fi	$12,000,000	N/A	N/A
Harris County, TX	WiFi hotspots, devices, affordability program	$32,000,000	40,000	800
Maricopa County, AZ	Hotspots	$6,800,000	29,790	228
City of Philadelphia, PA	Affordability, hotspots & devices, literacy	$17,100,000	35,000	489
Santa Clara County, CA	Affordability, hotspots & devices, literacy	$14,500,000	30,200	480

RISKS

There are risks that to keep in mind throughout implementation of the strategies and initiatives listed above. These include:

Overlap with existing digital literacy programs – High probability risk (i.e., higher probability of arising)

- The County can work with other entities (e.g., SANDAG) to coordinate and unite efforts under a single umbrella (e.g., coordinate public, non-profit, private, and other initiatives) in order to provide comprehensive and complementary services throughout the unincorporated area.
- The County plans to emphasize support for digital literacy offerings for key populations that live in areas where there are few or no ongoing efforts to promote digital literacy (e.g., areas and populations not already served by programs created from the funds County received from Emergency Connectivity Fund).

Low attendance or uptake of digital literacy programs – Medium probability risk (i.e., medium probability of arising)

• The County will engage with partners to communicate programs, link to related services (e.g., here is how digital literacy can allow people to access these other programs online).

Location cannot support digital literacy programs – Low probability risk (i.e., lower probability of arising)

• Should the County begin to roll out more digital literacy trainings in addition to those at their libraries, it should also strategically designate locations that are not only accessible to key populations but will be able to support the digital program needs (e.g., location has sufficient internet access, devices, etc.).

BENEFITS

While the benefits of these initiatives may be self-explanatory, it is still worth listing host of benefits that come with promoting digital adoption and expanding affordable and reliable internet access to all unincorporated area residents. In evaluating the benefits, it is important to keep in mind:

• **Internet subsidy programs will remove a significant barrier to broadband adoption** and help spur greater adoption across the unincorporated area.
• **Low-income families can participate more freely in the digital economy and digitally navigate online resources** as internet use can help with job applications, job attainment, participating in government services and programs, and telehealth.
• **There is already digital literacy work taking place** in each of the County branch libraries.
• **Stakeholders and residents have repeatedly stressed the need for digital literacy** to coincide with other broadband projects, proactively identifying the risk of expansion without adoption.
• **Leveraging digital navigators to assist community members in internet adoption** and the use of computing devices help residents.
  • Gain skills to compete in the modern-day workforce.
  • Access to County and other services (i.e., telehealth) online.
  • Drive economic development and workforce development.
• **Widespread use of internet enabled devices can help close the gap in educational attainment** as low-income students are able to reliably complete homework and gain access to educational materials after school.

SELECT CASE STUDIES

Salt Lake City Public Library Digital Navigator Program, UT[66]	The project aim was to address the need for emergency access to ICT resources as a result of COVID-19. Three high need neighborhoods were selected for the program. Digital navigator training was delivered by SLPCL and NDIA with a goal of helping at least 450 individuals to meet personal connectivity and digital adoption goals. In total 585 individuals were reached over a 10-month program with 16.92% of respondents able to connect with Lifeline or Comcast Internet Essentials.

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[66] "Digital Navigators." *Salt Lake City Public Library*, Salt Lake City, https://services.slcpl.org/digital-navigators

Seattle Public Library Hotspot Program, WA[67]	In partnership with Google and the Seattle City Council (funders), SPL initiated a hotspot lending program for homeless, unemployed, and low-income individuals. 675 hotspots are available for loan for free up to 21 days with an additional 325 hotspot devices reserved for "communities most in need". SPL partnered with the Seattle Housing Authority and Goodwill Training & Job Centre (amongst others) to help reach those who could most benefit.
Kramden Institute Device Refurbishing Program, NC[68]	Kramden Institute is a nonprofit that provides refurbished or donated computing devices to eligible K-12 students, adults, and nonprofit organizations. 43,600+ computers have been awarded since 2003 across 80 counties in North Carolina. They also provide digital literacy classes including train-the-trainer programs and incorporate an e-waste recycling program.
Los Angeles County Delete the Divide, CA[69]	The Delete the Divide campaign is an Internal Services Department led partnership initiative to unite public, private, academic, and community-based organizations to empower youth and small businesses in underserved communities to bring internet access to 365,000 households across the County.
Durham Housing Authority Internet Subsidy, NC[70]	The City of Durham partnered with Duke University and DHA to provide high speed wireless internet for the residents of eight Durham Housing Authority properties. The project is funded partially by money allocated by the City from funds provided through the CARES Act Federal Relief Program. The primary project objective is to provide connectivity for public school students living at the identified DHA properties to facilitate remote learning given the necessities of the COVID-19 crisis.

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[67] "Digital Equity." *The Seattle Public Library*, The Seattle Public Library, https://www.spl.org/programs-and-services/social-justice/digital-equity.
[68] "Kramden Institute Bridges Digital Divide with Refurbished Computers." *Kramden Institute*, Kramden Institute, 9 Feb. 2016, https://kramden.org/ki-bridges-divide-opensource/.
[69] "The Digital Divide." *Delete the Divide*, County of Los Angeles, https://www.deletethedivide.org/.
[70] "Get Connected at Home with Free Wi-Fi." *Durham Housing Authority*, Durham Housing Authority, https://www.durhamhousingauthority.org/whats-new-view?id=246.

Pillar 3. Partner and oversee

Organized collective action to provide greater flexibility for local governments in meeting constituents' connectivity needs. Provide centralized oversight for strategy implementation and a hub for partnerships, data-sharing, communication, and community engagement.

DESCRIPTION

3.1 Dedicate personnel to coordinate efforts and apply for grants - A dedicated coordination team will serve as the primary point of contact for broadband efforts in the region, particularly the unincorporated areas. This resource will provide on-the-ground support for implementation of the Plan as well as ongoing broadband investment efforts. Responsibilities include, but are not limited to:

• Facilitating strategy and tactical implementation / coordination.
• Organizing the asset inventory and data sharing with ISPs and partners.
• Coordinating joint funding efforts with partners, including cities, SANDAG, Caltrans, utilities, and tribal governments, compiling, and submitting County grant applications and compliance requirements for funding.
• Continuing and directing tailored community outreach to validate gaps and needs.
• Shepherding policy and process changes related to infrastructure permitting, approvals, etc.
• Serving as the primary point of contact for ISPs and other potential partners.
• Identifying and forecasting present and future broadband needs.
• Measuring success, including process and outcome metrics.
• Working closely with the San Diego Workforce Partnership to support the creation of more local workforce development for broadband expansion related activities.
• Opportunities to support economic development and skilled labor supply.

3.2 Create sustained stakeholder and community engagement channels - Increasing equitable access to broadband in the unincorporated area will require dedicated resources and partnerships with other organizations in this space. Before entering such agreements, it is important that all partners understand the unique challenges and future goals that communities in unincorporated areas have when accessing broadband. These challenges include a lack of accurate, granular data on internet speeds and reliability, which could be improved through joint assessments and sharing existing data. In this way, solutions that address both availability and adoption should work together to address resident needs most effectively.

3.3 Measure program and outcome success – Measuring success against key metrics will be crucial for tracking progress against the long-term initiatives embedded in the Comprehensive Broadband Plan. Key metrics to track the success of the Plan can include the following:

• Availability: Households with access to at least 100/20 Mbps.
• Reliability: Internet Downtime.
• Affordability: ACP enrollment, Avg $/Mbps.
• Overall Adoption: Number of broadband subscriptions.

This does not have to be an exhaustive list, and additional metrics should be established by the various entities and partners working together to track progress against the pillars and strategies outlined in the Comprehensive Broadband Plan.

JUSTIFICATION

It is important to centralize the management of broadband investment efforts to improve knowledge and data-sharing, provide a primary POC for potential partners, grant applications, and community members. A dedicated resource will ensure that projects gain traction and maintain momentum.

STAKEHOLDERS

Municipalities and local government, ISPs, CBOs and other non-profits, Caltrans, community anchor institutions, residents of the unincorporated area at large

CONSIDERATIONS

Considerations for this partner and oversee pillar include:

- If there are sufficient resources and demonstrated need, may consider increasing the number of dedicated or part-time staff as projects get underway and workload increases.
- This team can continue to work with SANDAG's task force and partners to pursue grants, highlighting opportunities in the unincorporated area.
- Other grant eligible entities, especially smaller CBOs, may benefit from grant writing support, which County or other partner resources could offer.
- Ongoing community outreach is important to validate gaps and needs, particularly around affordability and adoption, and is recommended to be overseen by the dedicated resource.
- A central repository of organizations and their relevant work may be helpful to manage ongoing broadband partnerships and conduct outreach as needed for future potential partnerships.
- The positions in this pillar are a suggested team and may not be needed depending on the number of grants the County and partners pursue.

COSTS

High Level, Order of Magnitude Cost Based on Case Studies: Around $6.6M to staff a broadband team for 10 years.

Rationale: This pillar is effectively a cross-cutting one to manage and oversee progress of the other two pillars. A team of broadband-focused staff members would be the primary cost of this pillar. It was challenging from desktop research to identify number of personnel and titles for comparable teams in similar jurisdictions, but three roles were identified as being helpful to keep momentum for broadband going: 1 Program Manager, 1 Technical Analyst, and 1 Community and Stakeholder Engagement Specialist.

Costs were estimated by using the mid-point for the positions identified with an additional 49% for benefits, which is the current percentage provided by the County's Office of Financial Planning. Years 2 through 10 factored in a 3% increase for increased salary, retirement, and benefit credits. Services and supplies were estimated at $5,000 annually per employee for phone, IT, and supplies. The total estimated cost does not include consultant contracts or other contracted services.

Table 16: Peer approaches to staffing broadband team positions

	Broadband Team Equivalent Description	Broadband Team Staffing
Harris County, TX	Office of Broadband	3
City of Philadelphia, PA	Office of Innovation and Technology	3 (estimated based on staffing of Innovation team)

RISKS

Current staff are already at capacity with existing projects and there is high demand for new workers experienced in broadband work – high probability risk (i.e., higher probability of arising)

• Develop a staffing plan and identify and pursue funding opportunities that can be used to fund labor costs both in the short and long term.

• If not hiring new staff, then dedicating a portion of existing staff's time to broadband work, particularly to pursue grants and coordinate projects.

BENEFITS

• Facilitation of broadband strategy and future broadband initiatives.
• Streamlined project management and grant compliance.
• Centralized knowledge and data repository within the County government.
• Single point of contact for partners and community members for unincorporated area projects.

SELECT CASE STUDIES

Office of Broadband in Harris County, TX[71]	The Office was initiated in November 2020 after Harris County Commissioners Court determined a greater need for more public internet, particularly to communities where both home internet and public internet were not readily available. The Office of Broadband's mission is to implement equitable and resilient broadband availability through the engagement of stakeholders, community partners, and residents. The Office of Broadband enables Harris County to connect, work, and innovate by increasing access to affordable and resilient broadband service.
Office of Broadband and Digital Equity in City of Baltimore, MD[72]	The Director of Broadband and Digital Equity role of the Office of Broadband and Digital Equity, funded with grant support. Baltimore is one of the only cities with an executive-level Digital Equity Director. This role focuses on how to expand high-speed, affordable internet access to over 60,000 Baltimore households that are currently without this critical necessity. The Office plans to hire a Digital Equity Coordinator and staff with expertise in wi-fi rollouts, fiber engineering, operations, and tech support. These positions will be funded through pre-existing resources and will not require the allocation of additional funds.

[71] "Bridging the Digital Divide." *Office of Broadband*, Harris County, https://broadband.harriscountytx.gov/.
[72] "Office of Broadband and Digital Equity." *City of Baltimore*, https://bde.baltimorecity.gov/.

| Office of Broadband Programs in Montgomery County, MD[73] | The Office of Broadband Programs manages use of public rights-of-way in Montgomery County by cable television providers, negotiates and enforces obligations in cable franchise agreements, provides consumer assistance with cable issues and complaints, and supports County policies addressing compensation for use of public rights-of-way by communications providers. The Office manages the Transmission Facility Coordinating Group to provide engineering review of applications to install towers and antennas for wireless services in Montgomery County, and coordination for rollouts of wireless facilities among department and agencies. |

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[73] "Office of Broadband Programs: Services." The Office of Broadband Programs, Montgomery County MD, https://montgomerycountymd.gov/obp/.

District-specific analysis

This section disaggregates and contextualizes findings and recommendations in the Plan by supervisorial district. Included in each district's 'Overview and Needs' section is a list of top priority census tracts, organized by broadband accessibility needs (i.e., does a given district need to prioritize improving broadband availability, adoption, or both) and then by how much the geographical presence of these census tracts intersects with the unincorporated areas of the given district. A full list of these priority tracts is included at the end of this report with additional information.

In the 'District Recommendations' section, we present recommendations on district-specific strategies the County and partners can consider addressing broadband accessibility challenges. Relevant stakeholders were sourced from County provided documents. These were then used to map stakeholder entities to a given supervisorial district based on that district's geographic boundaries and stakeholder location provided by the SanGIS interactive map/parcel lookup tool. This is true for all stakeholder entities listed below, except for Public Safety stakeholder entities and ISPs, which were mapped using the same process as the census tract priority table. The table below summarizes how stakeholders were mapped to districts:

Table 17: Definitions used for stakeholder mapping featured in 'District Recommendations'

Stakeholder	Definition
Community Planning Area	Community Planning Areas (sourced from Planning & Development Services) were mapped to a given supervisorial district by assessing which groups appeared to be located within that district's geographic boundaries using the SanGIS interactive map/parcel lookup tool.
Tribal Reservations	Tribal Lands in the San Diego Region (sourced from County of San Diego Assessor's Mapping Division, San Diego Geographic Information Source (SanGIS), SANDAG) were mapped to a given supervisorial district by assessing which groups appeared to be located within that district's geographic boundaries using the SanGIS interactive map/parcel lookup tool.
School Districts	County School Districts (sourced from the County of San Diego) were mapped to a given supervisorial district by assessing which School Districts appeared to be located within that district's geographic boundaries using the SanGIS interactive map/parcel lookup tool.
Libraries	Library Locations (associated with San Diego County Library) were mapped to a given supervisorial district by assessing the addresses of the Libraries that appeared to be located within that district's geographic boundaries using the SanGIS interactive map/parcel lookup tool.
Fire Districts/Departments	Fire Districts and Departments were mapped to a given supervisorial district if any portion of their geography intersected with a census tract that overlapped with the district's geographic boundaries. Municipal public safety entities that overlap geographically with a district were included because it is likely that residents could benefit from broadband related programs or initiatives that these entities might support or provide.
Law Enforcement	County Sheriff and local police department stations were mapped to the centroid of their location's census tract, and then assigned to the district(s) that intersects with that census tract. Municipal public safety entities that overlap geographically with a district were included because it is likely that residents could benefit from broadband related programs or initiatives that these entities might support or provide.
Consumer ISPs	Consumer ISPs that report offering any level of consumer service within a given census tract were mapped to the district(s) that intersect with that census tract.
Commercial ISPs	Commercial ISPs that report offering any level of commercial service within a given census tract were mapped to the district(s) that intersect with that census tract.

Each district analysis also has an accompanying map of that district's broadband needs and assets (Figures 16 – 20 in the Appendix). These maps visualize Broadband Index typologies and number of households with no wire-based broadband (i.e., DSL, cable, fiber) subscriptions by census tract, planned and existing fiber infrastructure locations/routes, community anchor institutions, and population counts at the census block level. Figure 15 in the Appendix further expands on how to read and interpret the district maps that accompany each analysis.
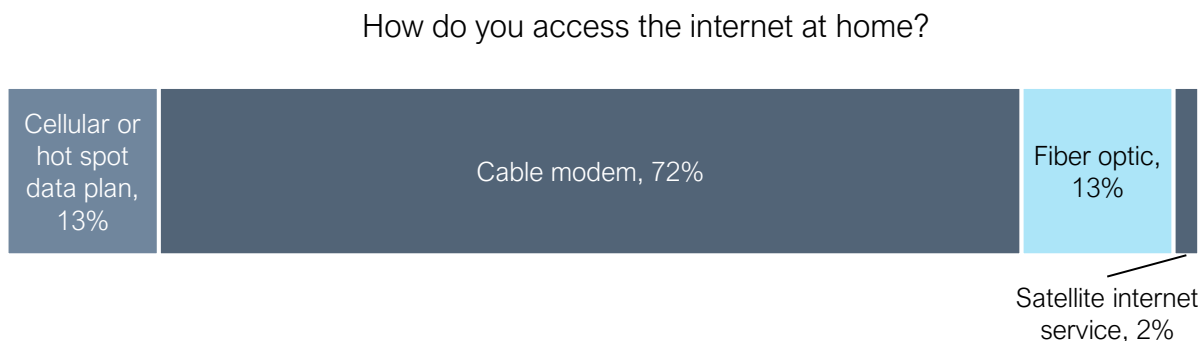
District 1

Overview and Needs

Supervisorial District 1 is situated on the southwestern border of San Diego county. While the district is primarily comprised of incorporated communities, it does include some portions of the more suburban unincorporated areas of the region. With respect to the latter, District 1 primarily overlaps with CPSGs such as Spring Valley, Sweetwater, and Otay, and is near others such as the District 2 communities of Valle de Oro and Jamul-Dulzura. Unincorporated population centers such as La Presa and Bonita are clustered in the north/northeastern portion of the district and largely developed, urbanized areas, especially in comparison to unincorporated communities in the region's backcountry. Average population density of census tracts that intersect with the district is nearly 10,000 persons per square mile, which is more than 10 times the population density for the region as a whole (790 persons per square mile) and about twice as dense as populations in census tracts that intersect with the larger, more rural Districts 2 and 5 (~5,000 persons/square mile).

Unincorporated District 1's proximity to the area's urban municipalities gives it an advantage with respect to certain aspects of broadband accessibility. Namely, broadband availability, as measured by the proximity of wired broadband infrastructure, is robust relative to other districts in the region. Data provided by SANDAG indicates that fiber is present in a sizable share of census blocks in the district.[74] In addition, publicly owned fiber that is a part of the regional transportation fiber ring, as well as fiber owned by DPW for traffic management, both run in and around the unincorporated areas of District 1 between Bonita and La Presa. Existing fiber infrastructure is expected to be further supplemented by the State of California's proposed middle mile network, which currently plans to run middle mile fiber routes through the district on SR-125.

The availability of broadband infrastructure in District 1 is reflected in both provider-reported data on service types offered in the area and survey data collected directly from community members themselves. On the former, both FCC 477 data and CPUC Broadband Mapping Program data indicates that census blocks that comprise unincorporated District 1 census tracts are relatively served.[75] With the latter, survey data collected for respondents based in District 1 indicates that 85% of survey takers in this category connect to the internet through fiber or cable at home (Graph 6 below).

Graph 6 Home internet access technologies used by District 1 survey respondents[76] (n=47)

How do you access the internet at home?

| Cellular or hot spot data plan, 13% | Cable modem, 72% | Fiber optic, 13% | |

Satellite internet service, 2%

Despite substantial broadband infrastructure driving high levels of broadband availability in District 1, broadband adoption among the unincorporated communities in the jurisdiction remains relatively low based

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[74] Census blocks highlighted on this map indicate that fiber passes through some portion of the block. Presence of fiber may be indicative of middle mile fiber or the segment of telecom networks that link the backbone to the local network. It does not necessarily indicate availability to census block residents.
[75] Defined as Census tracts that intersect with both District 1 and unincorporated jurisdiction geographies
[76] For the whole district, not disaggregated by incorporated/unincorporated jurisdiction

on outputs of the Broadband Index. Part of this disparity may relate to the fact that the district is home to some of unincorporated area's most socioeconomically disadvantaged. In La Presa for instance, the median household income (measured by the Census across all household sizes) is less than $75,000, according to American Community Survey 5-year data released in 2020.[77] Disaggregating further among census tracts in the area, we find that out of 33 census tracts that intersect with the unincorporated area and District 1, only three (9%) have been classified by the Broadband Index as having high levels of broadband adoption. The table below highlights three of the lowest scoring tracts among a cluster of low/medium adoption tracts in unincorporated District 1 that overlap with CPSGs such as Spring Valley, Sweetwater, and County Islands (encompassing the unincorporated communities of Lincoln Acres, Bonita, and La Presa). All tracts listed have a higher percentage of households with no wired broadband subscription than the region-wide average (~20%).

District 1 Table 1: Priority low adoption tracts

Tracts	CPSGs	Type	Households in UA[78]	Median household income	% Households with no wired broadband (fiber, cable, DSL)	Consumer ISPs[79]
32.07	Spring Valley, Sweetwater	low_adopt+ high_avail	1,745	$106,848	30.8%	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
122	County Islands[80]	low_adopt+ med_avail	438	$49,559	34.1%	AT&T California, Cox Communications, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
139.07	Spring Valley	low_adopt+ high_avail	1,315	$49,205	27.5%	AT&T California, Cox Communications, HughesNet, San Diego Broadband, Viasat Inc, VSAT Systems, LLC.

As such, the County and relevant partners should consider prioritizing **strategies that aim to lower adoption barriers for unincorporated community members residing in District 1**. On infrastructure development to further increase availability of broadband in District 1, the County may consider ways of integrating/leveraging existing public fiber infrastructure laid between the unincorporated communities of Bonita and La Presa for regional transportation as well as traffic management to identify possible options for subsidizing the cost of installing last-mile, FTTP for underserved residents in the unincorporated areas of the district.

District Recommendations

The Plan's strategies to increase broadband adoption are expected to be more relevant for District 1 constituents than other districts where infrastructure availability is a more major factor. Particularly in unincorporated communities such as Lincoln Acres and La Presa, efforts to increase broadband access should largely prioritize reducing financial and knowledge barriers. These efforts depend on successful

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[77] Median household income is $70,600 based on ACS 2020 5-year estimates; https://censusreporter.org/profiles/16000US0640326-la-presa-ca/
[78] Estimate. Assuming uniform distribution of households in the tract, takes the number of households and scales it by the percentage of land area of tract that intersects with the given district
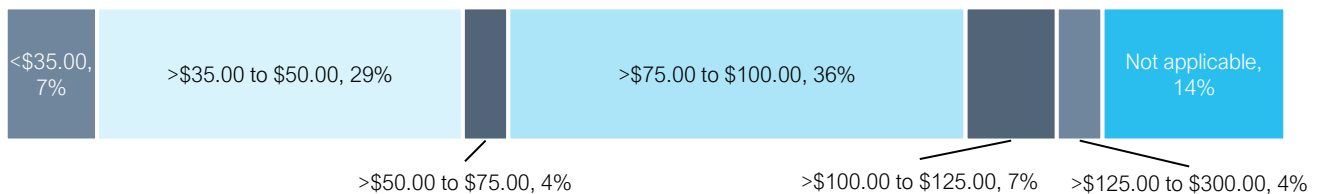[79] Inclusive of ISPs that can or do offer any level of consumer service in Census blocks of a given tract
[80] Lincoln Acres

application of pillar strategies, coordination with partners, and ability to obtain funding. In assessing financial barriers to broadband, survey data collected for respondents based in District 1 indicates that 61% of survey takers pay more than $100/month for their home internet service, which demonstrates the high cost of home internet plans in the area.

Graph 7 Prices of home internet plans from District 1 survey respondents[81] (n=28)

How much do you pay for your home internet plan each month?

| <$35.00, 7% | >$35.00 to $50.00, 29% | | >$75.00 to $100.00, 36% | | | Not applicable, 14% |

>$50.00 to $75.00, 4%   >$100.00 to $125.00, 7%   >$125.00 to $300.00, 4%

➤ **Apply pillar 2 strategies that focused on affordability and digital device access to increase adoption.** Multiple communities in District 1 could benefit from enrollment in existing discount programs like the FCC's Affordable Connectivity Program (ACP). For instance, in one Lincoln Acres Census tract classified as a low adoption area by the Broadband Index, the median household income in 2020 was a little under $50,000,[82] and the average household size for the region was about 4 members. This serves as a good indicator that residents in the tract could be eligible for ACP (the threshold income for a family of four to participate in ACP is $55,500)[83] and/or other internet cost subsidies.

There are multiple community anchor institutions in unincorporated District 1 that the County can coordinate with to design, promote, and implement initiatives, existing and forthcoming, that both help connect residents with adoption needs to the right resources and equip them will the skills they need to so on their own. Schools, libraries, and fire stations have been highlighted during stakeholder and community engagement sessions as institutions that are particularly involved in supporting broadband adoption. The 'Coordinating Entities' section below highlights key partner organizations the County should coordinate with to deliver services and programs for unincorporated community members in the district.

For some tactical considerations, outreach and marketing of broadband adoption programs may require dedicated and extended effort in District 1 as the County begins efforts to increase the number of unincorporated community residents here with connections to reliable, future-proof internet. This possibility emerges from the particular demographic attributes of the area. As a whole, District 1 is a majority-minority jurisdiction, and this population distribution continues to be reflected in the communities that have been identified to coincide with census tracts that have the lowest level of broadband adoption. For instance, census data for the communities of La Presa and Bonita suggests that they are both majority-minority communities, with Hispanic individuals comprising the largest share of non-white populations in each place. Relatedly, these areas are also home to significant shares of county residents with characteristics of hard-to-reach populations (e.g., diverse language speakers).

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[81] For the whole district, not disaggregated by incorporated/unincorporated jurisdiction
[82] https://censusreporter.org/profiles/14000US06073012200-census-tract-122-san-diego-ca/
[83] https://www.affordableconnectivity.gov/do-i-qualify/

➢ **Prioritize coordination (pillar 3) to promote infrastructure expansion efforts in parallel with public and private partners active in the area (pillar 1).** Although increasing the availability of broadband infrastructure in the unincorporated areas of District 1 may not be the major priority for increasing broadband accessibility, it is still valuable to be aware of (and take advantage of) planned capital development in the area (e.g., the proposed middle mile route running along SR-125 in the northern tip of the district). Indeed, broadband availability is in some sense a precursor to adoption, and investments made to lower the cost of building and maintaining infrastructure in the area may very well generate positive indirect effects on the affordability of downstream connections for consumers in the area. It is important to be collaborative in efforts to expand or operationalize existing wired broadband infrastructure, across the public and private sector, industries, and multijurisdictional boundaries.

Coordinating Entities

➢ **CPAs:** CPAs in District 1 are Jamul / Dulzura, Spring Valley, and Sweetwater.

District 1 Table 2: CPAs

CPA
Jamul / Dulzura
Spring Valley
Sweetwater

➢ **Libraries:** Libraries generally represent valuable on the ground partners that can act as a conduit through which the County can connect and interact with residents to further initiatives around broadband adoption. County Libraries in District 1 are Bonita-Sunnyside, Imperial Beach, Lincoln Acres, and Spring Valley. There is also a 24/7 County Library-to-go located in Chula Vista.

District 1 Table 3: County Libraries

County Libraries
Bonita-Sunnyside
Imperial Beach
Lincoln Acres
Spring Valley

➢ **Schools:** For District 1 to address barriers related to broadband adoption, the County can work with stakeholder groups that can reach communities of need and hard to reach populations. Specifically, the County may wish to work with Spring Valley, Chula Vista, San Ysidro, South Bay Union, Southwestern Community College, and Sweetwater Union High school districts on ensuring that communities with diverse language speakers are aware of broadband affordability programs. School districts highlighted below include the subset of District 1 school districts that intersect with low broadband access tract types and share land area overlaps with unincorporated county jurisdiction.

