# Southern Colorado Economic Development District

# **Broadband Blueprint**



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## I. Executive Summary

## A. Introduction

The Southern Colorado Economic Development District (SCEDD) strives to nurture the economies of the 13 member counties in southern Colorado – Baca, Bent, Chaffee, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Otero, Pueblo, and Prowers.

SCEDD believes that in today's information age, access to reliable and affordable broadband for all its members and residents is a necessity for long term sustainable economic growth. SCEDD's broadband initiative aims to help facilitate the expansion of broadband infrastructure throughout the SCEDD region. With unprecedented state and federal funding on the horizon, SCEDD believes it is uniquely positioned to help secure funding for this essential infrastructure. As the COVID-19 pandemic highlighted, having access to adequate, affordable broadband is essential for residents to fully participate in the modern economy, access education, access employment training activities, and to participate in telehealth services.

This Broadband Blueprint set to accomplish:

- Identification of broadband infrastructure in the region and gaps that exist
- Extensive stakeholder outreach through various tactics including social media, newsletters, individual and hosted community town hall meetings
- Development of middle mile projects to further broadband service and redundancy
- Establishment of cost estimates for the identified middle mile projects
- Development of operational models to plan the business aspects of broadband management
- Grant readiness

The work contained in this plan makes the SCEDD region ready for final design and construction of over \$80 million worth of broadband projects.

## B. Stakeholder Outreach

Through this Broadband Blueprint, SCEDD engaged member counties, towns and cities as well as ISPs throughout the region in a broad conversation about broadband implementation. SCEDD developed an internal working group responsible for stakeholder outreach and development this plan. A complete Stakeholder Outreach Plan was developed (Appendix A) and focused on building trust through proactive communication showcasing the team and tools being used to implement broadband. This included regular information sharing about program development, roll-out, operational elements and program status; as well as sharing information about national, statewide and local broadband initiatives and news (current events). Tactics used were:

- Social media and newsletters
- Town hall meetings and County Commissioner work sessions in Pueblo, Lamar, Rocky Ford, Florence, Walsenburg, Westcliffe, Salida, and Poncha Springs.
- Attendance at Regional broadband workshop hosted by Region 10
- Attendance at CBO Broadband Summit

Regular monthly meetings with CDOT and CBO staff

Through these various tools, SCEDD has reached over 1,000 stakeholders throughout the region who may be interested in the Blueprint Plan. This effort has, and will, produce more partnerships as SCEDD furthers its role in leading middle mile broadband implementation in the region.

## C. Operational Model

To facilitate broadband network expansion throughout the region, SCEDD evaluated two operational models. Each model provided a different role for SCEDD to play when assisting the region with broadband deployment. As a foundational purpose of this Blueprint, SCEDD's role definition became critical for establishing a successful relationship with member counties, the CBO and private ISPs.

The SCEDD Board was engaged throughout development of this plan and it chose the Developer/Connector model. This operational model is one where SCEDD would play an active role in broadband deployment throughout the region. SCEDD would apply for grants, perform duties as the grantee, manage P3 agreements, partner with member counties to identify broadband needs and target funding and projects to accomplish those needs. Depending on final elements of the projects and operational approach, SCEDD could:

- Initially manage \$8 to \$10 million in projects across the region (assuming support for local match exists) with an eye towards accomplishing over \$80 million in projects through a reasonable planning period
- Annually receive \$200,000 to \$500,000 in ongoing revenue from CNL or open access locations

## D. Recommendations

SCEDD has a large responsibility and opportunity to help the 13-county region with expanded broadband service. Through the foundational aspects of this Blueprint, SCEDD has the tools necessary to identify, fund, partner and implement middle mile fiber projects across the region. This Blueprint recommends SCEDD continue its work to act as a developer/connector throughout the region refining broadband projects, collaborating with ISPs, pursuing grant opportunities and helping deliver last mile solutions to rural, unserved areas of the region.

- Adopt the SCEDD Broadband Blueprint Plan.
- Share the plan widely with member counties and communities throughout the region
- Share the plan with the CBO.
- Develop Request for Proposal documents for regional ISP partnerships to pursue grant opportunities and projects.
- Identify and target grant opportunities through the CPF, BEAD, DOLA and USDA Reconnect grant programs.
- Continue to refine middle mile fiber projects with input from additional stakeholders and partners; develop proforma documents for operations should SCEDD own infrastructure in the region.

- Once funded, implement the broadband infrastructure and set up the appropriate operational components to own, lease and operate a network (or partner with an ISP to do so through a P3 agreement).
- Continue to identify and map fiber infrastructure assets throughout the region.
- Work with various ISPs and fiber ownership groups to develop middle mile access across the region.
- Continue leadership in the region in the broadband space to ensure collaboration and cooperation.

#### END EXECUTIVE SUMMARY

## II. Broadband Blueprint

## A. Introduction

The Southern Colorado Economic Development District (SCEDD) strives to nurture the economies of the 13 member counties in southern Colorado – Baca, Bent, Chaffee, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Otero, Pueblo, and Prowers.