District 1 Table 4: School Districts

School Districts
Chula Vista
San Ysidro
South Bay Union
Southwestern Community College
Sweetwater Union High

➢ **Public Safety:** Coordinating with District 1's public safety stakeholders will aid in communicating and advancing future activities related to broadband. Some municipal public safety entities overlap geographically with the District, and it is likely that District 1 residents could benefit from broadband related programs or initiatives that these entities might support or provide.

District 1 Table 5: Public safety entities in or near District

Law Enforcement	Fire Districts/Departments
Chula Vista Police	Bonita-Sunnyside Fire Protection District
Coronado Police	San Miguel Fire Protection District
National City Police	Chula Vista Fire Department
San Diego Police - Central Division	Imperial Beach Fire Department
San Diego Police - Midcity Division	City Of San Diego Fire Department
San Diego Police - Southeastern Division	National City Fire Department
San Diego Police - Southern Division	Coronado Fire Department
San Diego Police Headquarters	Heartland Fire & Rescue
Sheriff - Bonita Storefront	San Diego County Fire Authority
Sheriff - Imperial Beach Substation	
Sheriff - Lemon Grove Substation	
Sheriff - Rancho San Diego Station	
Sheriff - Spring Valley Storefront	

➢ **ISPs**: The following consumer ISPs report that they offer or are able to offer service in the census blocks that comprise low access census tracts in District 1 and can serve as a starting point for the County as it looks to identify private sector partners and investments for regional broadband development.

District 1 Table 6: ISPs

Residential ISPs[84]	Commercial ISPs[85]
AT&T California	Allstream Business US, LLC
Charter Communications Inc	Call One Inc
Cox Communications	CenturyLink
GeoLinks	Charter Communications Inc
Google Fiber California	Coba Internet
HughesNet	Cogent Communications
Lokket Inc	Crown Castle Fiber
MountainMesh	Earthlink Business, LLC
One Ring Networks	Fusion Cloud Services, Inc.
Sail Internet	GCI Communication Corp.
San Diego Broadband	MCI
SDWisp	Netfortris Acquisition Co., Inc
T-Mobile	PAETEC Communications Inc
Viasat Inc	Tailwind Voice and Data
VSAT Systems	Tierzero
Webpass	Tpx Communications
	Webpass, Inc.
	XO Communications
	Zayo Group LLC

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[84] FCC 477 data; ISPs that report offering any level of consumer service in census blocks of a given tract
[85] FCC 477 data; ISPs that report offering any level of commercial service in census blocks of a given tract

District 2

Overview and Needs

District 2 is in some ways a microcosm of the region. The area encompassed is vast, spanning urban and rural areas across both incorporated and unincorporated portions of the region. The district intersects with many unincorporated CPAs, from more developed areas like north county metro and Ramona to rural areas in the backcountry- Julian, Central Mountain, Mountain Empire, and more. In addition to these planning areas within District 2, several tribal reservations located in the county also fall within the district's boundaries.

Given District 2's large, diverse population and expansive geography, **the broadband needs identified for this region are inclusive of both availability and adoption typologies**. However, need typologies are not uniform across the district. Disaggregating down to the census tract level in the district using the Broadband Index, we find that poor broadband accessibility in western portions of the district near incorporated cities is primarily a function of low adoption, whereas poor broadband accessibility further east in the district backcountry is more so limited by infrastructure availability. With respect to the former, District 2 census tracts around unincorporated communities in eastern suburban areas (e.g., Bostonia, Lakeside) are

> *"At work, the staff network is slow…I wish we had stronger, faster connections, especially for when we have to do virtual meetings on Wi-Fi."*
>
> *– Bonita resident*

more readily classified as low adoption tracts by the Broadband Index; this is because they present more strongly on socioeconomic features typically associated with lower rates of broadband subscription (e.g., low income) relative to other tracts that in the area. Two tracts that exemplify this low adoption/low-income case in District 2 include Tracts 165.02 and 165.04 near the unincorporated community of Bostonia.

District 2 Table 1: Priority low adoption tracts[86]

Tract	CPSGs	Type	Households in UA[87]	Median household income	% Households with no wired broadband (fiber, cable, DSL)	Consumer ISPs[88]
165.02	Lakeside	low_adopt +high_avail	1,700	$60,705	24.2%	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
165.04	Lakeside	low_adopt +med_avail	1,250	$48,916	30.0%	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.

Even though these tracts do not have low levels of broadband availability based on the Broadband Index and encompass census blocks in which major ISPs such as AT&T/Cox report offering and/or being able to offer cable and fiber, fewer than expected households have adopted wired connections. Between a quarter and a third of households in these two tracts do not have a wired (fiber, cable DSL) broadband internet subscription (compared with a regionwide average of ~20%). From this, we can infer that residents are facing other

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[86] Sources include Census ACS 2020 5-year estimates, FCC 477
[87] Estimate. Assuming uniform distribution of households in the tract, takes the number of households and scales it by the percentage of land area of tract that intersects with the given district
[88] Inclusive of ISPs that can or do offer any level of consumer service in Census blocks of a given tract

barriers to accessing broadband that are not necessarily tied to infrastructure availability. For these tracts in particular, affordability could be a major factor that impacts a household's ability to purchase a broadband internet connection. In Tract 165.04 near Bostonia for instance, median household income is about $49,000/year. At just about three-fifths of the amount for the entire region (~$82,000),[89] spending on internet subscriptions, both fixed and mobile, represents a greater cost burden for households at this income level relative to other households across the region as a whole.

As for the latter issue of broadband availability, moving east across the district, tracts increasingly begin to display attributes of low availability areas as the reported prevalence of wireline infrastructure – fiber in particular – decreases. Tract 212.02 for instance, which encompasses the unincorporated community of Descanso, has been demonstrated to exhibit infrastructural and socioeconomic attributes that align with a classification of a low availability, medium adoption type tract. Tract 212.02 is also close to and overlapping with several backcountry sites identified by internal stakeholders as having poor connectivity. These include fire station/camps such as Descanso Station #45 and Mt. Laguna Station #4. This trend continues moving further into the backcountry, with certain areas within the district having been classified as places where both broadband availability and adoption levels are low. This result specifically affects Tracts 211.01, 211.02, and 213.02, which encompass border communities along the SR-94 corridor (e.g., Potrero, Campo, Boulevard, Jacumba).

District 2 Table 2: Priority low availability tracts[90]

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband (fiber, cable, DSL)	Consumer ISPs
211.01	Central Mountain, Alpine, Mountain Empire, Jamul-Dulzura	low_adopt +low_avail	1,657.54	$63,045	55.2%	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.
211.02	Central Mountain, Mountain Empire, Desert	low_adopt +low_avail	955.98	$42,579	75.6%	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.
212.02	Central Mountain, Alpine, Jamul-Dulzura	med_adopt +low_avail	1,061.00	$79,639	50.8%	AT&T California, Cox Communications, HughesNet, MountainMesh, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.
213.02	Alpine, Crest-Dehesa, Jamul-Dulzura, Otay	low_adopt +low_avail	1,394.94	$106,500	65.8%	AT&T California, Cox Communications, HughesNet, MountainMesh, One Ring Networks, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.

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[89] Census ACS 2020 5-year estimates
[90] Sources include census ACS 2020 5-year estimates, FCC 477

The patterns of broadband accessibility in District 2 discussed above are additionally corroborated by survey data results. On adoption challenges, particularly as they pertain to internet affordability, about 30% of District 2 survey respondents reported that they paid more than $100/month for home internet, while 41% reported paying more than $100/month for their cellular plan as well. When combined with the fact that nearly a third of District 2 survey respondents (n = 131) reported that they earn less than

> *"In my area, there is little to no cellular/data service...Cellular and wired internet is very expensive, spotty, and has very poor customer service."*
>
> – Guatay resident

$75,000/year, the burden that obtaining and maintaining access to the essential utility that is an internet connection for some residents within District 2 becomes clear. As for availability, over half of District 2 survey respondents (n = 136) reported accessing the internet through either a cellular or hot spot data plan or

Graph 8 District 2 download and upload speeds

District 2 download speeds

0 - 25 Mbps, 43.6%	25 - 100 Mbps, 35.9%	100+ Mbps, 20.5%

District 2 upload speeds

0 - 3 Mbps, 35.9%	3 - 20 Mbps, 53.8%	20+ Mbps, 10.3%

satellite internet service. In interviews and focus groups, respondents mentioned that even with hot spots, the service may still be poor because the cellular coverage of the hot spot is not strong enough. Moreover, only 4% of respondents said they accessed the internet through a fiber optic connection. Speed test results further reinforce the challenges District 2 residents face in terms of obtaining access to future-proof internet connections, with just 21% of respondents (n = 39) in the survey sample used to aggregate speed test data returning download speed test results above 100 Mbps.

Taking into consideration the evidence found through both quantitative and qualitative analysis of broadband accessibility in District 2, the County and partners should consider implementing strategies that both enable residents to adopt broadband connection services and increase the availability of broadband in and around unincorporated communities.

District Recommendations

In this section, we provide additional details on strategies, coordinating entities, and funding sources that can be leveraged to improve broadband accessibility in District 2.

➢ **Strategies that promote expansion of public infrastructure and streamline development policy (pillar 1) can help increase broadband availability for low availability tracts in and around the Mountain Empire and Central Mountain Community Planning Areas.** The State of California has released proposed middle mile fiber network routes in the San Diego region that could bring wireline broadband infrastructure closer to multiple unincorporated communities in District 2 than it has ever been before. Already, efforts to lay fiber along 18 miles of State Route (SR) 67 concurrently with a pavement rehabilitation project led by Caltrans in partnership with the County are under way (the State will now be funding this project in full, which frees up SANDAG and County funds that had previously been directed towards it). The State has also

proposed additional middle mile network routes running through District 2 along segments of SRs 79 and 94, as well as I-8.

In sequencing out the next set of potential projects based on projected size and type of need, the SR-94 corridor in District 2 emerges as one priority area for last-mile broadband infrastructure development to connect communities such as Potrero, Boulevard, Jacumba, and Campo to the State's proposed middle mile fiber network. The SR-94 corridor additionally represents an opportunity for the County and its partners to coordinate efforts, both in buildout and in financing aspects, with the Campo Kumeyaay Nation, which occupies the Campo Indian Reservation between Potrero and Boulevard. Any middle mile and last mile projects rolling out in the district will invariably take some time to complete. To bridge availability gaps in the meantime, enabling more robust fixed wireless and cellular coverage for residents in communities facing poor connectivity presents itself as a potential stopgap measure. District 2 can coordinate with the County as a whole to evaluate policies around telecom construction (e.g., permitting) and suggest ways that would streamline processes for providers.

➢ **Strategies that empower residents with the knowledge and financial means to use broadband (pillar 2) can help boost broadband adoption in District 2.** Even though implementing strategies that can help increase broadband availability may take precedence over expanding broadband adoption in District 2, given the longer timeframe and coordination required to operationalize capital projects, encouraging more adoption in the district

> *"The internet company provides low speed internet at very high cost. It is a very predatory practice that affects minorities and low-income people."*
>
> *– Descanso resident*

should not be overlooked. In particular, the County and its partners may consider applying more focused efforts to communities in and around the Lakeside community planning area (e.g., Bostonia) to better understand how adoption programs that reduce the cost of internet subscriptions, encourage better digital literacy, and increase access to devices can be used to increase broadband usage in those neighborhoods.

Coordinating entities

➢ **CPAs.** CPAs in District 2 are listed below. CPAs that are home to concentrations of census tracts with low broadband access attributes may be considered for additional coordination throughout the implementation process for broadband strategies discussed above.

District 2 Table 3: CPAs

CPA
Alpine
Boulevard
Campo / Lake Morena
Crest / Dehesa / Harbison Canyon / Granite Hills
Cuyamaca
Descanso
Jacumba
Jamul / Dulzura
Julian
Lakeside
Pine Valley
Potrero
Ramona
San Dieguito
Tecate
Valle De Oro

➤ **Libraries.** Libraries generally represent valuable on the ground partners that can act as a conduit between residents and County initiatives around broadband adoption. The Campo-Morena Village, Descanso, Jacumba, Lakeside, and Potrero Branches serve communities in census tracts identified as having large adoption and/or availability gaps and merit additional consideration as the County looks to coordinate with stakeholders to operationalize broadband initiatives.

District 2 Table 4: County Libraries

County Libraries
4S Ranch
Alpine
Campo-Morena Village
Crest
Descanso
El Cajon
Fletcher Hills
Jacumba
Julian
Lakeside
Pine Valley
Potrero
Poway
Ramona
Santee

➤ **Tribes.** Portions of District 2 that fall under the jurisdiction of tribal communities have expressed challenges with broadband affordability and availability, and several share geographies with non-tribal communities identified by the Broadband Index to also have low broadband accessibility. The County can also work with tribal stakeholders on recommended strategies that aim to address these challenges.

District 2 Table 5: Tribal Reservations

Tribal Reservation	Neighboring Community
Barona Reservation	Lakeside
Campo Reservation	Boulevard/Campo
Capitan Grande Reservation	Alpine
Ewiiaapaayp Reservation	Mount Laguna
Inaja - Cosmit Reservation	Julian
Jamul Indian Village	Jamul
La Posta Reservation	Boulder Oaks/Boulevard
Manzanita Reservation	Boulevard
Sycuan Reservation	Crest-Dehesa
Viejas Reservation	Alpine/Descanso

➢ **Schools.** District 2 school districts are highlighted below for coordination purposes.

District 2 Table 6: School Districts

School Districts
Alpine Union
Cajon Valley Union
Grossmont Community College
Grossmont Union High
Jamul-Dulzura Union
Julian High
Julian Union High
Lakeside Union
Mountain Empire Unified
Santee
Spencer Valley

➢ **Public Safety.** Coordinating with District 2's public safety stakeholders will aid in communicating and advancing future activities related to broadband. It is likely that District 2 residents could benefit from broadband related programs or initiatives that these entities might support or provide. These entities include:

District 2 Table 7: Public safety entities in or near District

Law Enforcement	Fire Districts/Departments
Sheriff - Lakeside Substation	Lakeside Fire Protection District
Sheriff - Pine Valley Substation	Alpine Fire Protection District
Sheriff - Campo/Tecate Substation	San Miguel Fire Protection District
Sheriff - Boulevard/Jacumba Office	San Diego County Fire Protection District
Sheriff - Pine Valley Substation	
Sheriff - Julian Substation	
Sheriff - Alpine Substation	

➢ **ISPs.** The following consumer ISPs report that they offer, or are able to offer, service in the census blocks that comprise District 2 and can serve as a starting point for the County as it looks to identify private sector partners and investments for regional broadband development.

District 2 Table 8: ISPs in District 2

Residential ISPs[91]	Commercial ISPs[92]
Airpeak Wireless	GCI Communication Corp.
AT&T California	CenturyLink
Canyon Wireless	TPx Communications
Charter Communications Inc	Coba Internet
Cox Communications	Fusion Cloud Services
Frontier Communications Corporation	
GeoLinks	
HughesNet	
MountainMesh	
One Ring Networks	
Race Communications	
Sail Internet	
San Diego Broadband	
SDWisp	
SkyValleyNetwork	
T-Mobile	
Valley Center Wireless	
Viasat Inc	
VSAT Systems	
Webpass	
Zito Media	

[91] FCC 477 data; ISPs that report offering any level of residential service in Census blocks of a given tract
[92] FCC 477 data; ISPs that report offering any level of commercial service in Census blocks of a given tract. While ISPs may possibly provide commercial service, they did not indicate this in FCC 477 data

District 3

Overview and Needs

District 3 is primarily comprised of incorporated coastal communities. It spans the majority of the region's coast, from Carlsbad in the north to Coronado in the south. Further inland in the district, parts of unincorporated communities in the San Dieguito community planning area fall within district boundaries as well. These communities include Rancho Santa Fe, Elfin Forest, and Harmony Grove.

In terms of broadband need, the unincorporated areas of District 3 perform well in the Broadband Index relative to other parts of the unincorporated area. No census tract that intersects with District 3 boundaries received a low type of classification by the broadband index across either adoption or availability sub-indices. As such, tables that highlight low adoption and/or low availability census tracts are not included in this section. Comparing different areas within the district, tracts around communities such as Harmony Grove/Elfin Forest were assessed to have relatively lower broadband access, particularly on adoption dimensions, when compared against tracts further south in the unincorporated parts of the district (i.e., Rancho Santa Fe). This is corroborated by resident feedback collected through community engagement; an attendee at the community workshop held in Rancho Santa Fe noted that while that area had readily available wired broadband infrastructure, population centers further north in the planning area—namely Elfin Forest and Harmony Grove—were still reliant on legacy wireline options, or fixed wireless that residents found to be slow and/or unreliable. Thus, taking these data points all together, it can be said that **overall broadband access is strong in unincorporated District 3** and priorities should thus be directed towards identifying and filling in the **outstanding gaps that may exist in north San Dieguito neighborhoods**.

> *"We are very grateful for [local ISP] existing. But it is still much slower than the internet that exists half a mile away in San Elijo Hills."*
>
> – Elfin Forest resident

District Recommendations

To connect the remaining pockets of underserved residents in unincorporated District 3, the County may consider applying strategies from pillars 1 (expand infrastructure) and 2 (enable adoption) to improve access.

➢ **Select prime opportunities for last-mile fiber buildout to fill outstanding gaps in infrastructure availability in north San Dieguito.** While unincorporated District 3 can be said to be well served by fiber, especially relative to other communities in unincorporated areas, there are still pockets of space in areas around the Elfin Forest Recreational Reserve and Harmony Grove that rely on fixed wireless and/or slower wired technologies such as DSL and cable to connect to the internet. In these instances, there is a case for the County to step in and coordinate efforts to close these last gaps in fiber coverage for the planning area, given that the semi-rural locale of the area is not the most conducive for organically attracting private investment.

➢ **Support affordability initiatives for those who may not qualify for existing programs.** Although the average median household income for unincorporated census tracts in District 3 is over $140,000,[93] there may be small pockets of populations, particularly in neighborhoods just outside Escondido, that are burdened by the cost of maintaining broadband internet but earn too much to qualify for existing programs at the state and federal level. The County can work to validate the extent to which these populations exist and determine the level of assistance needed to help these community members secure the necessary means to be able to afford adequate service.

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[93]Census ACS 2020 5-year estimates

Coordinating entities

➢ **CPAs/CPSGs:** CPAs in District 3 are listed below.

District 3 Table 1: Community Planning Areas

CPA
I-15 Corridor DRB
San Dieguito

➢ **Libraries:** Libraries in or near District 3 are listed below. Libraries generally represent valuable on the ground partners that can act as a conduit between residents and County initiatives around broadband adoption.

District 3 Table 2: County Libraries

County Libraries
Cardiff-by-the-Sea
Del Mar
Encinitas
Rancho Santa Fe
Solana Beach

➢ **Schools:** In order to further assess broadband affordability and accessibility for students across all of District 3 (including those in incorporated cities, outside of the County's jurisdiction), the County can coordinate with Cardiff Elementary, Coronado Unified School District, Del Mar Union Elementary School District, Encinitas Union Elementary School District, Escondido Union School District, Escondido Union High School District, San Diego Unified School District, and San Dieguito Union High School District.

District 3 Table 3: School Districts

School Districts
Cardiff
Carlsbad Unified
Del Mar Union
Encinitas Union
Mira Costa Community College
Poway Unified
Rancho Santa Fe
San Diego Community College
San Diego Unified
San Dieguito Union High
Solana Beach

➢ **Public Safety:** Coordinating with District 3's public safety stakeholders will aid in communicating and advancing future activities related to broadband. Some municipal public safety entities overlap geographically with the District, and it is likely that District 3 residents could benefit from broadband related programs or initiatives that these entities might support or provide. These entities include:

District 3 Table 4: Public safety entities in or near District

Law Enforcement	Fire Districts/Departments
San Diego Police - Northeastern Division	City Of Encinitas Fire Department
San Diego Police - Northwestern Division	Rancho Santa Fe Fire Department
Sheriff - North Coastal Station	City Of San Diego Fire Department
	City Of Solana Beach Fire Department
	San Diego County Fire Protection District

➢ **ISPs:** The following consumer ISPs report that they offer or are able to offer service in District 3 and can serve as a starting point for the County as it looks to identify private sector partners and investments for regional broadband development.

District 3 Table 5: ISPs in District 3

Residential ISPs[94]	Commercial ISPs[95]
AT&T California	CenturyLink
Canyon Wireless	Charter Communications Inc
Charter Communications Inc	Crown Castle Fiber
Comcast	EarthLink Business, LLC
Consolidated Smart Broadband Systems LLC	EarthLink Carrier, LLC
Cox Communications	Fusion Cloud Services, Inc.
GeoLinks	GCI Communication Corp.
HughesNet	MCI
Lokket Inc	PAETEC Communications Inc
One Ring Networks	TPx Communications
San Diego Broadband	XO Communications
T-Mobile	
Valley Center Wireless	
Verizon Wireless	
Viasat Inc	
VSAT Systems	
Webpass	
Zinnia Networks Inc dba Matrix Broadband	

[94] FCC 477 data; ISPs that report offering any level of consumer service in census blocks of a given tract
[95] FCC 477 data; ISPs that report offering any level of commercial service in census blocks of a given tract

District 4

Overview and Needs

The 4th Supervisorial District is the smallest of the five by land area, standing at just over 100 square miles. Still, the district serves some 676,000 residents (incorporated and unincorporated), making it one of the most densely populated jurisdictions. In the unincorporated areas, communities that are located within the boundaries of this district include parts of Spring Valley, Rancho San Diego, and Casa de Oro–Mount Helix. Situated around urban municipalities, these unincorporated communities of District 4 are in closer geographic proximity to existing fiber infrastructure (owned by local publicly entities or otherwise) than most other unincorporated areas. However, these communities are also home to some of the region's most socioeconomically disadvantaged and hard-to-reach populations, which is reflected in the cluster of low/medium adoption tracts found in this area, as classified by the Broadband Index. Of these communities, Spring Valley stands out as an area in which the Broadband Index and other analyses indicated evidence of particularly low broadband access, especially with respect to the adoption component of the issue. The table below presents key statistics on census tracts that intersect with the unincorporated areas of District 4 that scored poorly on measures of broadband accessibility in the Broadband Index and can thus serve as priority areas for the County to implement strategies that aim to increase broadband adoption.

District 4 Table 1: District 4 priority tracts with adoption needs[96, 97]

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband (fiber, cable, DSL)	Consumer ISPs
135.06	Spring Valley, Sweetwater, Valle De Oro	med_adopt+ med_avail	1,153	$66,924	29%	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.
138.01	Spring Valley, Valle De Oro	low_adopt+high_avail	1,222	$73,363	35%	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.

District Recommendations

In this section, we provide additional details on strategies, coordinating entities, and funding sources that can be leveraged to improve broadband accessibility in District 4.

➢ **Apply pillar 2 strategies that focused on affordability and digital device access to increase adoption.** The combination of low-income and high cost of broadband service places disproportionate burdens on residents of unincorporated District 4. While wire-based internet options that offer broadband speeds at the new State threshold (100/20 Mbps) are available in unincorporated District 4, they are often priced in a way such that maintaining access to it is out of reach for lower-income residents. Bills for home internet and cell phones, are just one of many expenses that households must balance, something that in recent times is becoming increasingly difficult to do as core household expenses such as rent and car ownership rise.

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[96] Sources include Census ACS 2020 5-year estimates, FCC 477
[97] This information in this table is aligned to each specific census tract, the geographical presence of which may intersect with Consumer ISPs and CPSGs that do not geographically overlap with other census tracts listed, despite having similar features. For more information, see introduction on page 85.

➢ **Invest in existing public access points and consider enhancing.** The value of public access points cannot be understated. During community engagement sessions, participants expressed how local public institutions like the library branch at Spring Valley often serve as hubs for residents looking for ways to connect to the internet, with computer stations at the library being full during opening hours and the parking lot continuing to stay full after hours as residents continued to connect to use the library's Wi-Fi connection in their vehicles. This direct community feedback from District 4 has manifested in conversations with other communities as well, suggesting some degree of alignment on the importance of having trusted partners in community institutions and the value of ensuring the connectivity solutions offered through them remain accessible and convenient (e.g., adequate hours of operation, support services).

➢ **Commit to continued community engagement.** Highest needs areas are also often the hardest to reach. Particularly with respect to areas in and around Spring Valley, households tend to earn less, have more people, and speak languages other than English at home.[98] Consequently, stakeholders should expect to dedicate more resources—time, capacity, effort—to establish relationships, secure enrollment, and increase participation for programs and services. Making a commitment to having ears on the ground by keeping in regular communication with residents and community-based organizations alike as it looks to scope out future projects, whether for increasing availability of broadband infrastructure or enabling greater broadband adoption, is an important step.

➢ **Facilitate collaboration between stakeholders, public and private.** The unincorporated areas in District 4 that are recommended for prioritization belong to a larger cluster of low adoption census tracts in the southern portion of the region that span multiple jurisdictions and geographic boundaries. For instance, District 1 also has concentrations of populations in which lowering barriers to broadband adoption should be prioritized, as does nearby municipal neighborhoods in the southeastern portion of the City of San Diego. This area is home to some of the census tracts with the lowest broadband subscription rates in the entire county. Thus, even though the scope of this plan focuses on the unincorporated areas of region, solutions should be formulated collaboratively, not in jurisdictional siloes.

Coordinating entities

➢ **CPAs/CPSGs:** CPAs in District 4 are listed below.

District 4 Table 2: CPAs

CPA
Crest / Dehesa / Harbison Canyon / Granite Hills
Spring Valley
Valle De Oro

➢ **Libraries:** Libraries in or near District 4 are listed below. Libraries generally represent valuable on the ground partners that can act as a conduit between residents and County initiatives around broadband adoption.

District 4 Table 3: County Libraries

County Libraries
Casa de Oro
La Mesa
Lemon Grove
Rancho San Diego

[98] https://censusreporter.org/profiles/16000US0673696-spring-valley-ca/

➢ **Schools:** Especially as it relates to the community of Spring Valley, establishing collaborative relationships with both La Mesa-Spring Valley School District and Lemon Grove School District can help the County and partners to address barriers to broadband adoption in the area. School districts highlighted below include the subset of District 4 school districts that intersect with low broadband access tract types and share land area that overlaps with unincorporated County jurisdiction.

District 4 Table 4: School Districts

School Districts
La Mesa
San Diego Unified
Spring Valley

➢ **Public Safety:** Coordinating with District 4's public safety stakeholders will aid in communicating and advancing future activities related to broadband. Some municipal public safety entities overlap geographically with the District, and it is likely that District 4 residents could benefit from broadband related programs or initiatives that these entities might support or provide. These entities include:

District 4 Table 5: Public safety entities in or near District

Law Enforcement	Fire Districts/Departments
La Mesa Police Department	Heartland Fire & Rescue
Sheriff - Casa De Oro Storefront	City of San Diego Fire Department
Sheriff - Lemon Grove Fire Department Substation	San Miguel Fire Protection District
Sheriff - Rancho San Diego Fire Department Station	San Diego County Fire Authority
Sheriff - Ranchita/Warner Springs Office	

➢ **ISPs:** The following consumer ISPs report that they offer or are able to offer service in District 4 and can serve as a starting point for the County as it looks to identify private sector partners and investments for regional broadband development.

District 4 Table 6: ISPs

Residential ISPs[99]	Commercial ISPs[100]
AT&T California	CenturyLink
Charter Communications Inc	Charter Communications Inc
Cox Communications	Crown Castle Fiber
GeoLinks	EarthLink Business, LLC
HughesNet	Fusion Cloud Services, Inc.
One Ring Networks	GCI Communication Corp.
San Diego Broadband	NetFortris Acquisition Co., Inc.
SDWisp	PAETEC Communications Inc

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[99] FCC 477 data; ISPs that report offering any level of consumer service in census blocks of a given tract
[100] FCC 477 data; ISPs that report offering any level of commercial service in census blocks of a given tract

Residential ISPs[99]	Commercial ISPs[100]
T-Mobile	TPx Communications
Viasat Inc	XO Communications
VSAT Systems	
Webpass	

District 5

Overview and Needs

The 5th Supervisorial District is the largest, comprised mostly of unincorporated areas in northern and eastern parts of the region. Many unincorporated communities fall within the boundaries of the district, from Rainbow in the far north to Borrego Springs in the backcountry of the region's eastern portion. In terms of physical locale, District 5's unincorporated communities are situated in some of the region's most geographically diverse environments–from the hills of north county to the Palomar Mountain range to the remote Anza Borrego Desert. That said, the District's major unincorporated population centers are mostly clustered in north county and include places like Fallbrook, Valley Center, and Bonsall. When it comes to broadband accessibility in these communities, analysis of publicly available data as well as data collected from stakeholder and community engagement indicates that **unincorporated District 5 faces both availability and adoption challenges**. Like District 2, the broadband accessibility challenges District 5 faces are not uniform across the jurisdiction. Rather, need typologies shift from primarily being adoption related to being largely availability related moving east across the district.

On broadband availability, the current state of wired broadband connectivity as it relates to fiber in unincorporated District 5 can be summarized as the following: unincorporated north county along the I-15 corridor contains some of the best-connected areas in District 5 but still has much less infrastructure available relative to other parts of the entire region (i.e., incorporated areas). East of I-15 wired broadband infrastructure becomes sparser still. This is evidenced by both County provided infrastructure data as well as publicly available information on service availability aggregated by entities such as the FCC and the CPUC. With County provided information, geospatial data obtained from SANDAG suggests that only a small collection of census blocks along the I-15 corridor in the northern part of the region has fiber present (though not necessarily available for consumer use, rather this is for commercial use or streetlights). A segment of the region's regional transportation fiber ring (spatial layer also obtained from SANDAG through the County) also passes through nearby on SR-76 from Santa Fe Ave. to I-15. County DPW further owns some fiber used for traffic management in Fallbrook. These three features represent the extent of data collected on existing fiber infrastructure in District 5. Beyond them, unincorporated communities east of I-15 (e.g., in the north: Valley Center, Pala; in Palomar/the eastern part of the area, Warner Springs, Borrego Springs) have no reported census blocks with fiber presence and furthermore tend to fall within census tracts that were more readily classified as having low or medium broadband availability

Graph 9 District 5 download and upload speeds

District 5 Download Speeds

0 - 25 Mbps, 44%	25 - 100 Mbps, 43%	100+ Mbps, 13%

District 5 Upload Speeds

0 - 3 Mbps, 28%	3 - 20 Mbps, 60%	20+ Mbps, 13%

"Lack of affordable, reliable, internet in sufficient quantity is a major factor keeping folks who need to work/study from home from moving [here]."

– Borrego Springs resident

"...during the pandemic my kids' grades suffered greatly because they were not able to access school online, even with the school giving us a Verizon hotspot."

– Fallbrook resident

"You go to San Diego (city), you can get so much more for $60. Here you pay $100 for 35mbps."

– Valley Center resident

by the Broadband Index. Table below highlights said census tracts, which encompass communities such as Pala, Ranchita, Borrego Springs, and Ocotillo Wells.

District 5 Table 1: Priority low availability tracts[101]

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband (fiber, cable, DSL)	Consumer ISPs
191.08	Rainbow, Pala-Pauma, North Mountain, Fallbrook	med_adopt +low_avail	937	$81,867	53%	Accel Wireless, Airpeak Wireless, AT&T California, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
209.03	Julian, Pala-Pauma, North Mountain, Desert, Ramona, North County Metro	med_adopt +low_avail	1,084	$53,750	57%	AT&T California, Frontier Communications Corporation, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC., Zito Media
210.01	Desert, Central Mountain, Mountain Empire, North Mountain	low_adopt+low_avail	731	$49,031	44%	AT&T California, Canyon Wireless, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC., Zito Media
210.02	Desert, North Mountain	high_adopt+low_avail	578	122,500	19%	AT&T California, GeoLinks, HughesNet, Viasat Inc, VSAT Systems, LLC., Zito Media

Indeed, even in the nominally more connected communities near I-15 in the northern part of the region, community members conveyed during engagement workshops that some residents still rely on fixed wireless technology to connect to the internet in their homes and expressed preferences for more stable, future-proof fiber internet service. Another unique concern raised by attendees of the community engagement workshop held in Fallbrook is the public safety risk that unreliable, slow connectivity poses for the high fire hazard areas that span significant portions of the area around communities such as De Luz and Rainbow. In these areas, residents describe how the combination of not only limited fixed broadband but also lack of cellular connectivity makes it particularly difficult for residents to receive critical information during emergencies. Survey responses from residents in District 5 further corroborate this sentiment. According to survey data collected, District 5 residents rely more on cellular data for internet access that any other method, and about 40% of those surveyed receive less than sufficient download and upload speeds.

On broadband adoption, affordability remains a key challenge for unincorporated residents in District 5. As introduced earlier, most unincorporated communities in District 5 are sparsely populated and situated in remote, difficult-to-build areas. 90% of census blocks in unincorporated District 5 contain less than 250 people, and the average population density is only two-thirds of the regionwide block average. (~5.7k persons/square mile vs. 8.4k persons/square mile). Between the higher cost and smaller economies of scale for ISPs offering service in the area, residents are left paying more for worse service. A Valley Center resident summed up this disparity well by saying, "You go to [the city of] San Diego, you can get so much more for $60. Here you pay $100 for 35mbps,"

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[101] Sources include Census ACS 2020 5-year estimates, FCC 477

The affordability issue is compounded in communities in which households earn less. Household income in both Fallbrook and Rainbow is below the county median, and so the cost of home internet and cellular data represent relatively larger shares of households' budgets in these cases. The cost of having good internet reflects in below average broadband adoption rates – for example, 27% of households in Fallbrook do not have wire-based broadband such as cable, fiber, or DSL,[102] leaving the rest either relying on subscriptions to less reliable wireless technologies, or without a broadband subscription at all (only 88% of Fallbrook households have a broadband subscription of any kind, including a cellular data plan). The table below highlights census tracts with the highest adoption needs in District 5. They encompass Fallbrook in area's north, as well as various communities in the Desert planning area (e.g., Borrego, Ocotillo Wells, Shelter Valley).

District 5 Table 2: Priority low adoption tracts[103]

Tract	CPSGs	Type	Households in UA	Median household income	% Households with no wired broadband (fiber, cable, DSL)	Consumer ISPs
189.03	Fallbrook, Pendleton-De Luz	low_adopt+ high_avail	1611	$ 56,569	26.3%	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
189.04	Fallbrook, Pendleton-De Luz	low_adopt+ high_avail	1870	$ 51,331	30.3%	AT&T California, Charter Communications Inc, HughesNet, Ranch Wifi, LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
189.05	Fallbrook	low_adopt+ high_avail	1846	$ 59,280	25.4%	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
189.06	Fallbrook, Pendleton-De Luz	low_adopt+ high_avail	1915	$ 67,208	26.7%	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.
210.01	Desert, Central Mountain, Mountain Empire, North Mountain	low_adopt+low_avail	731	$ 49,031	44.3%	AT&T California, Canyon Wireless, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC., Zito Media

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[102] https://censusreporter.org/data/table/?table=B28002&geo_ids=16000US0623462&primary_geo_id=16000US0623462
[103] Sources include census ACS 2020 5-year estimates, FCC 477

District Recommendations

In this section, we provide additional details on strategies, coordinating entities, and funding sources that can be leveraged to improve broadband accessibility in District 5.

➢ **Public private partnerships, fiber to the premises (FTTP), and fixed wireless can help un(der)served areas in District 5 obtain and benefit from additional broadband infrastructure.** The County and partners may apply principles put forth in pillar 1 to prioritize public infrastructure efforts that further FTTP (Strategy 1.1) and to support projects using cellular, fixed wireless, and other emerging technologies to fill gaps (Strategy 1.2) to improve availability for residents of unincorporated District 5. In particular, the County and partners may consider projects that build last-mile of planned and existing fiber routes in and around the I-15 corridor in the northern portion of the region to increase FTTP for underserved residents in primary population centers like Fallbrook and Valley Center. A next step would be to do the same for surrounding communities like De Luz, Rainbow, Pala, and Bonsall. From there, a more involved endeavor that could take place over a more extended timeframe would be getting wired broadband to communities east of I-15. Existing infrastructure is sparse or nonexistent, so much of development will likely happen from the ground up. Beyond I-15, the State's proposed middle mile is planned to primarily run along SRs 76, 78, and 79 in District 5. This would bring the anchor route right up to the foot of some communities like Warner Springs in the Palomar Mountain area.

Even with State support on middle mile fiber buildout, construction will take time and significant last mile infrastructure is needed on top of that in some cases, especially for communities like Borrego Springs that are located far away from the proposed routes. In these instances, the County may want to evaluate interim measures to secure relatively faster, more reliable speeds for communities in remote, hard to build areas that encompass much of the North Mountain/Desert planning areas. These measures can be based on a mix of quicker to implement solutions such as fixed wireless or cellular and can draw upon the existing infrastructure that local District 5 providers like San Diego Broadband and Valley Center Wireless already have in place to expand wireless connectivity. For financing these projects, the County and partners may want to consider pursuing grants for areas in which ISPs do not expect to be able to earn back sufficient ROI. In the case of District 5, this may very well be the majority of unincorporated areas, given that the largest unincorporated markets for providers here would be around the size of Fallbrook, which with around 32,000 residents is considered a small market for national ISPs.

➢ **Increase broadband adoption in District 5 by improving affordability of service.** While more infrastructure should help reduce the cost of broadband service in the long-term, the County and partners can provide some immediate relief to cost-burdened residents of unincorporated District 5 by promoting and potentially expanding cost subsidy programs like the ACP. The Broadband Index suggests that these efforts could be particularly impactful and needed for communities in and around Fallbrook and Desert, as low adoption census tracts in District 5 unincorporated areas were clustered around there. The County could leverage relationships with local community institutions to do so, like the Fallbrook and/or Borrego Springs libraries. On digital literacy and device access, data collected suggests that there is some need around connecting and providing residents with digital resources, especially among more elderly populations, but may be secondary on level of need relative to lowering costs as a way to reduce adoption barriers for UA residents in District 5.

Coordinating entities

➢ **CPAs/CPSGs:** CPAs and CPSGs in District 5 are listed below.

District 5 Table 3: CPAs

CPA
Bonsall
Borrego Springs
Fallbrook
Hidden Meadows
Julian
Pala/Pauma
Palomar Mountain
Rainbow
San Dieguito
Twin Oaks Valley
Valley Center
Warner Springs

➢ **Libraries:** Libraries in or near District 5 are listed below. Libraries generally represent valuable on the ground partners that can act as a conduit between residents and County initiatives around broadband adoption.

District 5 Table 4: County Libraries

County Libraries
Borrego Springs
Fallbrook
San Marcos
Valley Center
Vista

➢ **Tribes:** Ensuring that broadband is available and affordable in the northern and east portions of the region will require working with local tribal organizations to ensure that any planned or concurrent broadband initiatives are both comprehensive and complementary.

District 5 Table 5: Tribal reservations

Tribal Reservations	Neighboring Community
La Jolla Reservation	Valley Center
Los Coyotes Reservation	Warner Springs
Mesa Grande Reservation	Ramona
Pala Reservation	Valley Center
Pauma and Yuima Reservation	Valley Center
Rincon Reservation	Valley Center
San Pasqual Reservation	Valley Center
Santa Ysabel Reservation	Santa Ysabel

➢ **Schools:** School districts in District 5 have been trying to address the need for broadband for low-income students, with various degrees of success. The County can coordinate with the following school districts to capture lessons learned and gaps they are seeing in existing solutions.

District 5 Table 6: School Districts

School Districts
Bonsall Unified
Borrego Springs Unified
Escondido Union
Escondido Union High
Fallbrook Union
Fallbrook Union High
Julian High
Julian Union High
Mira Costa Community College
Oceanside Unified
Palomar Community College
Ramona Unified
San Marcos Unified
San Pasqual Union
Spencer Valley
Vallecitos
Valley Center Pauma Unified
Vista Unified
Warner Unified

➢ **Public Safety:** Coordinating with District 5's public safety stakeholders will aid in communicating and advancing future activities related to broadband. Some municipal public safety entities overlap geographically with the District, and it is likely that District 5 residents could benefit from broadband related programs or initiatives that these entities might support or provide. These entities include:

District 5 Table 7: Public safety entities in or near District

Law Enforcement	Fire Districts/Departments
California State University San Marcos (CSUSM) University Police Department	Borrego Springs Fire Protection District
Carlsbad Police	Carlsbad Fire Department
CHP - Oceanside Area Office	Deer Springs Fire Protection District
Escondido Police	Escondido Fire Department
Mira Costa College Dept of Public Safety	North County Fire Protection District
Oceanside Police	Oceanside Fire Department
Palomar College Campus Police	Rancho Santa Fe Fire Protection District
Sheriff - Bonsall Storefront	San Marcos Fire Protection District
Sheriff - Borrego Springs Office	Valley Center Fire Protection District
Sheriff - Fallbrook Substation	Vista Fire Protection District
Sheriff - San Marcos Station	
Sheriff - Valley Center/Pauma Substation	
Sheriff - Vista East Storefront	
Sheriff - Vista Station	
Sheriff - Vista Village Storefront	
Sheriff - Vista West Office	
Sheriff - Ranchita/Warner Springs Office	

➢ **ISPs:** The following consumer ISPs report that they offer or are able to offer service in District 5 and can serve as a starting point for the County as it looks to identify private sector partners and investments for regional broadband development.

District 5 Table 8: ISPs

Residential ISPs[104]	Commercial ISPs[105]
Accel Wireless	Allstream Business Us, LLC
Airpeak Wireless	CenturyLink
AT&T California	Charter Communications Inc
Canyon Wireless	Crown Castle Fiber
Charter Communications Inc	EarthLink Business, LLC
Cox Communications	Fusion Cloud Services, Inc.
Frontier Communications Corporation	GCI Communication Corp.
GeoLinks	MCI
HughesNet	NetFortris Acquisition Co., Inc.
Lokket Inc	PAETEC Communications Inc
Mediacom California LLC	Tailwind Voice and Data
One Ring Networks	TPx Communications
Ranch Wifi	XO Communications
San Diego Broadband	Zayo Group, LLC
SkyValleyNetwork	
Southern California Telephone Co	
T-Mobile	
Valley Center Wireless	
Viasat Inc	
VSAT Systems	
Zito Media	

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[104] FCC 477 data; ISPs that report offering consumer any level of residential service in census blocks of a given tract
[105] FCC 477 data; ISPs that report offering any level of commercial service in census blocks of a given tract

Survey results

The County conducted a survey to identify who has access to broadband internet and digital devices and who does not to assist communities where access is lacking, or service is insufficient. The survey contained questions related to experiences with internet services and usage, as well as demographics and an internet speed test. This survey was conducted online and accessible through a link that allowed for anonymous responses, with the option to provide a zip code of the respondents' test location. These results represent responses from respondents that provided a zip code aligned to an unincorporated area. Because of the anonymous nature of the survey, overall responses are from any respondents that could access the link and may have been taken from residents in both unincorporated areas of the county as well as incorporated residents despite having provided a zip code that corresponds to an unincorporated area. Any disaggregation related to community specific responses would be gathered from respondent provided zip codes. This information was collected to develop a plan that aligns projects with community needs. These anonymous responses are visualized below.[106] [107]

INTERNET SERVICES AND USAGE

Question 1. Do you currently have internet access at home? (n=522)

No - I do not have access, 6%

Yes - I pay a monthly fee for internet, 91%

Yes - I have access but do not pay a fee, 3%
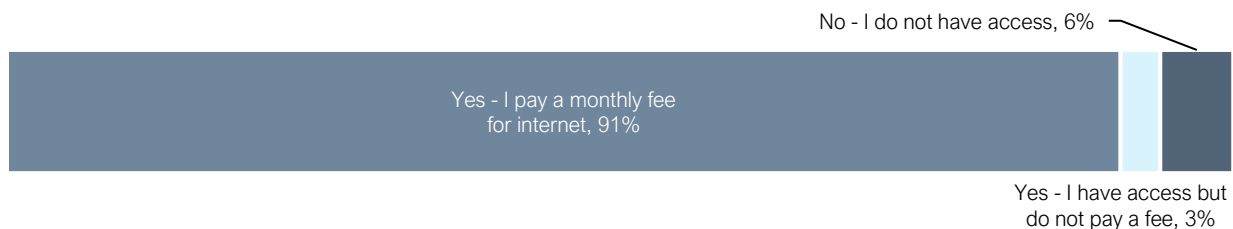
Question 2. How do you access the internet at home? Check all that apply. (n=584)

Dial-up, 1%

Not sure, 8%

Cellular or hot spot data plan, 29%

Cable modem, 28%

Satellite internet service, 17%

Digital subscriber line (DSL), 13%

Fiber optic, 4%
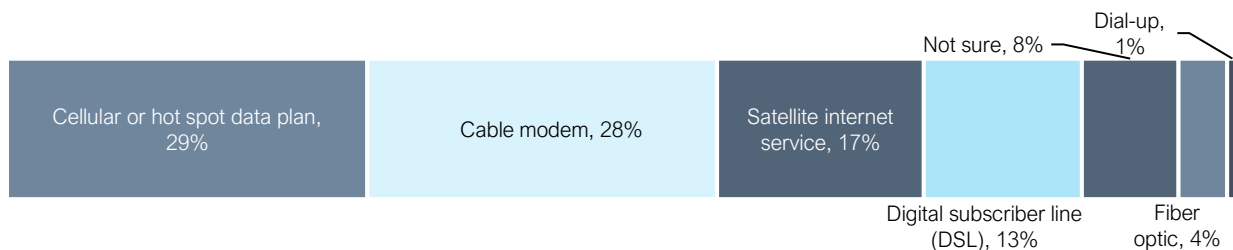
Question 3. How much do you currently pay for your home internet plan each month? (n=301)

>$35.00 to…

>$50.00 to $75.00, 35%

>$75.00 to $100.00, 20%

>$100.00 to…

>$125.00 to $300.00, 10%

<$35.00, 2%

>$300.00, 1%

Question 4. How much do you currently pay for your cellular data plan each month? (n=304)

<$35.00, 7%

>$35.00 to $50.00, 10%

>$50.00 to $75.00, 16%

>$75.00 to $100.00, 15%

>$100.00 to $125.00, 12%

>$125.00 to $300.00, 26%

>$300.00, 3%
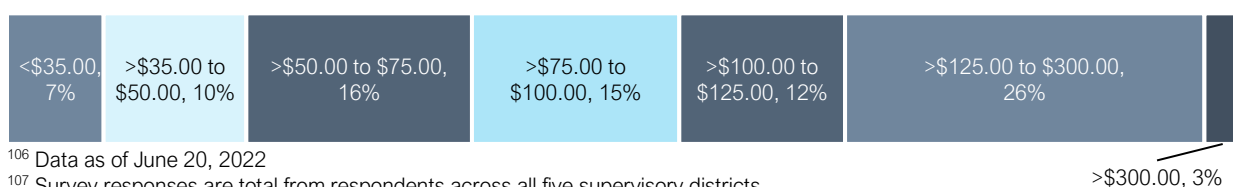
[106] Data as of June 20, 2022
[107] Survey responses are total from respondents across all five supervisory districts

Question 5. Please rate your internet service provider(s) on the following:

	Very Dissatisfied	Somewhat Dissatisfied	Satisfied	Very Satisfied
Customer service (n=369)	21%	24%	31%	24%
Internet speed (n=386)	30%	26%	24%	20%
Internet reliability (n=400)	26%	28%	25%	21%
Value I get compared to the price I pay (n=370)	37%	29%	18%	15%

■ Very Dissatisfied   ■ Somewhat Dissatisfied   ■ Satisfied   ■ Very Satisfied
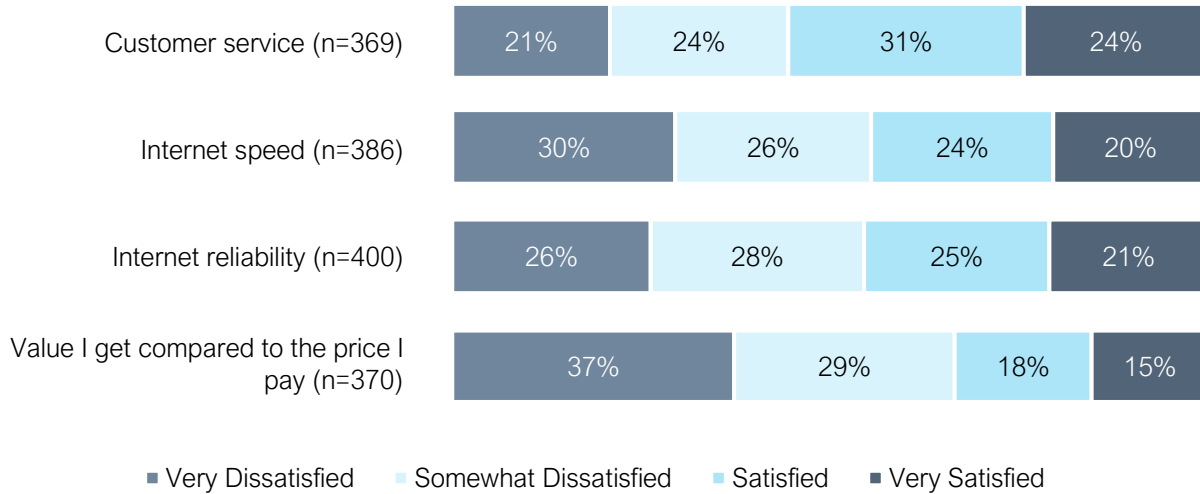
Question 6. What is the main reason you do not currently have internet access at home? (n=26[108])

Don't see the need for it, 4%	Not available in my area, 58%	Too expensive, 19%	Internet speed available is too slow, 15%	Concerns about online privacy or security, 4%

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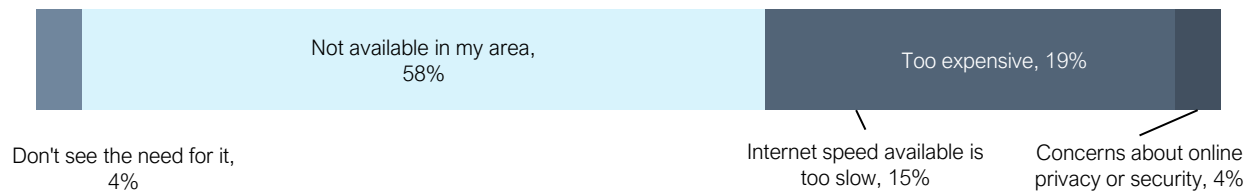
[108] Question 6 was directed to respondents who shared that they did not have internet access at home, and so has a smaller size of respondents.

Question 7. What devices do you use to access the internet? Check all that apply. (n=1932)[109][110]

Smart phone, 23%	Desktop computer, 14%	Laptop computer, 21%	Tablet/e-reader, 16%	Smart TV or connectors like Roku, FireTV, 18%	Gaming system, 7%

Other (please explain), 2%
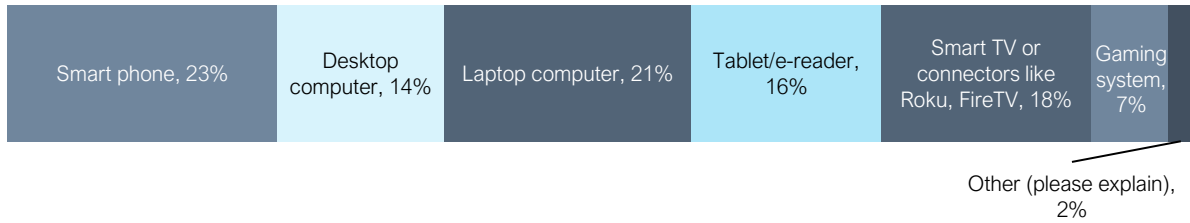
Question 8. How often do you engage in the following activities when using the internet?

Activity	Daily	Few times a week	Few times a month	Once every few months
Education (n=386)	53%	28%	13%	6%
Work or business (n=385)	77%	15%	6%	1%
News (n=455)	74%	19%	5%	2%
Entertainment / social media (n=445)	77%	15%	7%	1%
Communication with family and friends (excluding social media) (n=453)	64%	25%	9%	2%
Online shopping (n=462)	23%	45%	26%	5%
Job search (n=127)	27%	22%	20%	31%
Telehealth (n=322)	8%	11%	29%	52%
Paying bills or checking online account information (n=459)	33%	39%	24%	3%

■ Daily   ■ Few times a week   ■ Few times a month   ■ Once every few months

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[109] Respondents could choose as many devices as were relevant.
[110] Respondents that chose "other" wrote in a variety of responses, with 20% of this subset mentioning internet of things (IOT) devices, including security systems, medical monitoring devices, and smart plugs and appliances.

Question 9. How comfortable are you using devices to do the following tasks?