SCEDD believes that in today's information age, access to reliable and affordable broadband for all its members and residents is a necessity for long term sustainable economic growth. SCEDD's broadband initiative aims to help facilitate the expansion of broadband infrastructure throughout the SCEDD region. With unprecedented state and federal funding on the horizon, SCEDD believes it is uniquely positioned to help secure funding for this essential infrastructure. As the COVID-19 pandemic highlighted, having access to adequate, affordable broadband is essential for residents to fully participate in the modern economy, access education, access employment training activities, and to participate in telehealth services.

One of the most essential components in broadband planning is forming strong collaborative partnerships with neighboring communities and the organizations that serve them. The effort undertaken with this *Broadband Blueprint* is meant to further SCEDD's goals, establish a cohesive plan for middle mile connectivity, and reinforce collaborative partnerships to ultimately enable successful last mile projects.

SCEDD can work towards these goals by fostering relationships between communities, private ISPs and other fiber providers to extend local networks, facilitate middle mile projects or, as appropriate or necessary, manage middle mile leases and backhaul connections.

## B. Economic Development

Access to broadband has been shown to improve functional aspects of society and the economy. A 2016 study by the World Bank found that a 10% increase in internet penetration is associated with a 1.21% increase in Gross Domestic Product (GDP) growth in developed economies [1]. The McKinsey Global Institute has reported extensively on the positive impact of internet access on GDP [2] [3]. The International Monetary Fund found that internet access is a key driver of economic growth in developing countries, and that low internet access drives inequality [4]. These studies, and many others, suggest that there is a strong relationship between internet access and economic growth. Increasing access to high-speed broadband in rural areas can lead to higher property values, increased job (and population) growth, lower unemployment, as well as improved health outcomes. Return on investment in rural broadband is typically 2-4 times when considering the impact on the local economy.

## 1. Benefits of High-Speed Internet

Reliable high-speed broadband internet service is critical for anyone working or studying from home, needing telehealth services and is necessary for attracting and retaining a quality workforce that will encourage economic growth across the state.

High-speed internet is an essential component in today's world, providing numerous benefits for both individuals and businesses. Communication by high-definition video is a big step towards natural conversation, offering many benefits compared to text or audio-only interaction. Low lag, high-definition videos convey body language, engagement, and tone much more effectively than what is possible with traditional non-video-based technologies. Video, web-based meetings provide improved experiences across education, work, health, and emergency response.

#### a) Jobs

Through better connectivity, rural residents can maintain and grow their businesses and enable competition in the larger economy thereby competing with metropolitan areas. Empowering people to connect to the internet at the same speeds that are experienced in an urban environment, while staying local and supporting their communities, southern Colorado will attract businesses, skilled labor, and foster economic development for the region.

#### b) Agriculture

There are innumerable efficiency optimizations to the food production industry that are enabled by broadband access. The Office of Economics and Analysis along with the FCC released report in 2021 on the Impact of Broadband Penetration on U.S. Farm Productivity [5]. The study correlated biannual broadband availability data with information collected by the Census of Agriculture on farm production, expenses, and crop yields. The study found an increase in corn and soybean yields, and a decrease in overall farm operating expenses when U.S. farmers could access high-speed internet services.

As an example, the dairy farming industry has been employing networked devices and remote monitoring on their herds for years. Smart collars mounted on each cow remotely monitor their health, feed, and behavior from an app that can be monitored remotely by workers. These wireless transponders enable increased production and improve herd health while reducing overhead costs. [6]

The importance of broadband for day-to-day operational efficiency gains was illustrated when a satellite recently suffered an outage, disabling sub-inch accuracy for automatic tractor steering. Farming equipment that relied upon the service had to either wait for the fix or revert to the free signal at a much-reduced location accuracy, causing operational coverage inefficiencies [7].

#### c) Education

As the connected world develops, technology permeates through all aspects of life and public schooling is not (and should not be) immune. The National School Board Association reports [8] that nearly half of public-school students get internet-based assignments almost daily. However, in 2020, the National Education Association released a report that estimates more than 187,000 children in Colorado lacked internet access at home [9]. Students that lack access to high-speed internet will quickly fall behind their well-connected peers if they are unable to complete assignments in their home environments. The persistence of this

divide will grow into a social and societal problem more difficult to overcome than simply bringing broadband to unserved and underserved communities.

#### d) Telehealth

Access to high-speed broadband also increases access to health services, especially in rural areas where the nearest hospital, clinic, or specialist may be hours away. Patients and physicians can communicate more quickly, share electronic medical data, and even consult with other specialists typically located in larger metropolitan areas resulting in improved diagnosis and treatment; and ultimately better outcomes.

#### e) Emergency Management

Broadband communication is absolutely critical in emergency response situations within Colorado. Historically large wildfires can quickly cut off communities from the outside world. When families are forced to quickly coordinate evacuations from their homes they rely upon mobile networks. The middle mile infrastructure that supports mobile broadband connections can quickly be overwhelmed or destroyed, preventing not only families from planning their escape, but also impeding emergency response.