Helping children in your household complete their schoolwork or access online learning (n=188): 54%, 15%, 5%, 10%, 16%

Completing your schoolwork (n=175): 57%, 17%, 3%, 7%, 16%

Working or conducting business (n=398): 62%, 14%, 4%, 5%, 14%

Reading the news (n=439): 64%, 12%, 7%, 4%, 13%

Watching entertainment or interacting on social media (n=445): 62%, 14%, 8%, 4%, 12%

Communicating with friends or family (excluding social media) (n=451): 66%, 12%, 6%, 4%, 12%

Shopping online (n=456): 60%, 14%, 8%, 5%, 13%

Searching for jobs (n=206): 59%, 9%, 12%, 4%, 16%

Attending telehealth appointment (n=388): 49%, 17%, 12%, 9%, 12%

Pay bills and accessing personal information (taxes, insurance records, etc.) (n= 450): 61%, 13%, 7%, 6%, 13%

- Very comfortable
- Somewhat comfortable
- Neither uncomfortable nor comfortable
- Somewhat uncomfortable
- Very uncomfortable

Question 10. Where do you most frequently access internet (Wi-Fi) outside of your home? Please rank in order of importance (1 is most important, 3 is least). (n=426)

	Ranked 1 (most important)	Ranked 2	Ranked 3 (least important)
Public library	11%	12%	16%
Other public institutions	11%	25%	19%
Home Only	4%	13%	19%
Restaurants/cafes	8%	14%	16%
Someone else's home	9%	25%	19%
Retailers	32%	8%	8%
My work location	24%	3%	4%

■ Public library   ■ Restaurants/cafes   ■ Retailers
■ Other public institutions   ■ Someone else's home   ■ My work location
■ Home Only
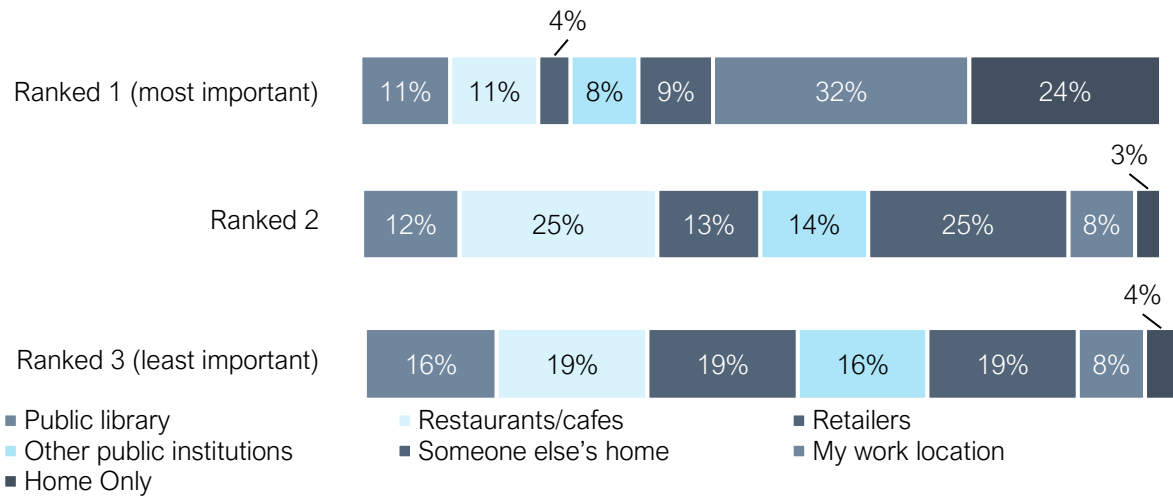
DEMOGRAPHICS

Question 11. Please tell us, how do you identify your race and/or ethnicity? Select all that apply. (n=460)

White, 62%
Hispanic or Latinx/o/a/e, 13%
Prefer not to say, 12%
Some other race (please specify), 3%
Native American or Alaskan Native, 3%
Southeast Asian, 2%
Black or African American, 2%
East Asian, 2%
South Asian/Desi, 1%
Native Hawaiian or Other Pacific Islander, 2%
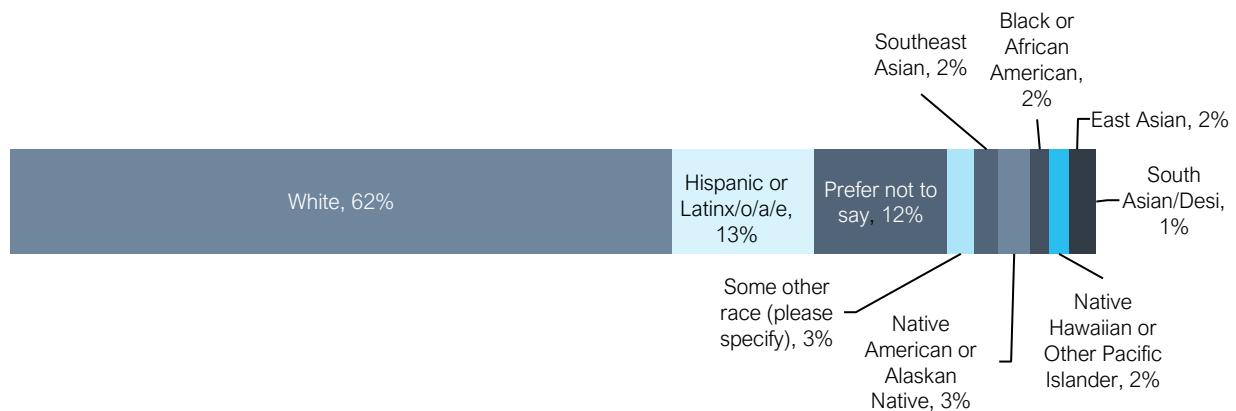
Question 12. What language(s) do you speak at home? (n=458)

English, 82%
Spanish, 12%
Vietnamese, 1%
Chinese, 1%
Filipino, 1%
Prefer not to say, 4%

Question 13. How old are you? (n=454)

| 25-34 years old, 7% | 35-44 years old, 15% | 45-54 years old, 22% | 55-64 years old, 23% | 65+ years old, 32% |

18-24 years old, 1%
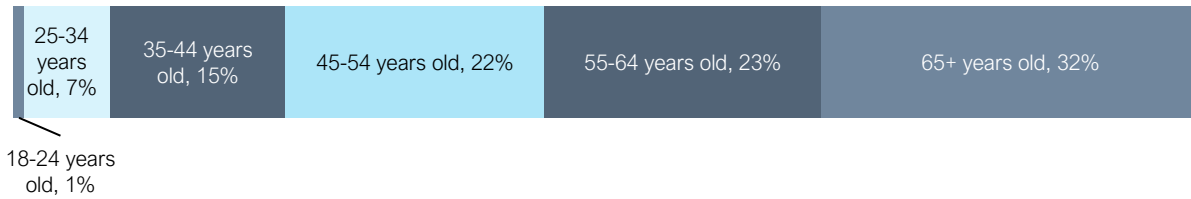
Question 14. How many people live in your household? (n=457)

| 12% | 44% | 12% | 28% | |

■ 1   ■ 2   ■ 3   ■ 4+   ■ Prefer not to say

Prefer not to say, 5%
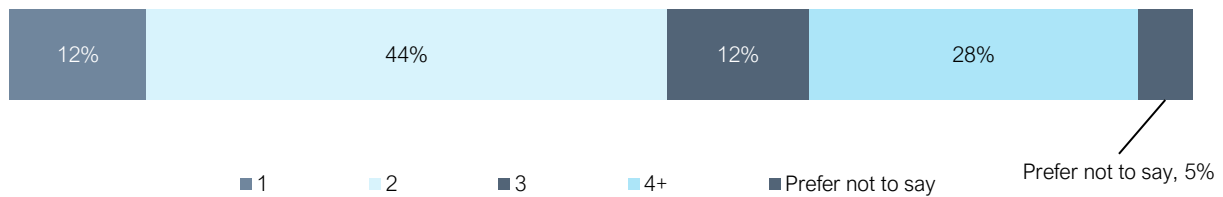
Question 15. How many members of your household are children under 18? (n=454)

| 65% | 11% | 11% | 5% | |

4%

■ 0   ■ 1   ■ 2   ■ 3   ■ 4+   ■ Prefer not to say

3%
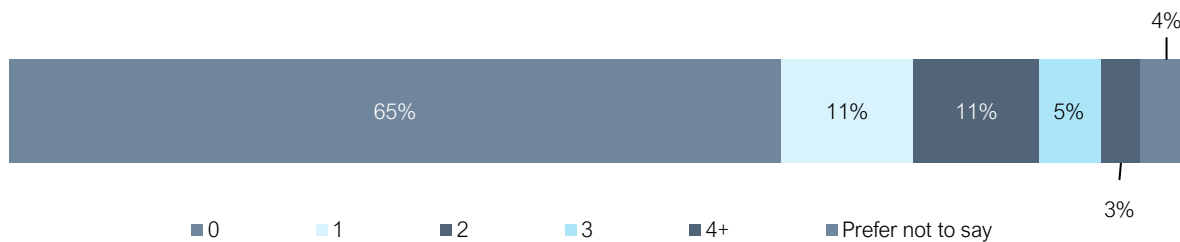
Question 16. What is your annual household income? (n=453)

- Prefer not to say, 23%
- $200,000 or more, 9%
- $150,000 to $199,999, 11%
- $125,000 to $149,999, 6%
- $100,000 to $124,999, 10%
- $75,000 to $99,999, 15%
- $60,000 to $74,999, 7%
- $50,000 to $59,999, 4%
- $45,000 to $49,999, 4%
- $27,000 to $44,999, 4%
- $15,000 to $26,999, 4%
- Less than $15,000, 2%
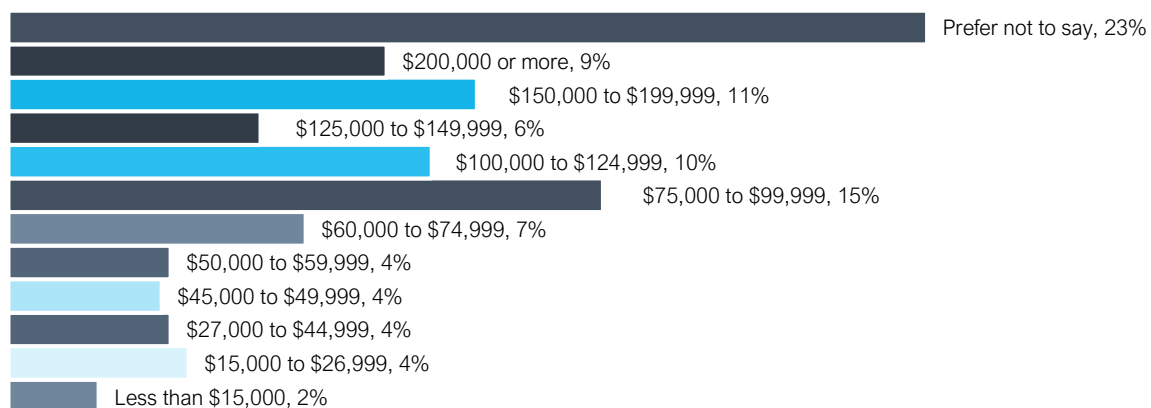
Question 17. What is your highest degree or level of school completed? (n=454)

Prefer not to say, 7%

Professional degree beyond a master's (e.g., PhD, JD, MD, DDS, LLB), 8%

Master's degree (e.g., MA, MS, MBA, MPA), 21%

Bachelor's degree (e.g., BA, BS), 27%

Associate's degree (e.g., AA, AS), 10%

Some college, 19%

High school diploma (or GED), 7%
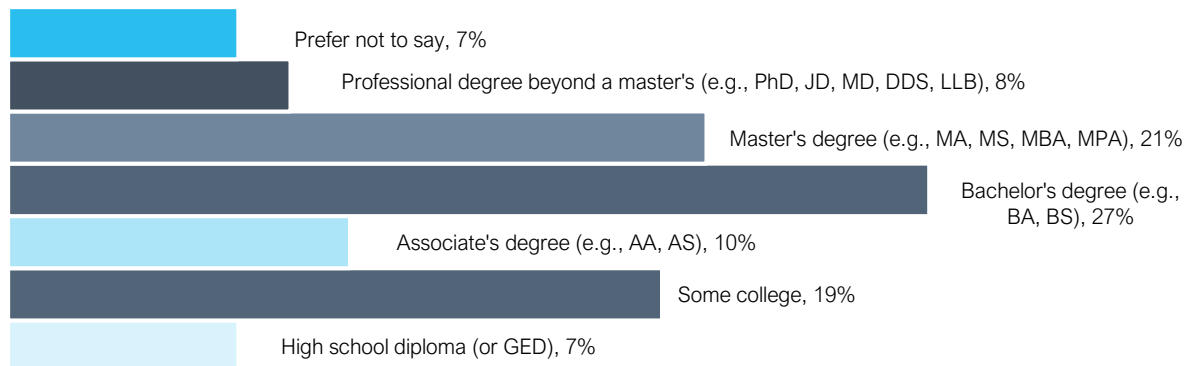
SPEED TEST

The FCC currently defines acceptable broadband speeds as minimum 25 megabits per second (Mbps) download and 3 Mbps upload speeds (25/3), and the State of California recently established a minimum broadband speed goal of 100 Mbps download. Responses for the speed test displayed below were identified as belonging to Unincorporated Area Residents by matching unique test IDs that we could confirm originated from a test conducted in a community considered to be an unincorporated area.

UAs[111]	Average download (Mbps)	Average upload (Mbps)	Download speed distribution ■ 0 - 25 Mbps ■ 25 - 100 Mbps ■ 100+ Mbps	Upload speed distribution ■ 0 - 3 Mbps ■ 3 - 20 Mbps ■ 20+ Mbps
Total overall (n=117)	56	24	44% 40% 15%	20% 40% 7%
District 1 (n=0)	N/A	N/A	N/A	N/A
District 2 (n=39)	65	31	44% 36% 21%	36% 54% 10%
District 3 (n=6)	50	5	50% 33% 17%	17% 83%
District 4 (n=0)	N/A	N/A	N/A	N/A
District 5 (n=72)	52	22	44% 43% 13%	28% 59.7% 13%

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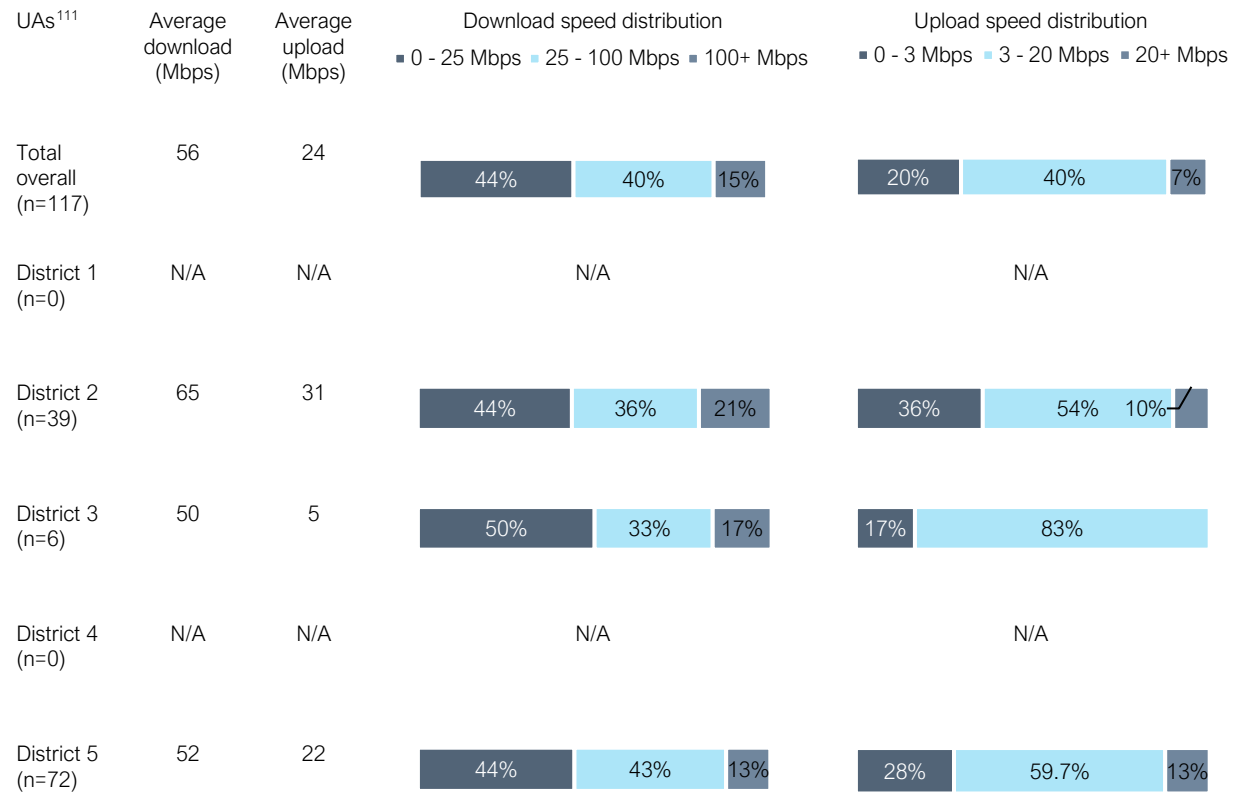
[111] No data available for District 1 and District 4 as speed test results from unincorporated area respondents were disaggregated to the district level and not all survey respondents participated in the speed test. The speed test was conducted using Ookla (https://www.speedtest.net/)

Additional Broadband Index methodology

To select variables for consideration and inclusion in the Index, we use a mixed method approach to identify framework factors that are associated with different levels of broadband availability/adoption. This approach utilizes four steps:
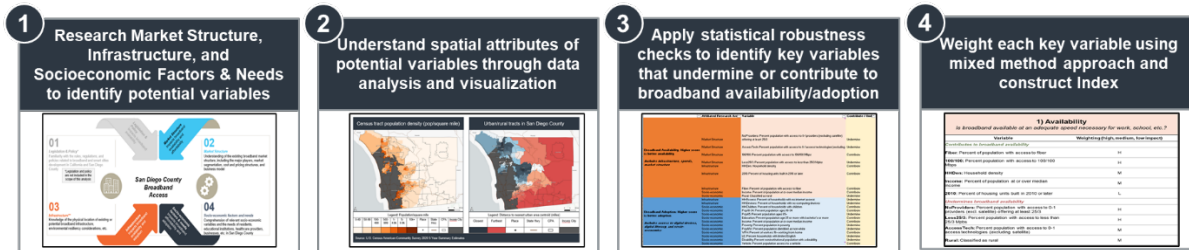
1. First, we researched Market Structure, Infrastructure, and Socioeconomic factors and needs to identify potential variables. Analyzing and understanding market structure, infrastructure, and socioeconomic factors is critical to identifying un(der)served geographic areas to address broadband needs and to support digital equity. Resources reviewed include other government broadband plans, academic journal articles, California broadband policy and legislation, think tank and advocacy group publications, news articles and more.
2. Next, we sought to understand spatial attributes of potential variables through data analysis and visualization. We broke this down into three steps: data collection, data transformation, and mapping & analysis. In the first step, we located data that represents Index variables (e.g., FCC/CPUC/Ookla data for broadband speeds, census for housing density, household broadband subscription rates, median family income, etc. We next cleaned and transformed data so that variables are represented at the census tract level in terms of geography and continuous/rates/shares. Finally, we mapped variables and conducted exploratory data analysis on variables for basic summary statistics and initial insights.
3. In the third step, we applied statistical robustness checks to identify key variables that undermine or contribute to broadband availability/adoption. The goal here was to construct a concise broadband index, sensitive enough to discern between different need typologies. This was achieved using the following approach:

    1. Variable selection: Selected, constructed variables that may be included in index

    2. Correlation analysis: Calculated correlation matrix, selected r-squared cutoff (used r-squared = 0.3 as cutoff for indicator of relationship between household broadband subscription rates and other indicators of 'adoption potential')

    3. Variance inflation factor (VIF) analysis: Calculated VIF for remaining variables, select VIF cutoff (used VIF = 10 to indicate intolerable multicollinearity)

    4. VIF filtering: Removed highly correlated variables until those left in subset had VIFs ≤ 10

4. Finally, we weighted each key variable using mixed method approach and constructed the Index. The below steps outline approach for variable weighting and Index construction:

    1. Developed weights for key availability and adoption variables based on statistical robustness checks and qualitative data inputs collected from stakeholder feedback.
    2. Calculated the z-scores for each variable to determine how far a given datapoint for a census tract lies above or below the mean and allow comparison across variables that may have different distributions.

3. Applied weightings (currently the Index uses equal weights) and calculated raw availability and adoption scores for each census tract.
4. Normalize draw scores to fall within the 0-100 range to allow for comparison across tracts.
5. Classified scores into high, medium, and low typologies using Jenks natural breaks optimization.

When refined and paired with other analysis components, the results of the Broadband Index can help enable targeted, geographic-specific broadband solutions for the unincorporated area. Index scores are used to group census tracts into different "typologies" (e.g., a high availability, low adoption tract), which informs the Comprehensive Broadband Plan by enabling:

- More informed project recommendations based on needs.

- Geographically targeted solutions to address broadband gaps.

- Identification of the appropriate potential sources of funding.

Map figures

Figure 2: Overlay of fixed broadband availability sources indicating areas with poor access to broadband speeds (<25 Mbps download). This map aggregates broadband speed data across various sources. The more red areas in a location, the more data sources that indicate there are poor speeds

Figure 3: Available last-mile broadband technology by census block using FCC data
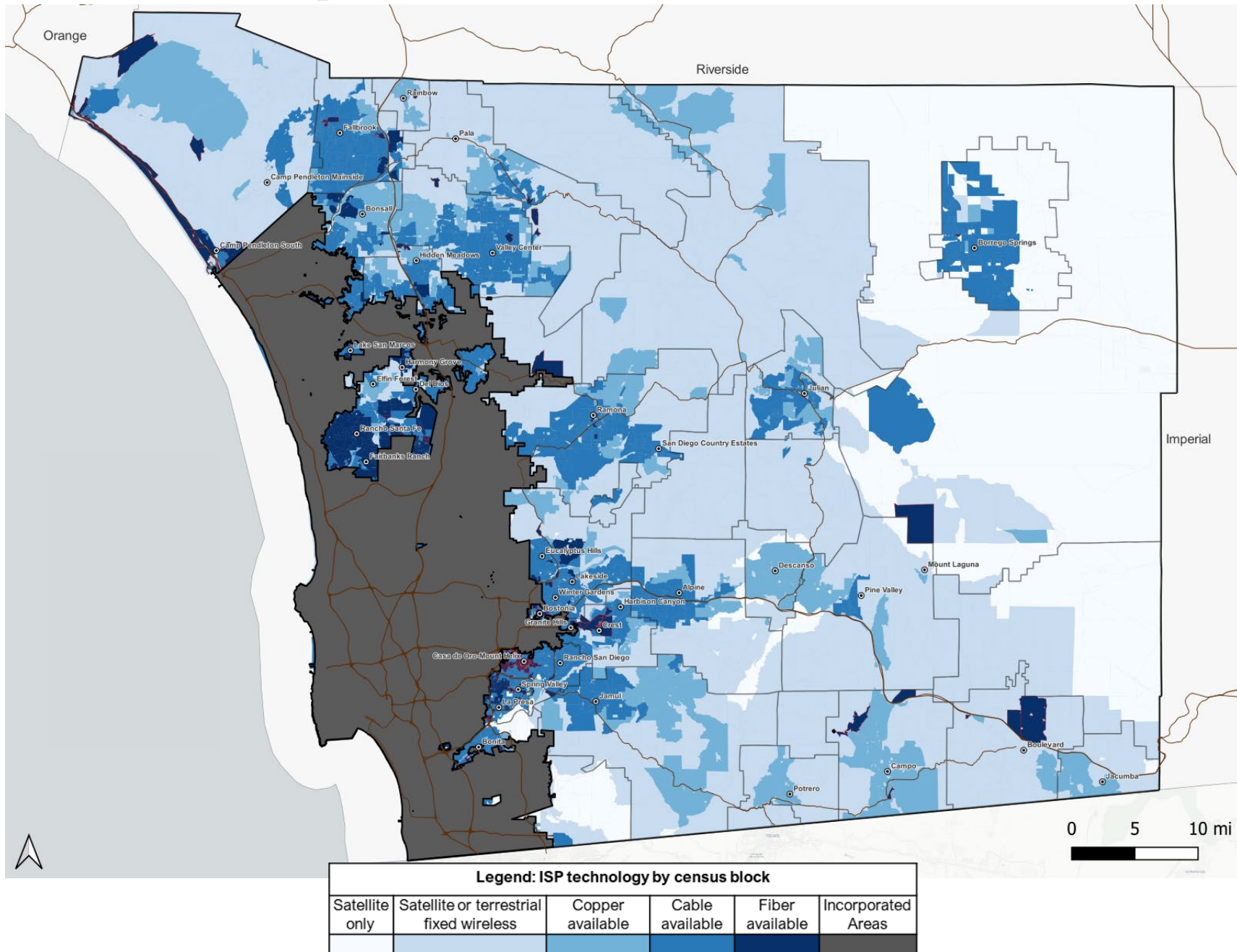

Legend: ISP technology by census block

Satellite only	Satellite or terrestrial fixed wireless	Copper available	Cable available	Fiber available	Incorporated Areas

Figure 4: Current and planned broadband infrastructure like fiber lines and cell sites
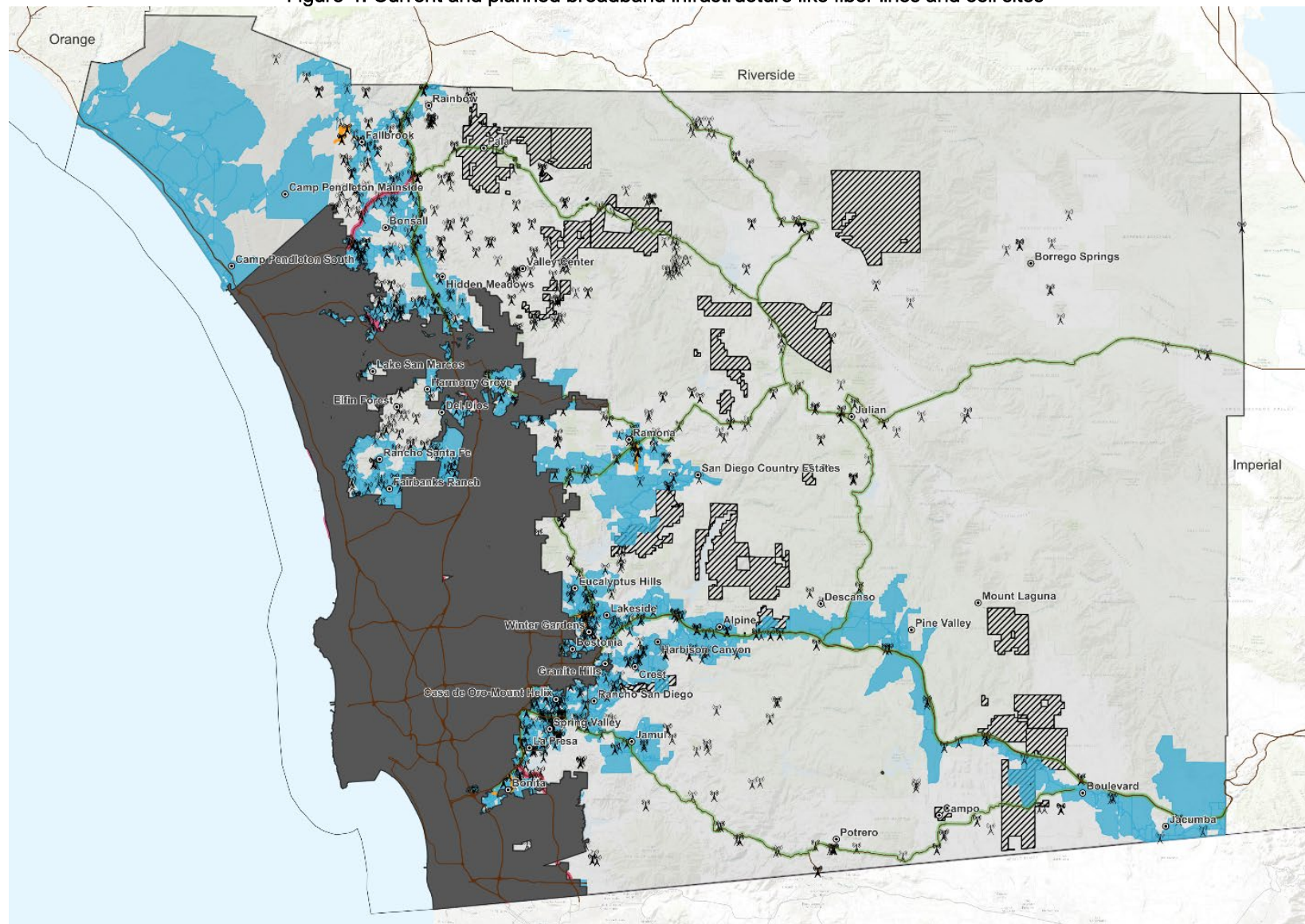
Legend: Current and potential wireline/wireless infrastructure in the unincorporated area							
DPW fiber locations	Regional transportation fiber ring	State proposed middle mile network (April 2022)	Census block with fiber presence	Cell site permits	Tribal land/ Reservations	Roads and highways	Incorporated Areas
⎯⎯⎯	⎯⎯⎯	⎯⎯⎯	▇	📡	▨	⎯⎯⎯	▇

Figure 5: Potential infrastructure, assets, and community anchor institutions that could be used to support broadband projects. Some areas have a high density of potential assets that might be used to support broadband related initiatives like public WiFi or 5G small cells
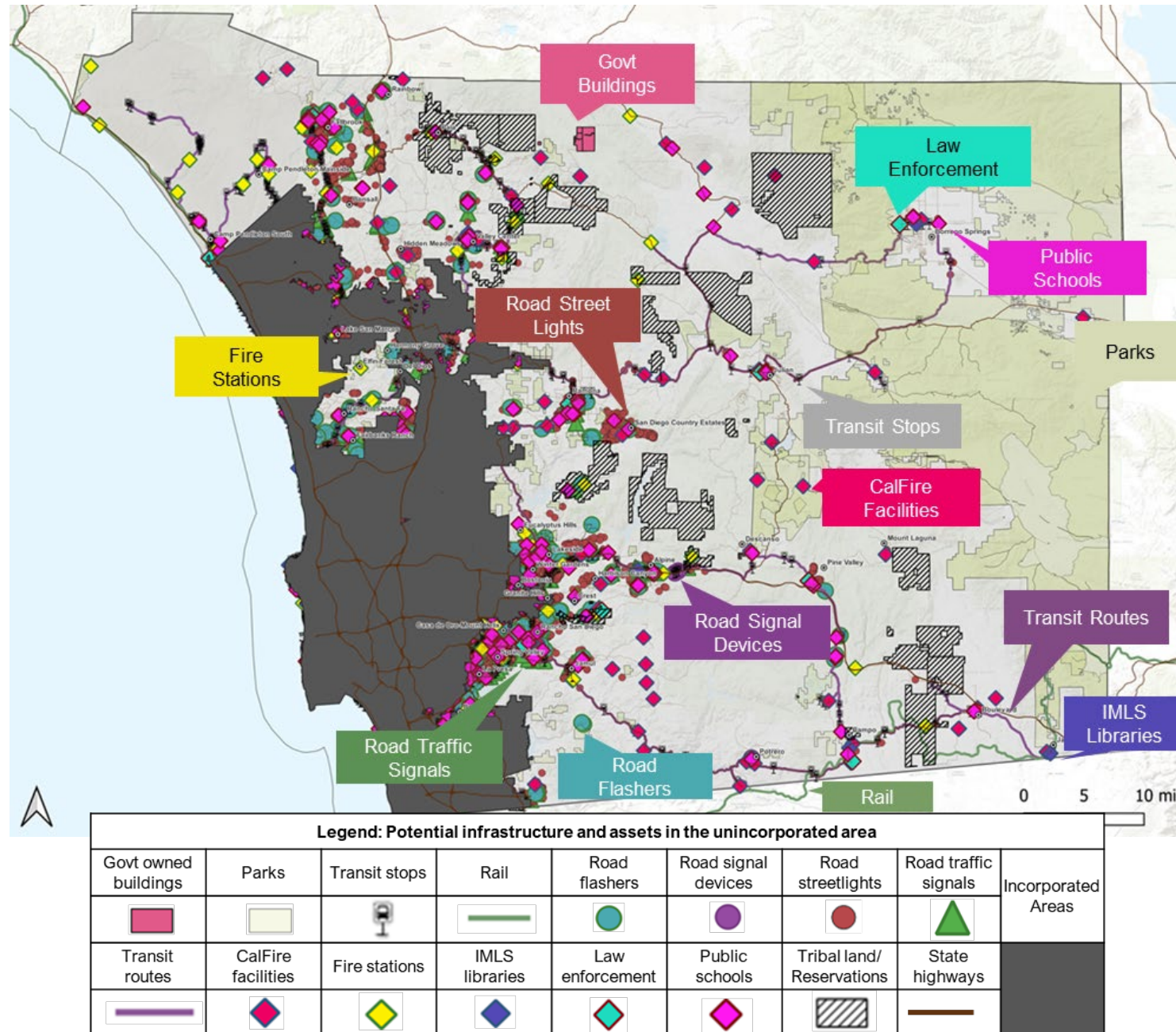
Figure 6: Percent of households with a broadband Internet subscription
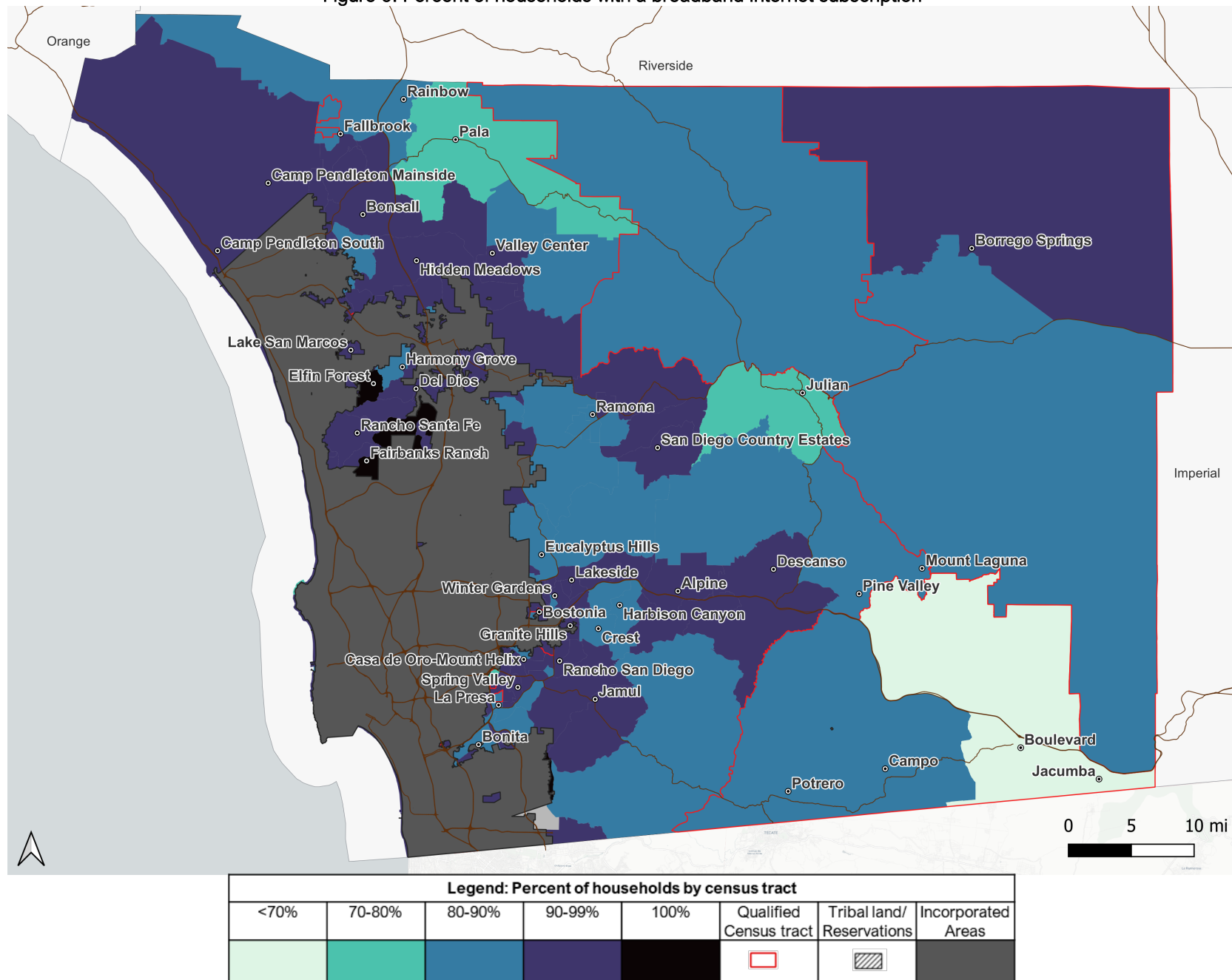
Legend: Percent of households by census tract							
<70%	70-80%	80-90%	90-99%	100%	Qualified Census tract	Tribal land/ Reservations	Incorporated Areas

Figure 7: Broadband access, as measured through adoption and infrastructure availability by census tract in the unincorporated area
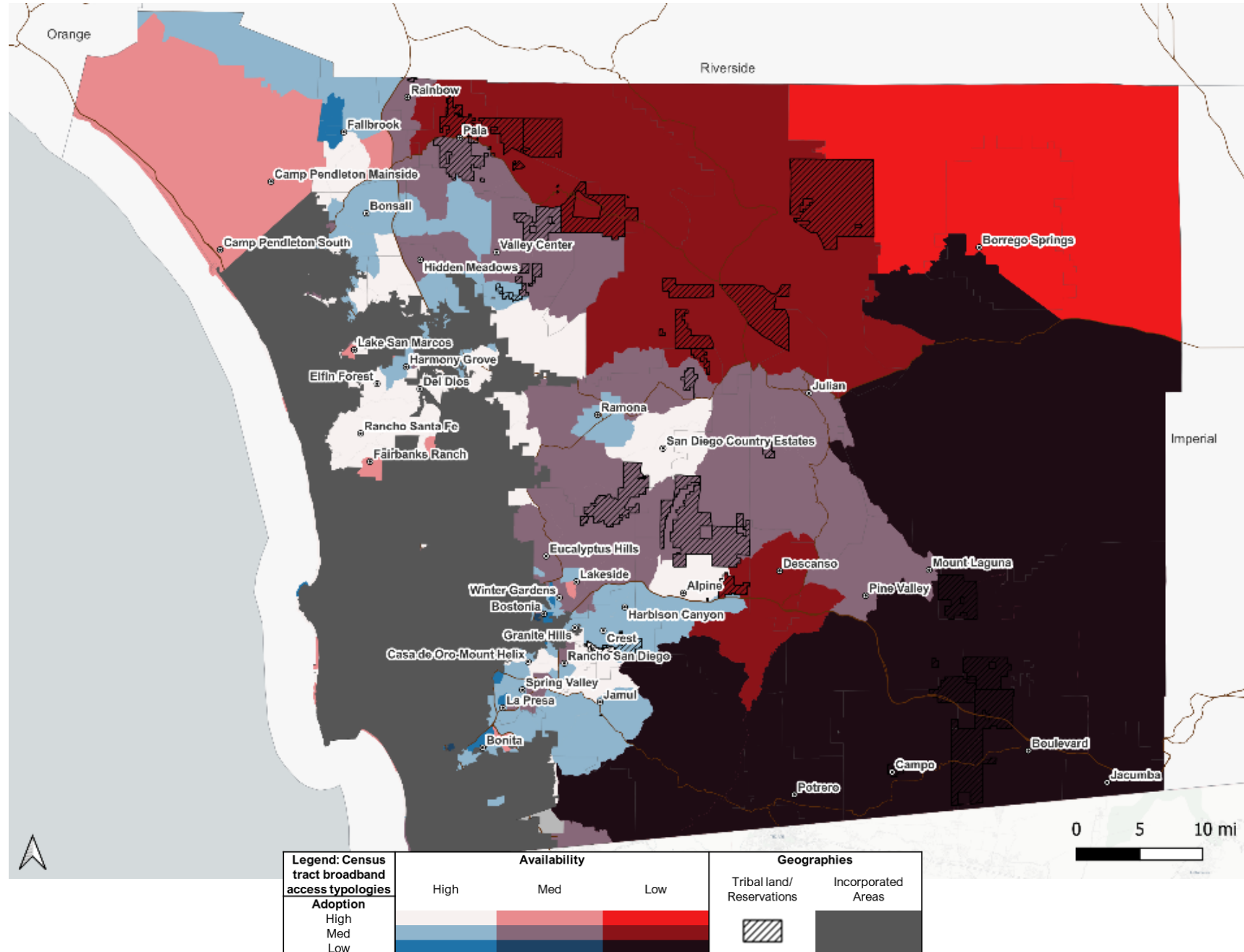
Figure 7a: Broadband **availability** as measured by the Broadband Index

Legend: Census tract broadband availability typologies

High	Med	Low

Geographies

Tribal land/ Reservations	Incorporated Areas
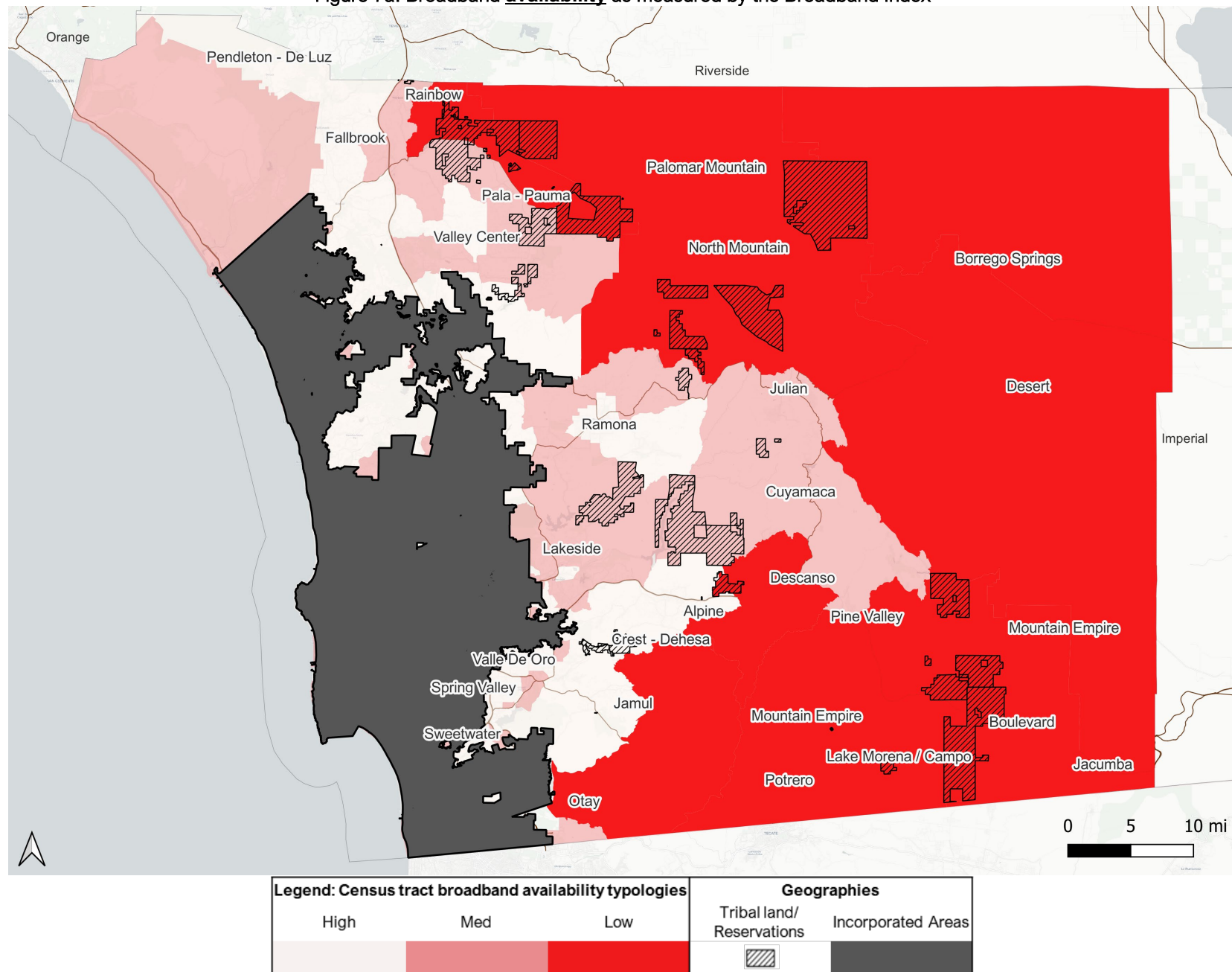
Figure 7b: Broadband **adoption** as measured by the Broadband Index

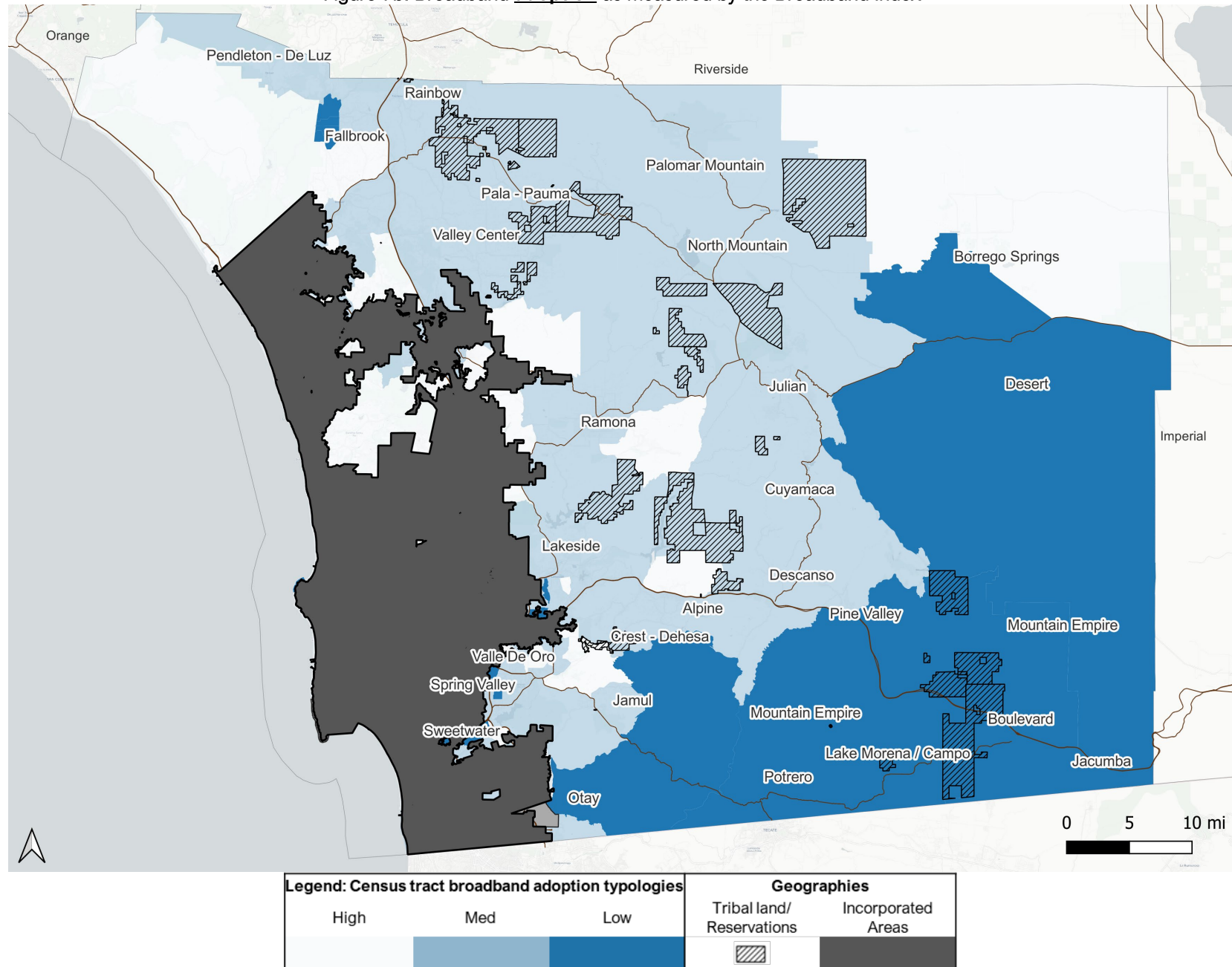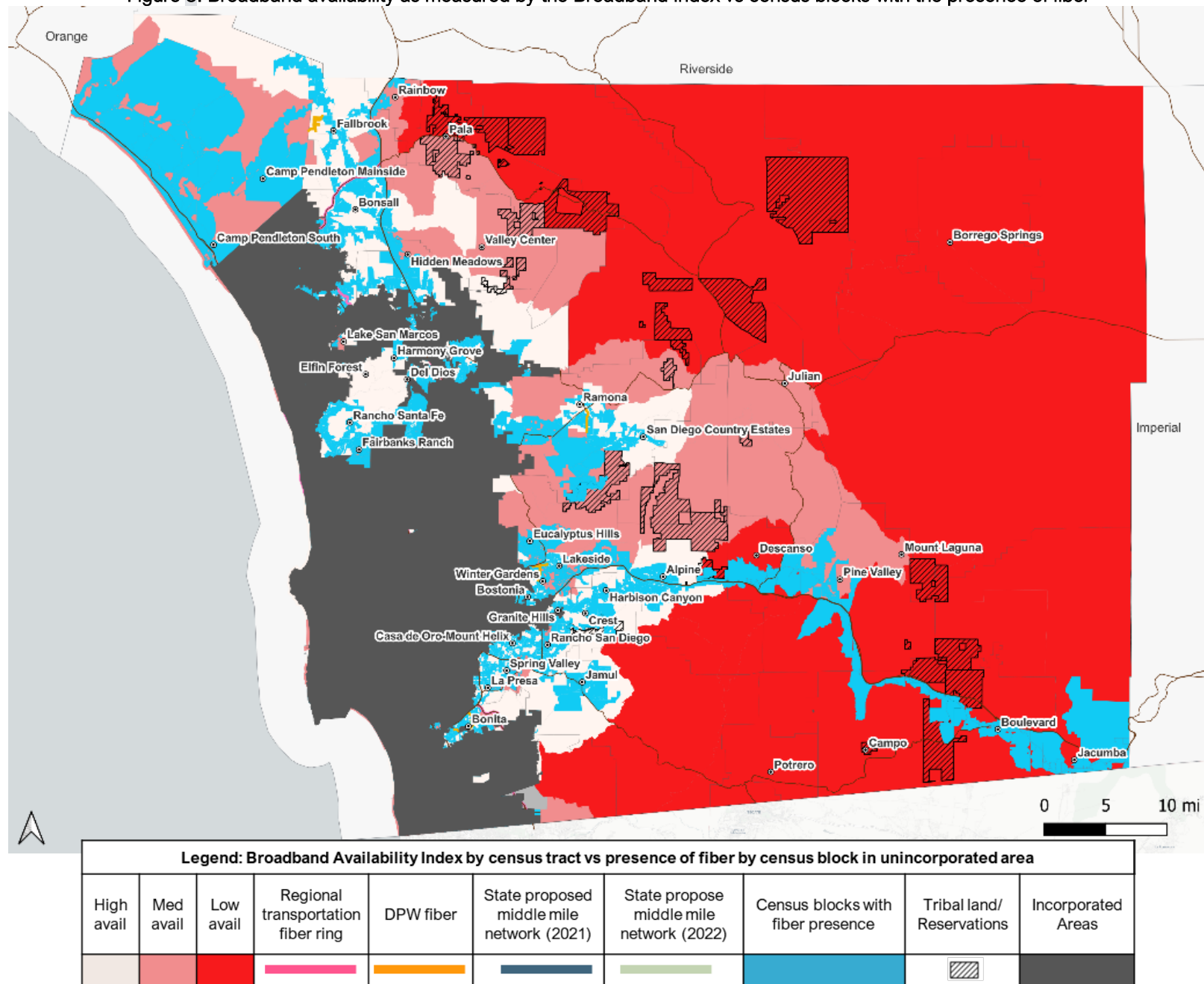Figure 8: Broadband availability as measured by the Broadband Index vs census blocks with the presence of fiber

Figure 9: Broadband adoption as measured by the Broadband Index vs qualified census tracts in the unincorporated area
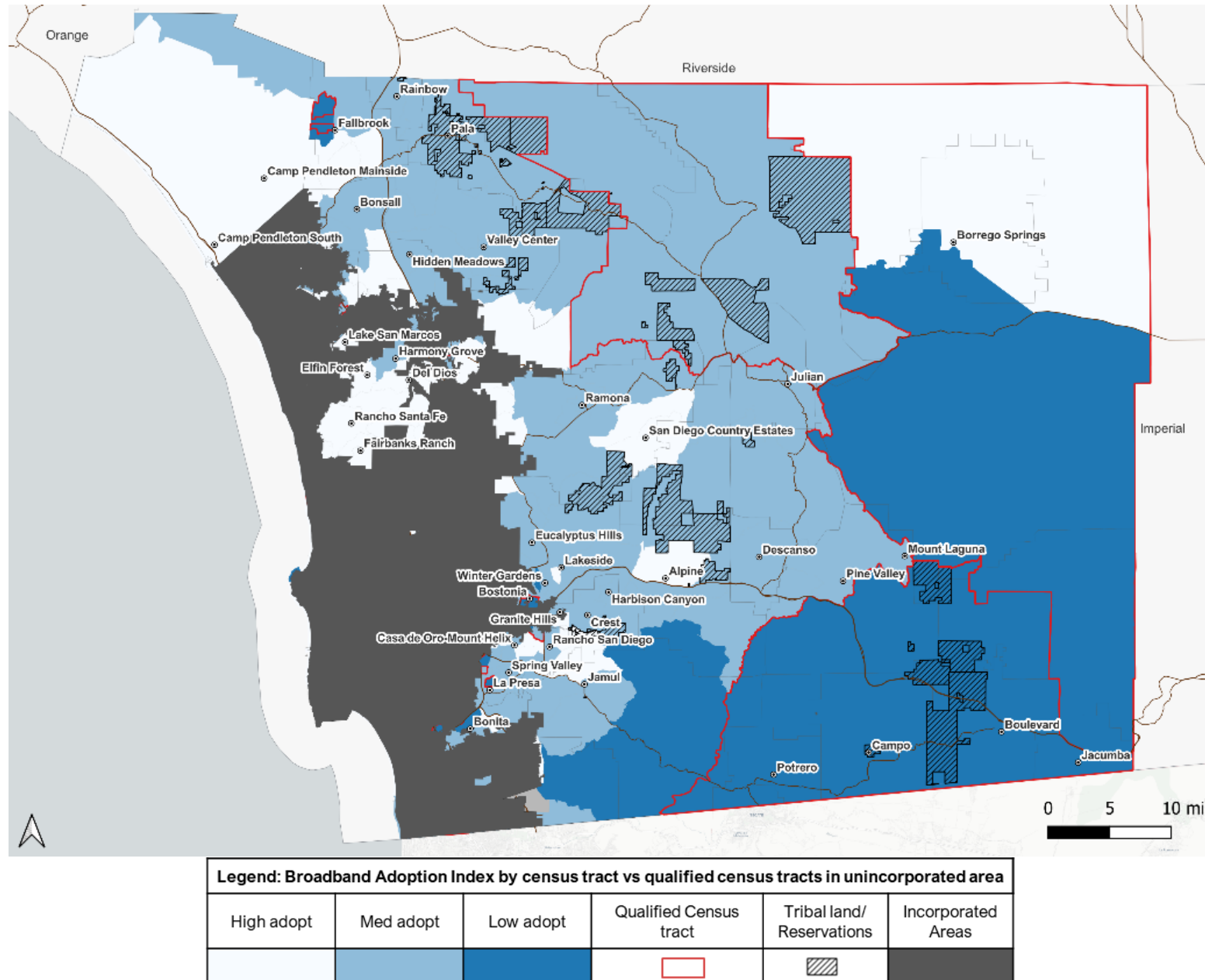
Figure 10: Broadband access in the unincorporated area

Figure 10 draws upon outputs from socioeconomic, infrastructural and Broadband Index tract classifications and combines them on a single visualization to show the type of broadband access that should be addressed (availability and/or adoption), the local socioeconomic context, and nearby fiber assets, existing and planned for a given community in the unincorporated areas. These attributes are displayed across three layers.
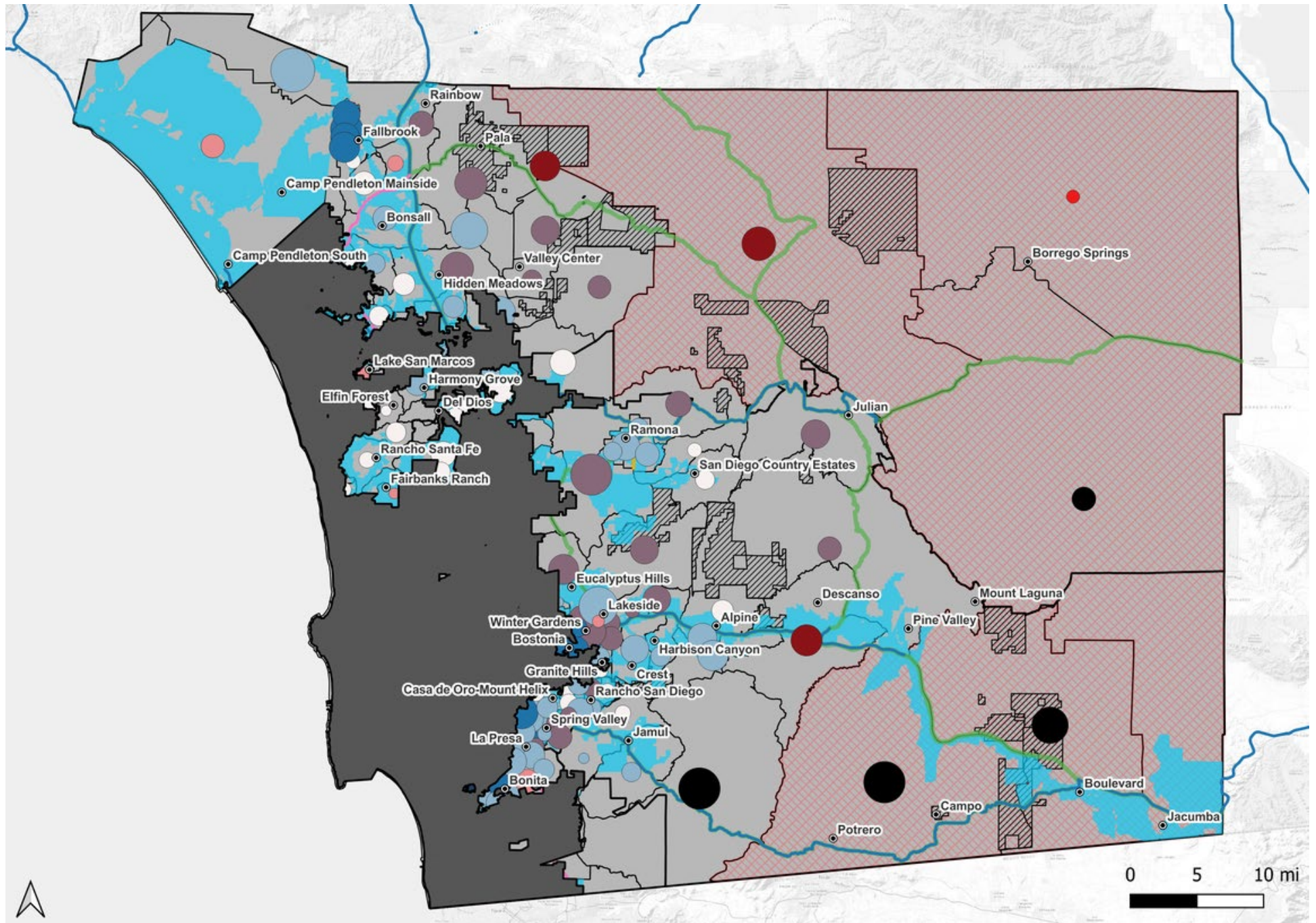
In the first layer, a bubble chart shows the type and magnitude of broadband need in each unincorporated area census tract. The type of need for a given tract is based on the outputs of the Broadband Index and represented by the color of the bubble. There are nine possible typologies in total—ranging from high availability, high adoption type census tracts (colored light purple) that have low overall priority for broadband intervention activities to low availability, low adoption type census tracts (colored dark purple) that have high overall priority for broadband intervention activities. Between these two typology combinations are seven other combinations of availability/adoption typologies that each correspond to a color based on the red-blue bivariate scale used to capture the three levels (low, medium, high) for each sub-index type. In both cases, darker colors indicate lower levels of broadband adoption (blue) and/or availability (red). To approximate the magnitude of need, the size of each bubble in this layer was defined according to census ACS data on the number of households in each tract without a wired broadband internet plan subscription. These values range between 200 – 1,000 households, with larger bubbles indicating that a greater number of households in that census tract are estimated to not have wired broadband internet subscriptions.

We can observe that the following areas in the region exhibit characteristics that are indicative of greater broadband need:

- In the eastern portion of the region, census tracts close to the Mexican border tend to be classified as having low broadband availability and adoption by the Index, in addition to having larger numbers of households without wired broadband subscriptions relative to other tracts that intersect with the unincorporated areas. These tracts encompass unincorporated communities such as **Potrero, Campo, Boulevard, and Jacumba**
- Across eastern census tracts more broadly, most of the unincorporated area's census tracts that are classified as low availability are located here, reflecting the distribution of broadband infrastructure, particularly fiber, that has been found to be clustered in and around the incorporated areas. These low availability tracts encompass and/or border unincorporated communities such as **Borrego Springs, Descanso, and Julian**
- In the north around **Fallbrook**, as well as the suburban east around **Spring Valley and La Presa**, census ACS data suggests that relatively higher numbers of households in census tracts do not have wired broadband subscriptions, similar to the outcomes noted for census tracts in the eastern part of the region. However, the low/medium adoption typologies assigned to these census tracts through the Broadband Index suggests that the type of broadband accessibility barrier is related to adoption issues rather than availability concerns

Overlayed on the first layer in this visualization, which captures the type and magnitude of need in each unincorporated area census tract, is an infrastructure asset layer than shows existing and planned fiber routes/footprints in the region. Using data sourced from the County, the State of California, and SANDAG, this layer shows how existing fiber infrastructure primarily covers incorporated areas in the region, whereas planned fiber infrastructure seeks to extend coverage, at the middle mile network level, out into the eastern portion of the region along key road corridors such as Interstate 8, as well as State Roads 78, 79 and 94. When considered in conjunction with the bubble map (which indicates type and magnitude of need across the unincorporated area), the planned fiber asset locations help elucidate which communities have both large needs and are expected to receive infrastructure development investment support from the State, which is important information for regional stakeholders to account for as they look to plan/prioritize last mile projects.

The last layer depicted in Figure 10 contains geography definitions of QCTs and tribal reservation areas in the region. The former geography can be used in combination with the Broadband Index bubble layer to emphasize areas that may require concerted efforts from stakeholders to increase connectivity. Depicting the geographic boundaries of tribal reservations shows how they are disproportionally impacted by the challenges of availability and adoption of broadband. When considered in the context of the planned fiber assets that are also mapped, it reminds stakeholders that some projects to expand broadband infrastructure in the region are expected to cross reservation land and thus benefit from coordination and collaboration with tribal entities in design and implementation.

Legend for Figure 10.

Count of households with no wired broadband					Broadband Index census tract typologies			
200	400	600	800	1K	Availability / Adoption	High	Med	Low
○	○	○	○	○	High	○	●	●
					Med	●	●	●
					Low	●	●	●

Existing and planned fiber assets					Geographies		
Regional transportation fiber ring	DPW fiber	State proposed middle mile network (2021)	State proposed middle mile network (2022)	Census blocks with fiber presence	Tribal land/ Reservations	Incorporated Areas	Qualified census tract
▬	▬	▬	▬	▬	▨	▬	▨

Figure 13: Broadband availability as measured by the Broadband Index in red with various current and planned fiber lines overlaid. The census tracts in red with yellow outline are potential target areas for broadband infrastructure availability strategies. Census blocks with fiber presence are noted in light blue for context.
(Note: Figures 11 and 12 are not maps and are in the main body of the text before the Appendix)

Legend: Broadband availability in unincorporated area with current and planned infrastructure

High avail	Med avail	Low avail, target tract area	Regional transportation fiber ring	DPW fiber	State propose middle mile network (2022)	Census blocks with fiber presence	Tribal land/ Reservations	Incorporated Areas
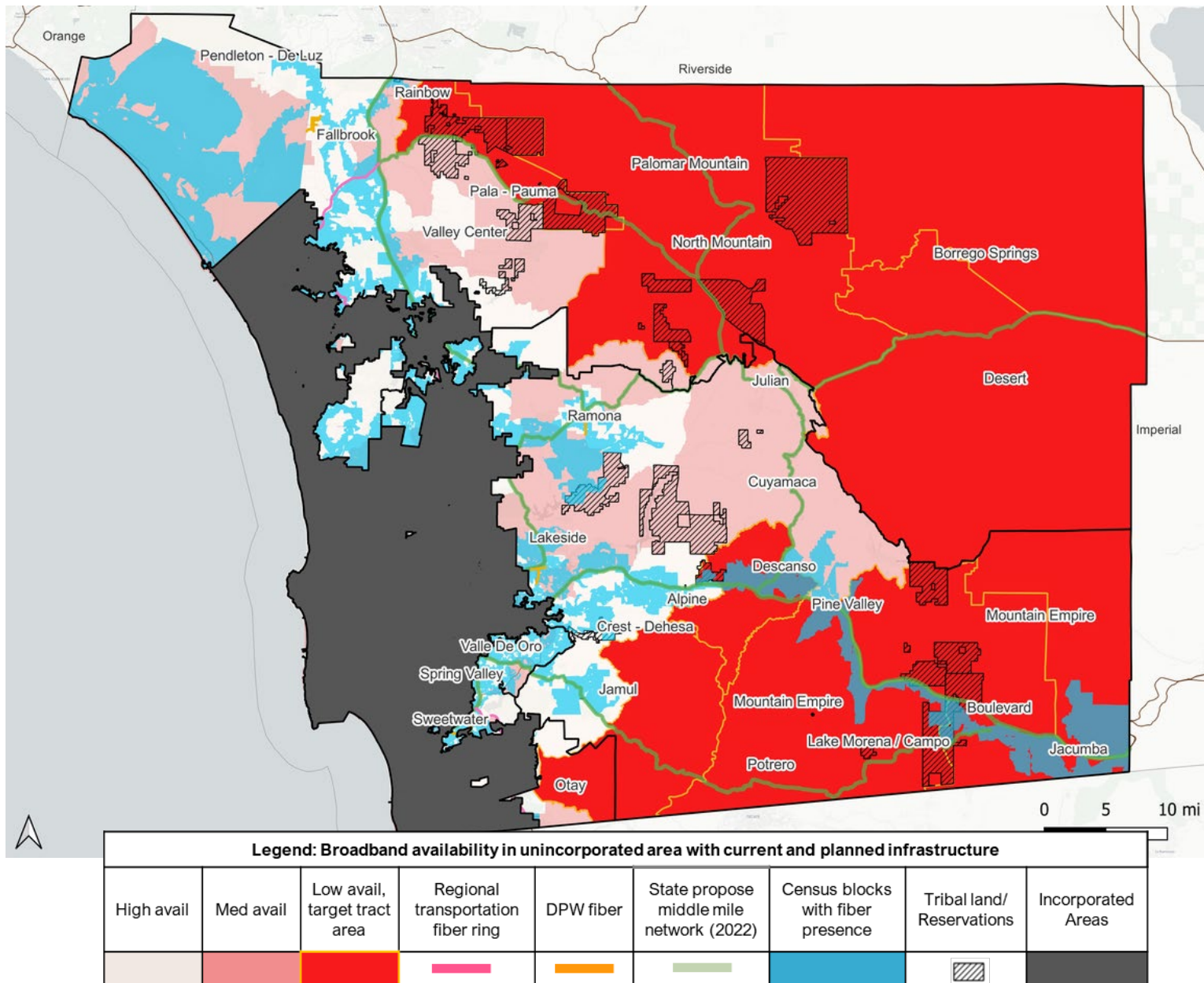
Figure 14: Broadband adoption as measured by the Broadband Index in blue with various community anchor institutions overlaid. The census tracts in blue with yellow outline are potential target areas for broadband adoption availability strategies. Census blocks with fiber presence are noted in light blue for context.
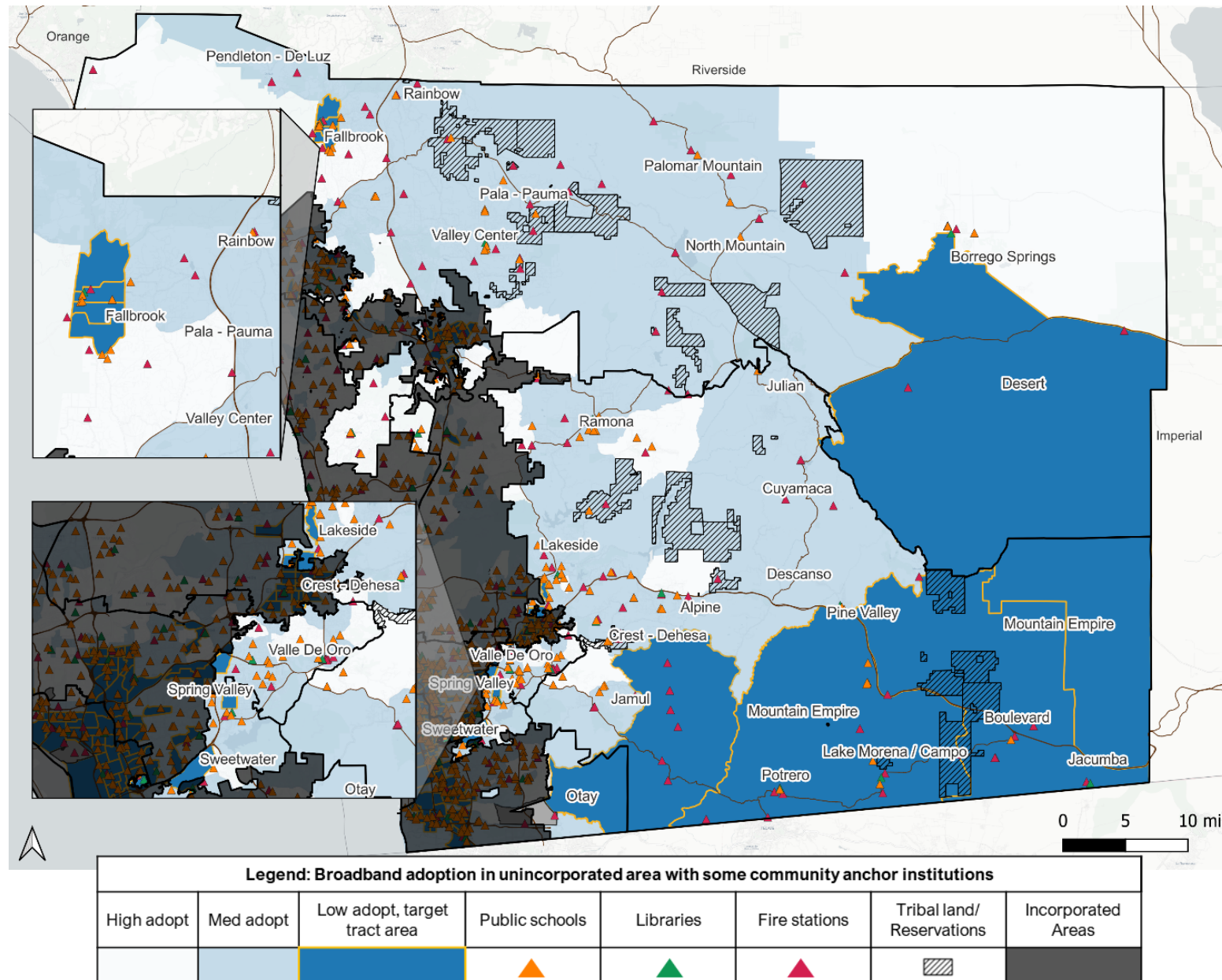
Figure 15: How to read district analysis maps:

District 1

Red and blue shades represent Broadband Index typologies by census tract in the unincorporated area. **Blue** shades indicate level of broadband adoption, while **red** shades indicate level of broadband availability in each tract. Darker colors indicate lower levels of broadband adoption and/or availability (i.e., higher need).

Pink, **brown**, and **white** lines represent existing and planned public fiber routes

Community anchor institutions such as schools, libraries, and fire stations are represented by **white** triangles respectively

Legend: Census tract broadband access typologies	Availability			Geographies		Other highlighted elements			
	High	Med	Low	Tribal land/ Reservations	Incorporated Areas	State highway	DPW Fiber	State proposed middle mile or regional transportation fiber ring	Select community anchor institution (library, public school, or fire station)
Adoption High Med Low									

Figure 16: Broadband access in District 1

Figure 17: Broadband access in District 2
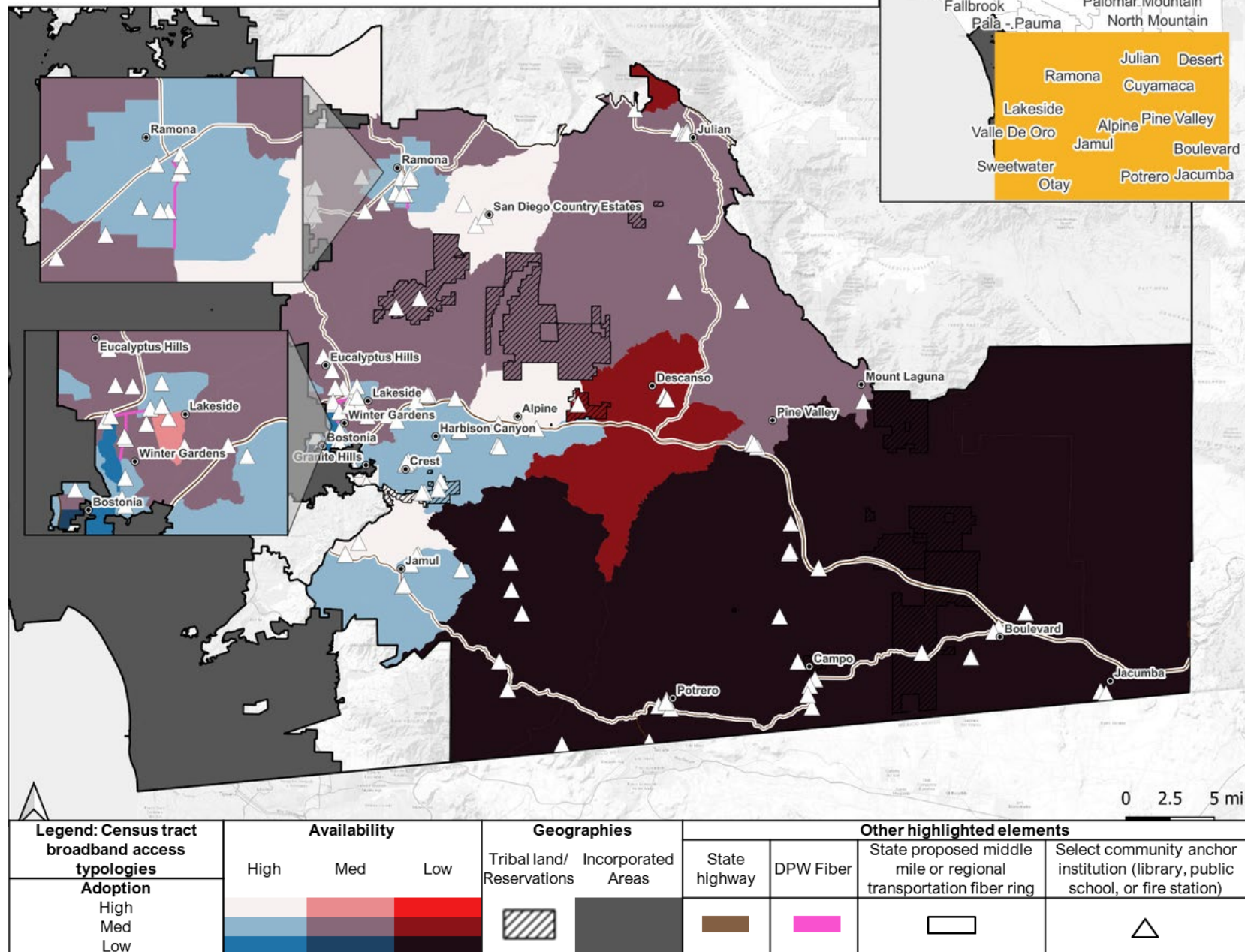
Figure 18: Broadband access in District 3

Legend: Census tract broadband access typologies	Availability			Geographies		Other highlighted elements			
	High	Med	Low	Tribal land/ Reservations	Incorporated Areas	State highway	DPW Fiber	State proposed middle mile or regional transportation fiber ring	Select community anchor institution (library, public school, or fire station)
Adoption									
High									
Med									
Low									
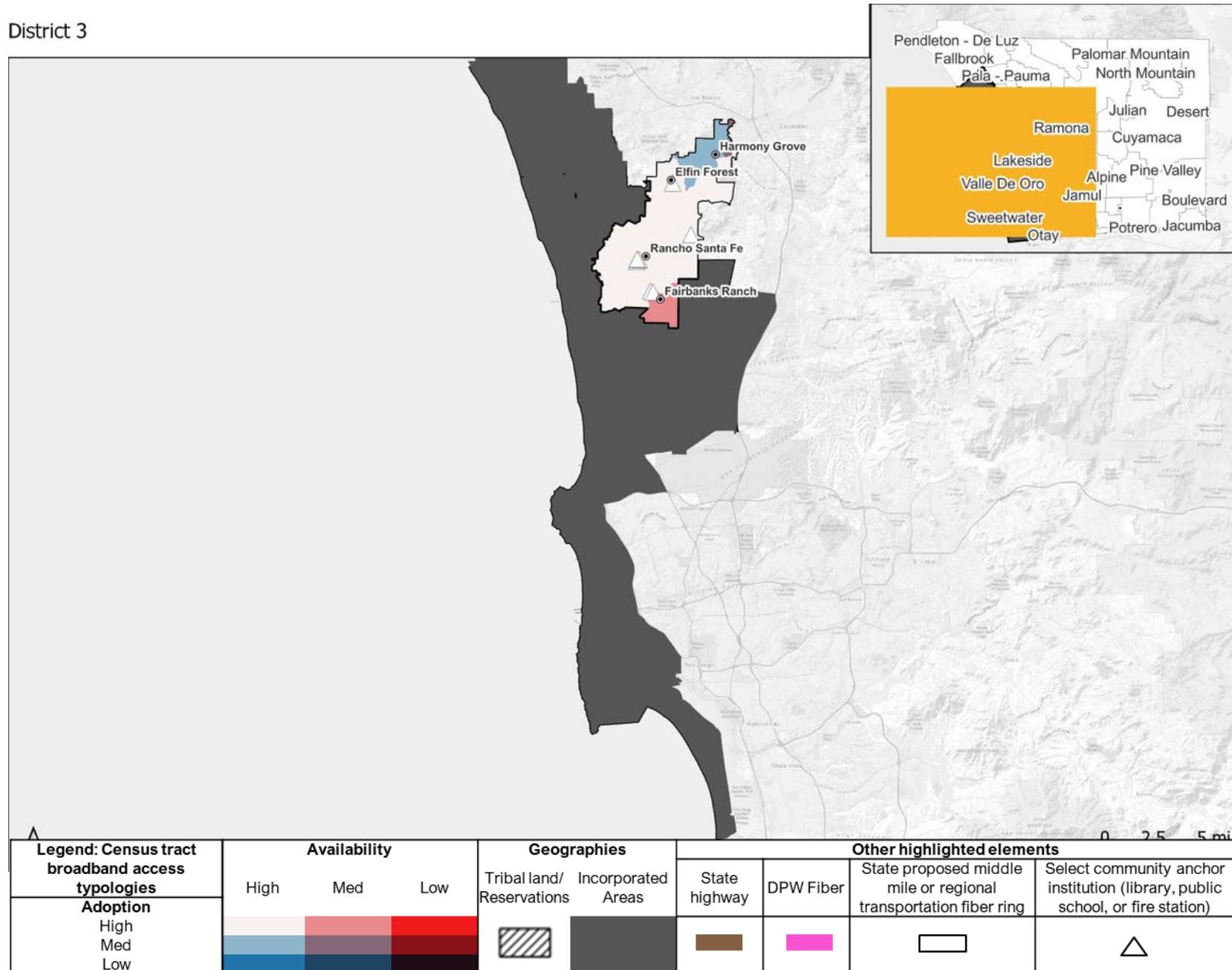
Figure 19: Broadband access in District 4
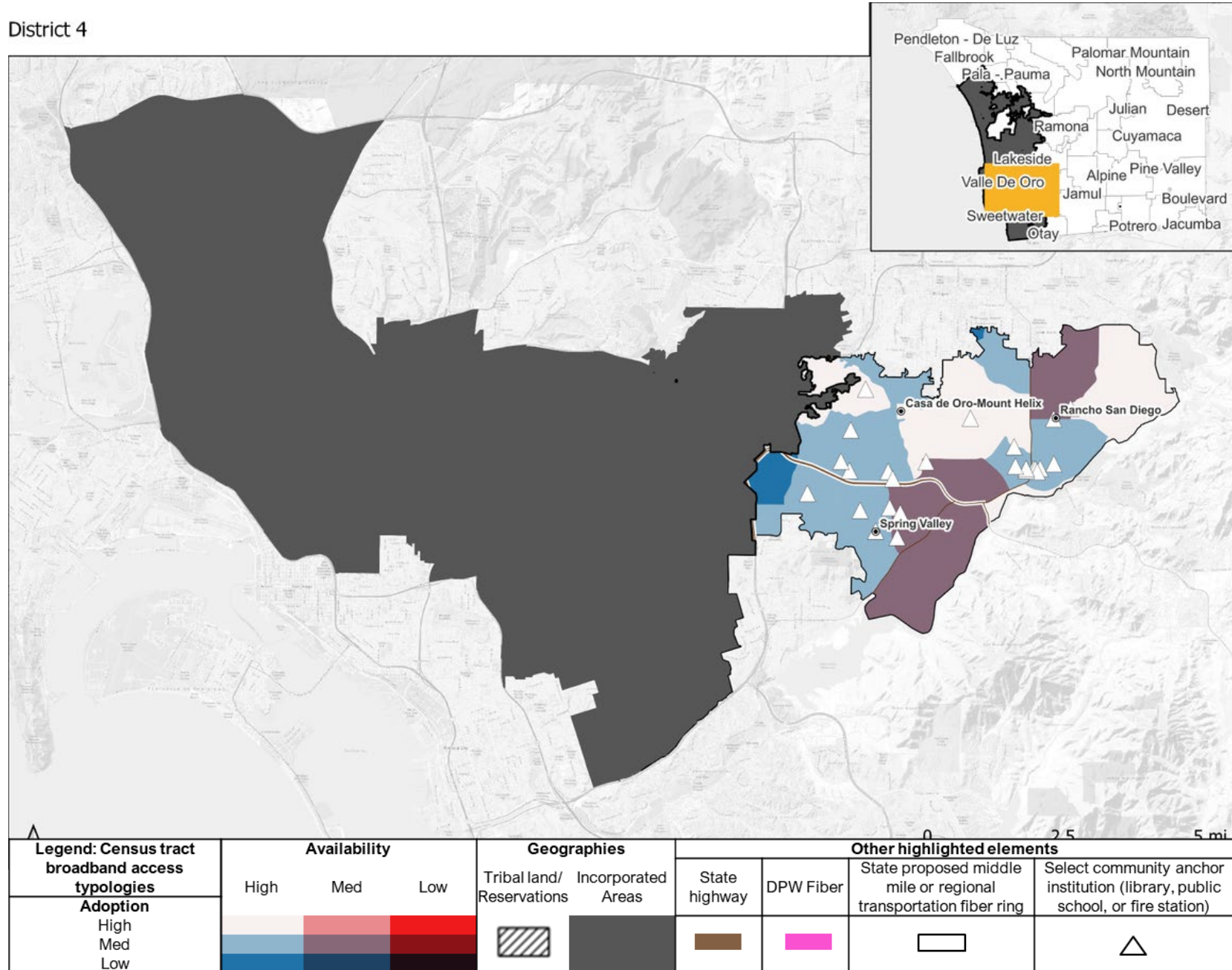
Figure 20: Broadband access in District 5
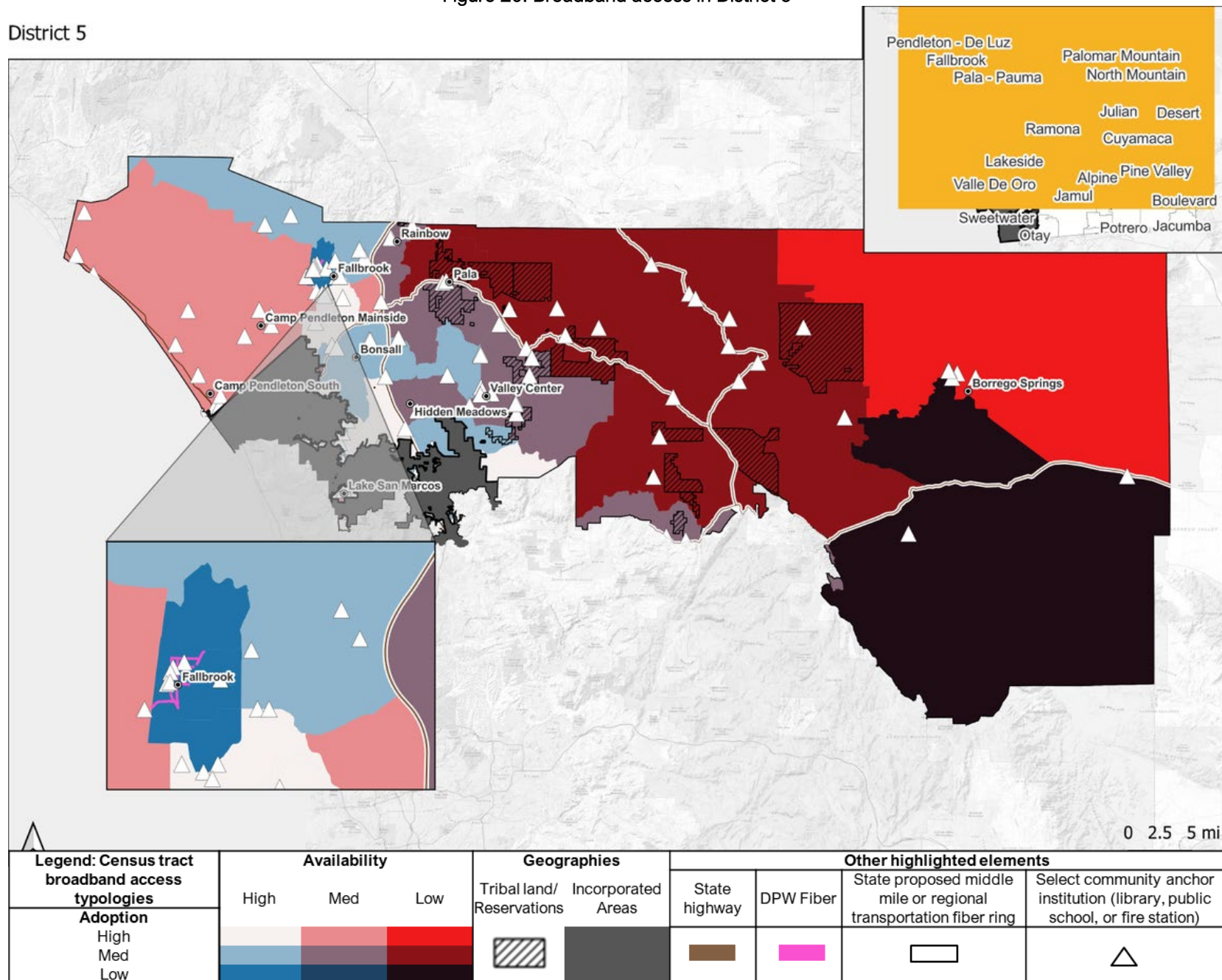
Census tract prioritization and closing

The above report and appendices provide an understanding of the current state of broadband connectivity in the region's unincorporated areas and outline a three-pillared strategic approach to help improve it, district by district. The suggestions were made with accessibility, affordability, reliability, and adoption in mind, with the ultimate goal of improving consumer broadband experiences throughout the unincorporated areas, but to be successful, they will need the buy-in of many different stakeholders along the way. Government entities like the County and SANDAG will need to work equal parts with other government entities, private ISPs, and community organizations, in order to help convene and coordinate between all possible contributors. By each playing to their different strengths, from grant applications to political acumen to technical know-how, these organizations can come together to turn the suggestions in this Plan into a more connected future for unincorporated areas.

This section contains a ranked list of census tracts by district, ordered by each tract's relative level of broadband access need. It should be noted that the intent of this table is to provide a starting point for prioritization of activity. This table is not intended to say that some census tracts do not have broadband needs. It is more so indicating that some needs may be more extreme than others. Priority rankings were developed based on how a given tract scored in the Broadband Index (both their availability score as well as their adoption one). The census priority tract table also features relevant stakeholders that could be engaged to conduct some of the activities discussed so far in this report. For this table, relevant stakeholders were determined based on a given entity's geographic proximity to a given supervisorial district. The table below summarizes how stakeholders were mapped to districts:

Table 128 Definitions used for stakeholder mapping by census tracts

Stakeholder	Definition
Community Planning Area	A CPA is mapped to a given supervisorial district if any portion of its geography intersects with a census tract that overlaps with the district's geographic boundaries.
Community Planning Sponsor Group	A CPSG is mapped to a given supervisorial district if any portion of its geography intersects with a census tract that overlaps with the district's geographic boundaries.
Tribes	A tribal reservation is mapped to a given supervisorial district if any portion of its geography intersects with a census tract that overlaps with the district's geographic boundaries.
Consumer ISPs	Consumer ISP that reported offering any level of consumer service in census blocks of a given census tract were identified. Then ISPs were mapped to districts based on whether any overlap between tract and district geographies exists.
Commercial ISPs	Commercial ISPs that reported offering any level of commercial service in census blocks of a given census tract were identified. Then ISPs were mapped to districts based on whether any overlap between tract and district geographies exists.

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
211.002	100.00%	low_adopt+ low_avail	1	956	2	Pine Valley, Mountain Empire, Desert, Jacumba, Boulevard, Lake Morena / Campo	Central Mountain, Mountain Empire, Desert	Campo Reservation, Cuyapaipe Reservation, La Posta Reservation, Manzanita Reservation	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Coba Internet, Gci Communication Corp.	Ribbonwood Rd, I-8 Wb Eg_Ribbonwood Rd, Carrizo Gorge Rd, Access Rd_I-8 Under Crossing, La Posta Truck Tl, Old Highway 80/La Posta Rd_End, Crestwood Rd, Ramps Eb I-8_Ramps Wb I-8, Kitchen Creek Rd, Eb Ramps_Wb Ramps, Old Hwy 80, Tierra Del Sol Rd_Sr 94, Tierra Del Sol Rd, Old Highway 80_Sr-94, Mc Cain Valley Rd, Old Highway 80_End, Old Hwy 80, I-8 Egress_In-Ko-Pah Park Rd	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,3,4,5,6, 7,9,10
213.02	99.90%	low_adopt+ low_avail	2	1395	1,2	Alpine, Crest - Dehesa, Jamul, Otay	Alpine, Crest-Dehesa, Jamul-Dulzura, Otay	Sycuan Reservation	AT&T California, Cox Communications, HughesNet, MountainMesh, One Ring Networks, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,3,5,6,7, 8,9,10
210.01	100.00%	low_adopt+ low_avail	3	731	2,5	Borrego Springs, Cuyamaca, Pine Valley, Mountain Empire, Desert, Jacumba, Boulevard, North Mountain	Desert, Central Mountain, Mountain Empire, North Mountain	Cuyapaipe Reservation	AT&T California, Canyon Wireless, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC., Zito Media	Gci Communication Corp., Tpx Communications	Sunrise Hy, Snow Gate 3_Sr-79, Old Hwy 80, I-8 Egress_In-Ko-Pah Park Rd, Great S Overland 1849, Sr 78_Mile Post 18.0	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,3,4,5,6, 7,8,9,10
209.03	100.00%	med_adopt +low_avail	4	1084	2,5	Julian, Pala - Pauma, Palomar Mountain, Desert, North Mountain, Ramona, North County Metro	Julian, Pala-Pauma, North Mountain, Desert, Ramona, North County Metro	La Jolla Reservation, Los Coyotes Reservation, Mesa Grande Reservation, Pala Reservation, Pauma and Yuima Reservation, Santa Ysabel Reservation	AT&T California, Frontier Communications Corporation, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC., Zito Media	Centurylink, Gci Communication Corp.	Sr 76, East Grade Rd_End, Riverwood Rd Prd 16, Sr-78_Mountainbrook Rd Prd 16, Washington St, Sr-79_End, Wynola Rd, Sr-79_Mile Post 01.0, Springview Rd, Sr-78_Mountainbrook Rd, Mesa Grande Rd, Mile Post 01.0_Sr-79, San Felipe Rd, Sr-79_Mile Post 01.0, East Grade Rd, Henshaw Rd_Sr-76, Fink Rd, Sr-79_End, San Felipe Rd, Mile Post 16.0_Sr-78	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,3,4,5,6, 7,9,10
211.01	100.00%	low_adopt+ low_avail	5	1658	2	Pine Valley, Alpine, Mountain Empire, Boulevard, Lake Morena / Campo, Potrero, Tecate, Jamul	Central Mountain, Alpine, Mountain Empire, Jamul-Dulzura	Campo Reservation, La Posta Reservation	AT&T California, Canyon Wireless, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Fusion, Fusion Cloud Services, Inc., Gci Communication Corp., Tpx Communications	La Posta Truck Tl, Old Highway 80/La Posta Rd_End, Harris Ranch Rd, Sr-94_End Z1914, Dewey Pl, Sr-94_End Cmr, Crestwood Rd, Ramps Eb I-8_Ramps Wb I-8, Old Hwy 80, I-8 Wb Ramps_I-8 Eb Ramps, Kitchen Creek Rd, Eb Ramps_Wb Ramps, Shockey Truck Tl, Sr-94_Far Valley Rd, Corte Madera Rd, Lebanon Rd_End, Unnamed F57 Aka Old Hwy 94, Unnamed F57/Sr 94_Unnamed F57/Sr 94	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,3,5,6,7, 9,10
212.02	100.00%	med_adopt +low_avail	6	1061	2	Cuyamaca, Pine Valley, Descanso, Alpine, Jamul	Central Mountain, Alpine, Jamul-Dulzura	Capitan Grande Reservation, Viejas Reservation	AT&T California, Cox Communications, HughesNet, MountainMesh, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	Viejas Bl, Sr-79_Manzanita Ln E, Willows Rd, Ramps Eb_Ramps Wb, Riverside Dr, Viejas Grade Rd_Sr-79, Wildwood Glen Ln, Sr-79_Los Terrinitos Rd	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,5,6,7,8
191.08	100.00%	med_adopt +low_avail	7	937	5	Rainbow, Pala - Pauma, Palomar Mountain, North	Rainbow, Pala-Pauma, North Mountain, Fallbrook	La Jolla Reservation, Pala Reservation, Pauma and Yuima Reservation, Rincon Reservation	Accel Wireless, Airpeak Wireless, AT&T California, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless,	Fusion Cloud Services, Inc., Gci Communication Corp., Tpx Communications	Cole Grade Rd, Sr-76_Spring Valley Rd, Magee Rd, Sr-76_Magee Rd Prd 8, Pala Mission Rd, Pala Temecula Rd_Sr-76	1.1, 1.2, 1.3, 2.3, 3.1, 3.2, 3.3	1,2,3,5,6,7, 9,10

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
						Mountain, Fallbrook			Viasat Inc, VSAT Systems, LLC.				
210.02	100.00%	high_adopt +low_avail	8	578	5	Borrego Springs, Desert, North Mountain	Desert, North Mountain	Los Coyotes Reservation	AT&T California, GeoLinks, HughesNet, Viasat Inc, VSAT Systems, LLC., Zito Media	Centurylink, Gci Communication Corp., Mci, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2, 2.3	1,2,5,6,7,8
148.06	0.30%	low_adopt+ med_avail	9	4	4	County Islands	County Islands	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp., Tpx Communications, Xo Communications	N/A	1.3, 3.1, 3.2, 3.3	1,3,5,6,9,10
144	3.50%	low_adopt+ high_avail	10	63	4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp., Paetec Communications Inc, Tpx Communications	N/A	1.3, 3.1, 3.2, 3.3	1,3,4,5,6,9,10
135.06	100.00%	med_adopt +med_avail	11	1153	4	Spring Valley, Sweetwater, Valle De Oro	Spring Valley, Sweetwater, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,8,9,10
169.02	100.00%	med_adopt +med_avail	12	820	2	Central Mountain, Barona, Alpine, Lakeside, Ramona	Central Mountain, Barona, Alpine, Lakeside, Ramona	Barona Reservation, Capitan Grande Reservation	AT&T California, Canyon Wireless, Cox Communications, HughesNet, San Diego Broadband, SDWisp, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Santa Maria Av, Sr-67_End Cmr	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6,7
122	48.30%	low_adopt+ med_avail	13	438	1	County Islands	County Islands	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp.	Sweetwater Rd, Nc Cl Enter_Orange St Cs	1.3, 3.1, 3.2, 3.3	1,3,4,5,6,8,9,10
154.07	15.10%	low_adopt+ high_avail	14	189	2,4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	1,3,4,5,6,9,10
121.02	6.60%	low_adopt+ high_avail	15	59	1	County Islands	County Islands	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	3,4,9,10
165.04	54.00%	low_adopt+ med_avail	16	1245	2	Lakeside	Lakeside	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Tpx Communications,	N/A	1.3, 3.1, 3.2, 3.3	3,4,9,10

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
										Xo Communications			
100.15	39.70%	med_adopt +med_avail	17	371	1	Otay	Otay	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Netfortris Acquisition Co., Inc., Paetec Communications Inc, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6
139.07	100.00%	low_adopt+ high_avail	18	1315	1	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.3, 3.1, 3.2, 3.3	3,4,9,10
189.05	100.00%	low_adopt+ high_avail	19	1846	5	Fallbrook	Fallbrook	N/A	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications	N/A	1.3, 3.1, 3.2, 3.3	3,9,10
165.02	68.80%	low_adopt+ high_avail	20	1719	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	1,3,5,6,9,10
209.04	100.00%	med_adopt +med_avail	21	1121	2,5	Julian, Central Mountain, Cuyamaca, Desert, North Mountain, Ramona	Julian, Central Mountain, Desert, North Mountain, Ramona	Inaja and Cosmit Reservation	AT&T California, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC., Zito Media	Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Tpx Communications	Sr 79, Old Cuyamaca Rd_Old Cuyamaca Rd, Riverwood Rd Prd 16, Sr-78_Mountainbrook Rd Prd 16, Sr 78/79, Payson Dr_Pine Hills Rd, Canyon Dr, Sr-78_Prospect Pl, Washington St, Sr-79_End, Wynola Rd, Sr-79_Mile Post 01.0, Sunrise Hy, Snow Gate 3_Sr-79, Springview Rd, Sr-78_Mountainbrook Rd, Old Cuyamaca Rd, Slumbering Oaks Tr_Sr-79, Second St, Sr-78_Caltrans Row, Sleepy Hollow, Sr-78_End, Harrison Park Rd, Sr-79_Oak Ln Prd 18, C St, Aly-Julian Btwn Sr-78 & Third St_Sr-78, B St, Third St_Sr-79, Whispering Pines Dr, Sr-78_Sunshine Tl	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6,7
32.07	81.10%	low_adopt+ high_avail	22	1745	1	Spring Valley, Sweetwater	Spring Valley, Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Worthington St, Mesa View Wy_Sweetwater Rd, Briarwood Rd, Robinwood Rd_Sd Cl Enter	1.3, 3.1, 3.2, 3.3	
139.09	100.00%	med_adopt +med_avail	23	1481	1	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,8,9, 10

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
200.29	0.10%	med_adopt +high_avail	24	2	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Earthlink Business, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Netfortris Acquisition Co., Inc., Paetec Communications Inc, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,4,5,6,9, 10
191.09	100.00%	med_adopt +med_avail	25	1471	5	Pala - Pauma, Bonsall, Fallbrook, Valley Center	Pala-Pauma, Bonsall, Fallbrook, Valley Center	N/A	AT&T California, Charter Communications Inc, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Mci	Pala Mission Rd, Pala Temecula Rd_Sr-76, Dulin Rd, Old Highway 395_Lake Circle Dr, West Lilac Rd, Old Hwy 395_Shirley Road (Pvt)	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6
136.07	100.00%	med_adopt +med_avail	26	1007	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Gci Communication Corp., Netfortris Acquisition Co., Inc., Tpx Communications	N/A	1.1, 1.2, 1.3, 3.1, 3.2	3,9,10
187	98.30%	high_adopt +med_avail	27	7011	5	Fallbrook, Pendleton - De Luz	Fallbrook, Pendleton-De Luz	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp., Mci, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,3,4,5,6,9, 10
207.07	5.80%	low_adopt+ high_avail	28	87	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.3, 3.1, 3.2, 3.3	1,3,4,5,6,9, 10
168.06	100.00%	med_adopt +high_avail	29	1356	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
209.02	100.00%	med_adopt +med_avail	30	787	2	Julian, Central Mountain, Cuyamaca, Pine Valley, Descanso, Alpine, Desert	Julian, Central Mountain, Alpine, Desert	Capitan Grande Reservation, Inaja, and Cosmit Reservation	AT&T California, Cox Communications, HughesNet, MountainMesh, San Diego Broadband, SDWisp, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT	Gci Communication Corp., Tpx Communications	Sunrise Hy, Snow Gate 3_Sr-79, Old Hwy 80, I-8 Wb Ramps_I-8 Eb Ramps, Corte Madera Rd, Lebanon Rd_End	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6,7

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
									Systems, LLC., Zito Media				
32.08	2.00%	low_adopt+ high_avail	31	39	1,4	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	1,3,5,6,9,10
139.03	100.00%	med_adopt +high_avail	32	1271	1	Spring Valley, Sweetwater	Spring Valley, Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Elkelton Pl, Sb-125 Off Ramp_Nb 125 On Ramp, Paradise Valley Rd, Sweetwater Rd_Sr-54 Wb On Ramp	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
200.36	0.20%	low_adopt+ high_avail	33	2	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.3, 3.1, 3.2, 3.3	3,4,9,10
189.04	100.00%	low_adopt+ high_avail	34	1870	5	Fallbrook, Pendleton - De Luz	Fallbrook, Pendleton-De Luz	N/A	AT&T California, Charter Communications Inc, HughesNet, Ranch Wifi, LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Gci Communication Corp., Tpx Communications, Utility Telecom	N/A	1.3, 3.1, 3.2, 3.3	1,3,4,5,6,9, 10
189.03	100.00%	low_adopt+ high_avail	35	1611	5	Fallbrook, Pendleton - De Luz	Fallbrook, Pendleton-De Luz	N/A	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	1,3,5,6,9,1 0
208.07	99.70%	med_adopt +med_avail	36	1074	2,5	Central Mountain, North Mountain, Ramona, North County Metro	Central Mountain, North Mountain, Ramona, North County Metro	Mesa Grande Reservation	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Old Julian Hy, Littlepage Rd_Sr-78, Casner Rd, Sr-78_End, Magnolia Av, Sr-78_Penn St, Sutherland Dam Rd, Sr-78_End Cmr, Haverford Rd, Sr-78_Pine St, Old Julian Hy, Mile Post 08.0_Sr-78	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6,7
138.02	100.00%	med_adopt +high_avail	37	869	4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
191.07	100.00%	med_adopt +med_avail	38	722	5	Pala - Pauma, North Mountain, Valley Center, North County Metro	Pala-Pauma, North Mountain, Valley Center, North County Metro	La Jolla Reservation, Rincon Reservation, San Pasqual Reservation	AT&T California, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6,7
200.19	4.90%	med_adopt +med_avail	39	139	3,5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6,8

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
									Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Corp., Mci, Tpx Communications			
138.01	73.70%	low_adopt+high_avail	40	1222	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	Campo Rd, Kenwood Dr_Merritt Bl, Spring St, Broadway/Campo Rd_Sr-94 Wb Ramp/Sr-125, Bancroft Dr, Sr-94 Eb Ramps_Sr-94 Wb Ramps	1.3, 3.1, 3.2, 3.3	1,5,6
203.13	17.50%	med_adopt+med_avail	41	203	3,5	San Dieguito, North County Metro	San Dieguito, North County Metro	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Earthlink Business, Llc, Earthlink Carrier, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Netfortris Acquisition Co., Inc., Paetec Communications Inc, Tpx Communications, Utility Telecom, Xo Communications	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,3,4,5,6,9,10
140.01	0.40%	low_adopt+high_avail	42	6	4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Paetec Communications Inc, Tpx Communications	N/A	1.3, 3.1, 3.2, 3.3	3,9,10
203.11	75.50%	med_adopt+high_avail	43	904	3,5	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, GeoLinks, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
167.06	100.00%	low_adopt+high_avail	44	895	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	1,3,5,6,9,10
168.12	100.00%	med_adopt+med_avail	45	1259	2	Alpine, Lakeside	Alpine, Lakeside	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Alpine Bl, I-8 Wb Ramps_Viewside Ln, Peutz Valley Rd, Alpine Bl_End	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,9,10
168.13	100.00%	med_adopt+med_avail	46	1122	2	Lakeside	Lakeside	N/A	Airpeak Wireless, AT&T California, Canyon Wireless, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Olde Hwy 80, Labrador Ln_Flinn Springs Rd, Lake Jennings Park Rd, I-8_In Wb	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
189.06	100.00%	low_adopt+ high_avail	47	1915	5	Fallbrook, Pendleton - De Luz	Fallbrook, Pendleton-De Luz	N/A	AT&T California, Charter Communications Inc, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.3, 3.1, 3.2, 3.3	1,3,5,6,9,10
139.06	100.00%	med_adopt +high_avail	48	1691	1	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	Blossom Ln, Sweetwater Rd_Folkestone St	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,4,9,10
165.03	92.30%	med_adopt +med_avail	49	906	2	Lakeside	Lakeside	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,8,9,10
166.07	24.30%	med_adopt +med_avail	50	592	2	Lakeside	Lakeside	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Mci, Netfortris Acquisition Co., Inc., Tpx Communications	Riverford Rd, Woodside Av_Eg Sb	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6,8
136.08	100.00%	med_adopt +high_avail	51	1498	4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
191.1	100.00%	med_adopt +med_avail	52	1471	5	Pala - Pauma, Valley Center	Pala-Pauma, Valley Center	La Jolla Reservation, Rincon Reservation	AT&T California, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications	Cole Grade Rd, Sr-76_Spring Valley Rd	1.1, 1.2, 1.3, 3.1, 3.2	1,2,3,5,6,9,10
200.37	0.20%	med_adopt +high_avail	53	2	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
134.01	14.90%	med_adopt +high_avail	54	190	1	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
162.02	7.50%	med_adopt +high_avail	55	109	2	Lakeside	Lakeside	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Logix Communications, Mci, Paetec Communications Inc, Tierzero, Tpx Communications,	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
										Xo Communications			
168.09	95.70%	med_adopt +med_avail	56	1721	2	Crest - Dehesa, Lakeside	Crest-Dehesa, Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Lake Jennings Park Rd, In Eb_I-8, Lake Jennings Park Rd, I-8_In Wb, Los Coches Rd, I-8 Wb Eg Ramp_I-8 Eb Eg Ramp	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6
32.14	64.50%	med_adopt +high_avail	57	1059	1,4	Spring Valley, Sweetwater	Spring Valley, Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc	Elkelton Pl, Sb-125 Off Ramp_Nb 125 On Ramp, Paradise Valley Rd, Sweetwater Rd_Sr-54 Wb On Ramp, Worthington St, Mesa View Wy_Sweetwater Rd	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
140.02	46.00%	med_adopt +high_avail	58	537	1,4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Blossom Ln, Sweetwater Rd_Folkestone St, Jamacha Rd, Sr-125 Sb Ramps_Sr-125 Nb Ramps	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,8,9, 10
206.02	16.60%	med_adopt +high_avail	59	323	2,5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Mci	Idaho Av, Es Cl Leave_Sr-78, Ranrido Dr, Sr-78_Cul De Sac, Birch Av, Sr-78 Cs_Destree Rd	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
200.24	1.20%	med_adopt +high_avail	60	19	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,4,9,10
156.01	12.20%	med_adopt +high_avail	61	251	2	Crest - Dehesa	Crest-Dehesa	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
32.13	2.00%	med_adopt +high_avail	62	19	1,4	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	Briarwood Rd, Robinwood Rd_Sd Cl Enter	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
139.08	100.00%	med_adopt +high_avail	63	1171	1	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Earthlink Business, Llc, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
196.02	32.90%	med_adopt +high_avail	64	549	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
168.11	100.00%	med_adopt +med_avail	65	1610	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6,8
167.03	28.40%	med_adopt +med_avail	66	294	2	Lakeside	Lakeside	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp., Tpx Communications	Riverford Rd, Woodside Av_Eg Sb	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6
135.05	100.00%	med_adopt +med_avail	67	2040	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Sweetwater Springs Bl, Campo Rd/Agua Dulce Bl_Sr-94 Eb Ramp, Calavo Dr, Sr-94 Ramps_Sr-94 Ramps	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,9,10
134.23	86.70%	med_adopt +high_avail	68	888	1	Spring Valley, Sweetwater	Spring Valley, Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, Sail Internet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8
208.06	100.00%	med_adopt +high_avail	69	1975	2	Ramona	Ramona	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Earthlink Business, Llc, Gci Communication Corp., Netfortris Acquisition Co., Inc., Paetec Communications Inc, Tpx Communications	Fourteenth St, Sr-67_End, Sixteenth St, Sr-67_H St, Ramona St, Raymond Av_Sr-67/Day St, Olive St, Sr-78_Maple St, Cedar St, Sr-78_End Cmr, Twelfth St, B St_Sr-67, A St, Ninth St_Sr-78, Ash St, Maple St_Sr-78, B St, Eleventh St_Sr-78, Eleventh St, Sr-67_B St, Thirteenth St, Main St_Maple St	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
32.04	57.50%	med_adopt +high_avail	70	593	1	County Islands, Sweetwater	County Islands, Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Earthlink Business, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications, Xo Communications	Sweetwater Rd, Nc Cl Enter_Orange St Cs	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8
123.04	5.20%	med_adopt +high_avail	71	67	1	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Mci	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
31.07	25.60%	med_adopt +high_avail	72	403	1,4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
191.11	100.00%	med_adopt +med_avail	73	1125	5	Valley Center, North County Metro	Valley Center, North County Metro	Rincon Reservation, San Pasqual Reservation	AT&T California, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Fusion Cloud Services, Inc., Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,2,3,5,6,9,10

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
169.01	88.50%	med_adopt +med_avail	74	2154	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Fusion Cloud Services, Inc., Gci Communication Corp., Netfortris Acquisition Co., Inc., Tpx Communications	Johnson Lake Rd Prd 101, Sr-67_Hi Ridge Rd Prd 101A, Channel Rd, Sr-67_Industry Rd, Mapleview St, Sr-67_Maine Av, Santa Maria Av, Sr-67_End Cmr, Posthill Rd, Valle Vista Rd_Sr-67, Channel Rd, Lakeshore Dr_Sr-67, Winter Gardens Bl, Sr-67 Eb Eg_Sr-67 Eg In	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,8,9, 10
186.12	16.80%	med_adopt +med_avail	75	229	5	Bonsall	Bonsall	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6,8
155.01	100.00%	med_adopt +high_avail	76	1833	2	Alpine, Crest - Dehesa, Lakeside	Alpine, Crest-Dehesa, Lakeside	Sycuan Reservation	AT&T California, Canyon Wireless, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	Olde Hwy 80, Labrador Ln_Flinn Springs Rd, Lake Jennings Park Rd, In Eb_I-8	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,2,5,6
201.06	18.00%	med_adopt +high_avail	77	183	5	Hidden Meadows	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
167.05	100.00%	med_adopt +med_avail	78	1742	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Charter Communications Inc, Gci Communication Corp., Paetec Communications Inc, Tpx Communications	Channel Rd, Lakeshore Dr_Sr-67, Winter Gardens Bl, Sr-67 Eb Eg_Sr-67 Eg In	1.1, 1.2, 1.3, 3.1, 3.2	1,3,5,6,9,1 0
190.02	99.90%	med_adopt +med_avail	79	838	5	Rainbow, Pala - Pauma, Fallbrook	Rainbow, Pala-Pauma, Fallbrook	Pechanga Reservation	AT&T California, Charter Communications Inc, HughesNet, Lokket Inc, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Tpx Communications, Utility Telecom	Rainbow Valley Bl W, In/Eg Nb_In Sb, Mission Rd, I-15 Sb Ramps_I-15 Nb Ramps, Rice Canyon Rd, Sr-76_Mile Post 01.0, Stewart Canyon Rd, Canonita Dr_Pankey Rd, Pankey Rd, Shearer Cg_Sr-76, Rainbow Glen Rd, Old Highway 395_Rainbow Hills Rd	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6
208.12	100.00%	med_adopt +high_avail	80	774	2	Ramona	Ramona	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Sixth St, B St_Sr-78, Magnolia Av, Sr-78_Penn St, Ninth St, Sr-78_D St, Tenth St, D St_Sr-67/Sr-78, Cedar St, Sr-78_End Cmr, A St, Ninth St_Sr-78, Fifth St, D St_Sr-78, Haverford Rd, Sr-78_Pine St, Ash St, Maple St_Sr-78, Earlham St, Sr-78_Second St, Sixth St, Aly-Ramona/Sixth St_Sr-78, Seventh St, D St_Sr-78, Eighth St, Sr-78_B St, Third St, Sr-78_D St	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,4,5,6,9, 10
134.12	38.30%	med_adopt +high_avail	81	622	1	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc, Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,1 0

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
192.1	0.40%	med_adopt +high_avail	82	7	5	Bonsall	Bonsall	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
154.08	70.20%	med_adopt +high_avail	83	969	2,4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Xo Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8
190.01	100.00%	med_adopt +high_avail	84	2223	5	Rainbow, Fallbrook, Pendleton - De Luz	Rainbow, Fallbrook, Pendleton-De Luz	Pechanga Reservation	AT&T California, Charter Communications Inc, Frontier Communications Corporation, HughesNet, San Diego Broadband, Southern California Telephone Co, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Mci, Tpx Communications	Rainbow Valley Bl W, In/Eg Nb_In Sb, Mission Rd, I-15 Sb Ramps_I-15 Nb Ramps, Rainbow Glen Rd, Old Highway 395_Rainbow Hills Rd	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,2,5,6
168.04	100.00%	med_adopt +high_avail	85	2737	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Mapleview St, Sr-67_Maine Av	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
201.11	91.60%	med_adopt +high_avail	86	1176	5	Hidden Meadows, Twin Oaks	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	Deer Springs Rd, I-15 In/Eg N_I-15 In/Eg S, Mesa Rock Rd, N Centre City Py_Windsong Ln	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
164.03	77.00%	med_adopt +high_avail	87	1271	2	Crest - Dehesa, Lakeside	Crest-Dehesa, Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
168.07	94.90%	med_adopt +med_avail	88	2418	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6,8
134.11	43.80%	med_adopt +high_avail	89	694	1	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
208.01	91.70%	med_adopt +med_avail	90	1650	2	Barona, Lakeside, Ramona, North County Metro	Barona, Lakeside, Ramona, North County Metro	Barona Reservation	AT&T California, Canyon Wireless, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, SkyValleyNetwork, T-	Gci Communication Corp., Mci	Rockhouse Rd, Sr-67_End, Dye Rd, Lansdown Ln_Sr-67/Highland Valley Rd, Mt Woodson Rd, Sr-67_Sr-67, Haverford Rd, Sr-78_Pine St, Ash St, Maple St_Sr-78	1.1, 1.2, 1.3, 3.1, 3.2	1,2,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
									Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.				
191.05	100.00%	med_adopt +med_avail	91	2406	5	Bonsall, Valley Center, Hidden Meadows	Bonsall, Valley Center, North County Metro	N/A	AT&T California, Cox Communications, HughesNet, Mediacom California LLC, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	Lawrence Welk Dr, Lawrence Welk Ct_Champagne Bl, Deer Springs Rd, I-15 In/Eg N_I-15 In/Eg S, Gopher Canyon Rd, I-15 Nb Ramps_I-15 Sb In	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6
31.08	99.90%	med_adopt +high_avail	92	1008	1	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	Jamacha Rd, Sr-125 Sb Ramps_Sr-125 Nb Ramps	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
168.1	100.00%	high_adopt +med_avail	93	843	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
200.42	55.10%	high_adopt +med_avail	94	928	3,5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Earthlink Business, Llc, Gci Communication Corp., Mci, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
208.05	100.00%	med_adopt +high_avail	95	1101	2	Ramona	Ramona	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, SkyValleyNetwork, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Rotanzi St, Vermont St_Sr-67, Ramona St, Raymond Av_Sr-67/Day St, Pala St, Kelly Av_Sr-67, Letton St, Sr-67_Kelly Av, Kalbaugh St, Kelly Av_Sr-67, Julian St, Kelly Av_Sr-67, Etcheverry St, Kelly Av_Sr-67, Hunter St, Sr-67_Vermont St, Kalbaugh Street, Main Street_Toub Street	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
137.02	100.00%	med_adopt +high_avail	96	1589	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp.	Kenwood Dr, Ramps Wb_Ramps Eb	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
203.09	42.20%	med_adopt +high_avail	97	594	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Earthlink Business, Llc, Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications	Rock Springs Rd, Montiel Rd_Es Cl Enter	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
201.05	28.10%	med_adopt +high_avail	98	410	5	Hidden Meadows, North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
213.06	80.80%	med_adopt +high_avail	99	1223	1,2	Jamul, Spring Valley, Sweetwater, Valle De Oro	Jamul-Dulzura, Spring Valley, Sweetwater, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, Sail Internet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc	Proctor Valley Rd, Sr-94_Maxfield Rd, Old Campo Rd, Sr-94_End	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
200.25	0.00%	med_adopt +high_avail	100	0	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Mci, Paetec Communications Inc	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
154.05	87.60%	med_adopt +med_avail	101	1551	2,4	Crest - Dehesa, Valle De Oro	Crest-Dehesa, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6
155.02	100.00%	med_adopt +high_avail	102	963	2	Alpine, Crest - Dehesa, Lakeside	Alpine, Crest-Dehesa, Lakeside	Sycuan Reservation	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Alpine Bl, I-8 Wb Ramps_Viewside Ln, Peutz Valley Rd, Alpine Bl_End	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,2,5,6
153.02	52.50%	med_adopt +high_avail	103	790	2,4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8
136.01	100.00%	med_adopt +high_avail	104	1971	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc	Sweetwater Springs Bl, Campo Rd/Agua Dulce Bl_Sr-94 Eb Ramp, Calavo Dr, Sr-94 Ramps_Sr-94 Ramps	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
208.13	100.00%	med_adopt +high_avail	105	1380	2	Ramona	Ramona	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Tpx Communications	Sixth St, B St_Sr-78, Magnolia Av, Sr-78_Penn St, Ninth St, Sr-78_D St, Tenth St, D St_Sr-67/Sr-78, Fourth St, Sr-78_D St, Fifth St, D St_Sr-78, Earlham St, Sr-78_Second St, Sixth St, Aly-Ramona/Sixth St_Sr-78, Seventh St, D St_Sr-78, Third St, Sr-78_D St	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
201.07	12.40%	med_adopt +high_avail	106	159	5	Hidden Meadows	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
164.01	28.00%	med_adopt +high_avail	107	469	2	Lakeside	Lakeside	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Earthlink Business, Llc, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
197.01	20.00%	med_adopt +med_avail	108	516	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile,	Centurylink, Crown Castle Fiber, Gci	N/A	1.1, 1.2, 1.3, 3.1, 3.2	1,5,6,8

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
										Viasat Inc, VSAT Systems, LLC.	Communication Corp., Mci			
135.03	100.00%	med_adopt +high_avail	109	1913	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Earthlink Business, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Tpx Communications, Xo Communications	Kenwood Dr, Ramps Wb_Ramps Eb, South Barcelona St, Sr 94_South Bonita St/Norte Mesa Dr, South Barcelona St, Buena Vista Dr_Sr 94	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
200.17	20.50%	med_adopt +high_avail	110	203	3,5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
167.04	39.40%	med_adopt +high_avail	111	943	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6,8
134.22	78.10%	high_adopt +med_avail	112	1065	1	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, Sail Internet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC., Wave	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6,8
191.03	100.00%	med_adopt +high_avail	113	1967	5	Pala - Pauma, Bonsall, Valley Center	Pala-Pauma, Bonsall, Valley Center	N/A	AT&T California, Cox Communications, HughesNet, Mediacom California LLC, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Old Hwy 395, I-15 In/Egress N_Sr I-15, Gopher Canyon Rd, I-15 Nb Ramps_I-15 Sb In, Camino Del Rey, Mile Post 03.0_Old Hwy 395/Old Hwy 395, West Lilac Rd, Old Hwy 395_Shirley Road (Pvt)	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
199.02	64.80%	med_adopt +high_avail	114	798	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Netfortris Acquisition Co., Inc., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
212.04	100.00%	med_adopt +high_avail	115	1905	2	Alpine, Crest - Dehesa	Alpine, Crest-Dehesa	Sycuan Reservation, Viejas Reservation	AT&T California, Cox Communications, HughesNet, MountainMesh, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	Willows Rd, Ramps Eb_Ramps Wb, West Willows Oc, Ramps Wb_Ramps Eb	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,2,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
83.6	0.40%	med_adopt +high_avail	116	9	3	County Islands	County Islands	N/A	AT&T California, Charter Communications Inc, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Earthlink Business, Llc, Earthlink Carrier, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications, Xo Communications	Pomerado Rd, Eg Nb Cs_Begin Cmr	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
212.05	100.00%	med_adopt +high_avail	117	2456	2	Alpine	Alpine	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Tavern Rd, Ramps Eb_Ramps Wb, West Willows Oc, Ramps Wb_Ramps Eb, Victoria Dr, Victoria Pl_I-8, Victoria Dr, I-8_Alpine Bl, Peutz Valley Rd, Alpine Bl_End, Victoria Dr, Alpine Glen Pl N_Victoria Meadows Dr	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
201.1	57.30%	med_adopt +high_avail	118	1320	5	Valley Center, Hidden Meadows, North County Metro	Valley Center, North County Metro	San Pasqual Reservation	AT&T California, Cox Communications, HughesNet, Mediacom California LLC, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,2,5,6
94	0.00%	high_adopt +med_avail	119	0	2,3	County Islands	County Islands	N/A	AT&T California, Charter Communications Inc, GeoLinks, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Earthlink Business, Llc, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Tpx Communications	Pomerado Rd, Eg Nb Cs_Begin Cmr	1.1, 1.2, 2.1, 2.2	1,3,4,5,6,8,9,10
133.17	12.10%	med_adopt +high_avail	120	413	1	Otay	Otay	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Earthlink Business, Llc, Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
176.01	0.00%	high_adopt +med_avail	121	0	3	Not identified	Not identified	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Call One Inc, Centurylink, Charter Communications Inc, Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp., Paetec Communications Inc, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
139.05	100.00%	med_adopt +high_avail	122	1237	1	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
207.12	14.00%	med_adopt +high_avail	123	207	2,5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
213.04	100.00%	med_adopt +high_avail	124	963	1,2	Jamul, Otay	Jamul-Dulzura, Otay	Jamul Indian Village	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Maxfield Rd, Sr-94_Proctor Valley Rd, Rancho Jamul Dr, Sr-94_End Cmr, Proctor Valley Rd, Sr-94_Maxfield Rd	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,2,5,6
203.05	25.70%	med_adopt +high_avail	125	556	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
186.01	0.00%	med_adopt +high_avail	126	0	5	Pendleton - De Luz	Pendleton-De Luz	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
213.05	100.00%	high_adopt +high_avail	127	1239	2,4	Crest - Dehesa, Jamul, Valle De Oro	Crest-Dehesa, Jamul-Dulzura, Valle De Oro	Sycuan Reservation	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Lyons Valley Rd, Sr-94_Olive Vista Dr, Proctor Valley Rd, Sr-94_Maxfield Rd, Old Campo Rd, Sr-94_End	1.1, 1.2, 2.1, 2.2	1,2,5,6
200.4	0.20%	med_adopt +high_avail	128	4	5	Twin Oaks, North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
166.08	45.70%	med_adopt +high_avail	129	356	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
193.03	29.70%	med_adopt +high_avail	130	776	5	Bonsall	Bonsall	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
183.01	0.00%	high_adopt +med_avail	131	0	5	Pendleton - De Luz	Pendleton-De Luz	N/A	AT&T California, Cox Communications, HughesNet, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
188.03	100.00%	med_adopt +high_avail	132	1789	5	Bonsall, Fallbrook	Bonsall, Fallbrook	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Old Hwy 395, I-15 In/Egress N_Sr I-15, Gopher Canyon Rd, I-15 Nb Ramps_I-15 Sb In, Camino Del Rey, Mile Post 03.0_Old Hwy 395/Old Hwy 395, Dulin Rd, Old Highway 395_Lake Circle Dr, West Lilac Rd, Old Hwy 395_Shirley Road (Pvt)	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
135.04	100.00%	med_adopt +high_avail	133	1247	4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
192.09	93.50%	med_adopt +high_avail	134	913	5	Bonsall, North County Metro, Twin Oaks	Bonsall, North County Metro	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Earthlink Business, Llc, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
207.08	21.10%	med_adopt +high_avail	135	258	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Tpx Communications, Xo Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6
32.12	2.60%	med_adopt +high_avail	136	26	1,4	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
194.03	0.60%	high_adopt +high_avail	137	11	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
156.02	65.10%	high_adopt +high_avail	138	499	2	Crest - Dehesa	Crest-Dehesa	N/A	AT&T California, Cox Communications, HughesNet, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6,8
32.09	1.30%	med_adopt +high_avail	139	25	1,4	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	3,9,10
137.01	99.60%	med_adopt +high_avail	140	837	4	Spring Valley, Valle De Oro	Spring Valley, Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	Kenwood Dr, Ramps Wb_Ramps Eb, Bancroft Dr, Sr-94 Eb Ramps_Sr-94 Wb Ramps	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
149.01	0.90%	med_adopt +high_avail	141	15	4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile,	Centurylink, Crown Castle Fiber, Gci	Spring St, Broadway/Campo Rd_Sr-94 Wb Ramp/Sr-125	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10

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Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
									Viasat Inc, VSAT Systems, LLC.	Communication Corp.			
207.1	15.80%	high_adopt +high_avail	142	99	2,5	Ramona, North County Metro	Ramona, North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Paetec Communications Inc	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
215.02	0.00%	high_adopt +high_avail	143	0	3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Comcast, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,3,5,6,9,10
203.1	0.80%	high_adopt +med_avail	144	19	3,5	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Fusion Cloud Services, Inc., Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
204.03	16.90%	med_adopt +high_avail	145	205	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp., Tpx Communications	South Centre City Py, Clarence Ln_Esc Cl Enter	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,3,5,6,9,10
207.05	59.60%	med_adopt +high_avail	146	776	2,5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Idaho Av, Es Cl Leave_Sr-78, Bear Valley Py, Bear Valley Rd_Sr-78, Birch Av, Sr-78 Cs_Destree Rd	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
146.02	0.30%	high_adopt +high_avail	147	6	4	Spring Valley	Spring Valley	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.		1.1, 1.2, 2.1, 2.2	
192.08	96.50%	high_adopt +high_avail	148	1141	5	Bonsall, Hidden Meadows, North County Metro, Twin Oaks	Bonsall, North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Lawrence Welk Dr, Lawrence Welk Ct_Champagne Bl, Deer Springs Rd, I-15 In/Eg N_I-15 In/Eg S, Gopher Canyon Rd, I-15 Nb Ramps_I-15 Sb In	1.1, 1.2, 2.1, 2.2	1,5,6
95.04	0.00%	med_adopt +high_avail	149	1	2	County Islands, Lakeside	County Islands, Lakeside	N/A	AT&T California, Canyon Wireless, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp., Paetec Communications	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
									Inc, Tpx Communications				
152	68.00%	high_adopt +high_avail	150	924	4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6,8
204.04	30.70%	high_adopt +high_avail	151	629	2,5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Mci	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
134.17	27.50%	med_adopt +high_avail	152	186	1	Sweetwater	Sweetwater	N/A	AT&T California, Cox Communications, HughesNet, Sail Internet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Earthlink Business, Llc, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
136.04	100.00%	med_adopt +high_avail	153	1957	4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	N/A	1.1, 1.2, 1.3, 2.1, 2.2, 3.1	
133.2	23.10%	high_adopt +high_avail	154	459	1	Otay	Otay	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
186.19	35.30%	high_adopt +high_avail	155	609	5	Bonsall, Fallbrook, Pendleton - De Luz	Bonsall, Fallbrook, Pendleton-De Luz	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
170.2	33.30%	high_adopt +high_avail	156	475	2	Ramona	Ramona	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
207.11	81.30%	high_adopt +high_avail	157	996	2,5	Pala - Pauma, North Mountain, North County Metro	Pala-Pauma, North Mountain, North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Cloverdale Rd, San Pasqual Rd_Sd CI Leave	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
199.04	26.70%	high_adopt +high_avail	158	664	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Allstream Business Us, Llc, Centurylink, Crown Castle Fiber, Gci Communication Corp., Paetec Communications Inc, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
188.01	100.00%	high_adopt +high_avail	159	1263	5	Fallbrook, Pendleton - De Luz	Fallbrook, Pendleton-De Luz	N/A	Airpeak Wireless, AT&T California, Charter Communications Inc, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Mci	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
192.03	80.40%	high_adopt +high_avail	160	691	5	Bonsall	Bonsall	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
170.6	0.00%	high_adopt +high_avail	161	0	2	Ramona	Ramona	N/A	AT&T California, Charter Communications Inc, HughesNet, One Ring Networks, San Diego Broadband, SkyValleyNetwork, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Mci	N/A	1.1, 1.2, 2.1, 2.2	1,5,6,8
208.11	100.00%	high_adopt +high_avail	162	1936	2	Central Mountain, Barona, Lakeside, Ramona	Central Mountain, Barona, Lakeside, Ramona	Barona Reservation, Capitan Grande Reservation	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Fusion Cloud Services, Inc., Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,2,5,6
199.03	89.20%	high_adopt +high_avail	163	1290	5	North County Metro, Twin Oaks	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Fusion Cloud Services, Inc., Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
198.09	17.00%	high_adopt +high_avail	164	282	5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
203.04	50.50%	high_adopt +high_avail	165	1107	5	Hidden Meadows, Twin Oaks, North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	Deer Springs Rd, I-15 In/Eg N_I-15 In/Eg S, Mesa Rock Rd, N Centre City Py_Windsong Ln	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
188.04	100.00%	high_adopt +high_avail	166	1859	5	Bonsall, Fallbrook	Bonsall, Fallbrook	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	
203.12	74.70%	high_adopt +high_avail	167	1120	2,3,5	San Dieguito, North County Metro	San Dieguito, North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
188.05	100.00%	high_adopt +med_avail	168	1346	5	Fallbrook	Fallbrook	N/A	AT&T California, Charter Communications Inc, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Charter Communications Inc, Gci Communication Corp.	Stewart Canyon Rd, Canonita Dr_Pankey Rd	1.1, 1.2, 2.1, 2.2	1,5,6
200.38	19.40%	high_adopt +high_avail	169	304	5	North County Metro, Twin Oaks	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
83.28	0.10%	high_adopt +high_avail	170	2	3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
212.06	100.00%	high_adopt +high_avail	171	1189	2	Alpine	Alpine	Capitan Grande Reservation, Cuyapaipe Reservation, Viejas Reservation	AT&T California, Cox Communications, HughesNet, MountainMesh, San Diego Broadband, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Fusion Cloud Services, Inc., Gci Communication Corp.	Tavern Rd, Ramps Eb_Ramps Wb, Victoria Dr, Victoria Pl_I-8, Peutz Valley Rd, Alpine Bl_End, Victoria Dr, Alpine Glen Pl N_Victoria Meadows Dr	1.1, 1.2, 2.1, 2.2	1,2,5,6
200.26	32.30%	high_adopt +high_avail	172	520	5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, GeoLinks, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	
207.06	84.30%	high_adopt +high_avail	173	1806	2,5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Cloverdale Rd, San Pasqual Rd_Sd Cl Leave, Old San Pasqual Rd, Caltrans Row_Sr-78, Summit Dr, Sr-78/San Pasqual Valley Rd E_Valencia Dr	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
154.03	86.30%	high_adopt +high_avail	174	679	2,4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	
170.62	61.00%	high_adopt +med_avail	175	882	3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp., Mci, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6,8
170.1	39.40%	high_adopt +high_avail	176	383	2	Lakeside	Lakeside	N/A	AT&T California, Canyon Wireless, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Scripps Poway Py, Pw Cl Leave_Sr-67 Row	1.1, 1.2, 2.1, 2.2	1,5,6
171.06	94.70%	high_adopt +high_avail	177	1407	3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, Race Communications, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
154.06	100.00%	high_adopt +high_avail	178	807	2,4	Crest - Dehesa, Valle De Oro	Crest-Dehesa, Valle De Oro	Sycuan Reservation	AT&T California, Cox Communications, HughesNet, SDWisp, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	2
170.33	0.00%	high_adopt +high_avail	179	0	3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
204.01	44.90%	high_adopt +high_avail	180	384	2,5	San Dieguito, North County Metro	San Dieguito, North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
136.05	100.00%	high_adopt +high_avail	181	2165	4	Valle De Oro	Valle De Oro	N/A	AT&T California, Cox Communications, GeoLinks, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6,8
170.7	99.50%	high_adopt +high_avail	182	1590	2,3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile,	Centurylink, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
									Viasat Inc, VSAT Systems, LLC.				
171.11	78.80%	high_adopt +high_avail	183	1233	2,3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, Race Communications, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp., Netfortris Acquisition Co., Inc.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
208.1	100.00%	high_adopt +high_avail	184	1583	2	Central Mountain, Ramona	Central Mountain, Ramona	N/A	AT&T California, Cox Communications, HughesNet, San Diego Broadband, SkyValleyNetwork, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	Old Julian Hy, Littlepage Rd_Sr-78	1.1, 1.2, 2.1, 2.2	1,5,6
170.71	44.80%	high_adopt +med_avail	185	806	2	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications, Xo Communications, Zayo Group Llc	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
134.25	16.90%	high_adopt +high_avail	186	87	1	Jamul, Otay	Jamul-Dulzura, Otay	N/A	AT&T California, Cox Communications, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
200.43	3.90%	high_adopt +high_avail	187	65	3,5	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
170.22	8.50%	high_adopt +high_avail	188	191	2,3	County Islands	County Islands	N/A	AT&T California, Charter Communications Inc, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Allstream Business Us, Llc, Centurylink, Charter Communications Inc, Crown Castle Fiber, Fusion Cloud Services, Inc., Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications, Xo Communications	Pomerado Rd, Eg Nb Cs_Begin Cmr	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
200.34	0.30%	high_adopt +high_avail	189	3	3	Not identified	Not identified	N/A	AT&T California, Charter Communications Inc, HughesNet, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
204.05	53.30%	high_adopt +high_avail	190	659	2,5	North County Metro	North County Metro	N/A	AT&T California, Cox Communications, HughesNet, One Ring Networks, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	South Centre City Py, Clarence Ln_Esc Cl Enter	1.1, 1.2, 2.1, 2.2	8
170.21	38.00%	high_adopt +high_avail	191	431	2	Ramona	Ramona	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Valley Center Wireless, Viasat Inc, VSAT Systems, LLC.	Centurylink, Crown Castle Fiber, Gci Communication Corp., Mci, Tpx Communications	Mt Woodson Rd, Sr-67_Sr-67	1.1, 1.2, 2.1, 2.2	1,5,6
170.65	1.00%	high_adopt +high_avail	192	26	2,3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
171.13	26.00%	high_adopt +high_avail	193	455	3,5	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
200.44	11.50%	high_adopt +high_avail	194	301	5	San Dieguito, North County Metro	San Dieguito, North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	
170.64	100.00%	high_adopt +high_avail	195	2343	2	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, San Diego Broadband, Viasat Inc, VSAT Systems, LLC.	Centurylink, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6
170.61	36.10%	high_adopt +high_avail	196	445	2,3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, Cox Communications, GeoLinks, HughesNet, Race Communications, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp.	N/A	1.1, 1.2, 2.1, 2.2	1,5,6

Census Tract	%UA	Broadband Index Typology	Overall Priority Rank	Estimated HH in UA	District(s)	CPAs	CPSGs	Tribes	Residential ISPs	Commercial ISPs	Road segment Intersections with State Middle Mile	Relevant Strategies	Relevant Funding Sources
173.06	44.90%	high_adopt +high_avail	197	446	3	San Dieguito	San Dieguito	N/A	AT&T California, Charter Communications Inc, HughesNet, One Ring Networks, Race Communications, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp., Mci, Paetec Communications Inc, Tpx Communications, Xo Communications	N/A	1.1, 1.2, 2.1, 2.2	
200.31	5.20%	high_adopt +high_avail	198	125	3,5	North County Metro	North County Metro	N/A	AT&T California, Charter Communications Inc, Cox Communications, HughesNet, One Ring Networks, San Diego Broadband, T-Mobile, Viasat Inc, VSAT Systems, LLC.	Centurylink, Charter Communications Inc, Crown Castle Fiber, Gci Communication Corp., Tpx Communications	N/A	1.1, 1.2, 2.1, 2.2	1,5,6