The Spring Creek Fire in 2018 near La Veta Pass in Huerfano and Costilla Counties destroyed an aerial middle mile fiber cable that linked La Veta to Fort Garland. When the cable was destroyed, all cellular and online transmissions to and from the area were dropped until FastTrack, Jade Communications, and SECOM could reroute traffic through a different circuit and restore access.

In Larimer County during the fall of 2020, the Cameron Peak Fire and East Troublesome Fire quickly burned through the national forest and rapidly approached Estes Park. Worried that the fire would disconnect the town from the internet, the municipality, regional power authorities, and project Thor staff worked over one weekend to rapidly resplice Thor's network to bring a redundant link to the town [10].

## 2. COVID and the Digital Divide

When schools and businesses were forced to close at the onset of the pandemic, we all observed that high speed reliable broadband was critical to continuing work and education from physically isolated locations. School children who did not have access to broadband fell behind their well-connected peers; adults who could not work from home had difficulty performing their job.

The digital divide is a term that refers to the gap between demographics and regions that have access to modern information and communications technology, and those that don't or have restricted access. This technology can include telephone, television, personal computers and internet connectivity. Well before the late 20th century, the digital divide was referred to chiefly in relation to the division between those with and without telephone access. After the late 1990s, the term began to be used mainly to describe the split between those with and without internet access, particularly broadband.

The digital divide typically exists between those in urban areas and those in rural areas; between the educated and the uneducated; between socioeconomic groups; and, globally, between the more and less industrially developed countries. Even among populations with some access to technology, the digital divide can be evident in the form of lower-performance computers, lower-speed wireless connections, lower-priced internet such as dial-up and limited access to subscription-based content. The digital divide is still very much a reality today. In 2019, approximately 5 million rural American households and 15.3 million urban or metropolitan areas still didn't have access broadband internet. Meanwhile, a study by the Pew Research Center noted that 24% of adults with household incomes below \$30,000 a year don't own a smartphone and 40% of those with lower incomes don't have home broadband services or a computer.

For the SCEDD region, data published by the American Community Survey (ACS) [11] shows computer ownership by census block (See Figure 1). The survey counts those who report owning a desktop or laptop computer; smartphone; tablet or another portable wireless computer. While computer ownership varies across the SCEDD region, many communities still have device ownership below the 80% threshold shown below.



**Figure 1**. Visual representation of the ACS 2021 data showing the estimated percentage of residents in each census block group that owns a computer device. Less than 80% of residents in the blue census block groups are estimated to own computers, laptops, tablets, or smartphones.

SCEDD heard anecdotal evidence from various communities around the region who reported children had to drive hours away to access Wi-Fi for their schooling during the pandemic lockdowns. Through this unprecedented experience, broadband was unequivocally essential for connecting to school, work, health care, and government assistance, and also a prerequisite for online shopping and entertainment. The Pew Research Center reported that as many as 90% of Americans said the internet was essential or important for them during the lockdown [12].

## C. Characterization of Broadband in the Region

Executive Order D 2022-009 [13] was issued by the Governor in February 2022 to establish the goal of connecting 99% of households within Colorado to high-speed broadband by the end of 2027. This order has charged the Colorado Broadband Office (CBO) to lead stakeholders statewide towards the goal of connecting households to a service that reliably delivers 100 megabits per second (Mbps) download and 20 Mbps upload and is ultimately scalable to a symmetrical 100 Mbps service.

To better assess and understand the broadband need across the country, the Federal Communications Commission (FCC) routinely requires internet service providers (ISPs) to provide speed and service data about the locations they serve. In order to more accurately evaluate the data, it is collected by broadband serviceable location (BSL) rather than simply by census block. This level of granular data has resulted in a far more detailed picture of broadband availability throughout the country. Analysis of data collected by the FCC is a critical component of the SCEDD Broadband Blueprint using ISP service level data to identify access to broadband as well as to formulate potential infrastructure projects.

#### 1. FCC Fabric Dataset

The FCC National Broadband Map consists of multiple datasets to describe broadband availability at a serviceable address level of detail. Each broadband serviceable address, or BSL, is a location on a map representing a business or residential building that would subscribe to a regularly marketed broadband service. Information such as broadband technology type, provider information, maximum download speed, maximum upload speed, and low latency<sup>1</sup> is attributed to each BSL to help characterize the broadband availability per individual location.

This report, as well as most grant programs, only considers broadband services offered to BSLs from ISPs using terrestrial technologies (i.e., not including broadband service from satellites).

Service availability has been broken down into two primary technology categories, wireline, or wireless. Wireline access is defined as broadband service provided to the serviceable location by physical cable or wired infrastructure (e.g., fiber optics, coaxial cable, DSL, etc.). Wireless broadband is defined as fixed and mobile wireless technologies *excluding* satellite (wireless service provided by fixed towers such as microwave and cellular). These two primary categories, when combined, are considered terrestrial broadband technologies. This data is used to assign each BSL a service level (or quality of broadband service), whose definition is based on download and upload speeds, and is defined in Table 1.

<sup>&</sup>lt;sup>1</sup> Low latency is defined by the FCC as having a round-trip latency of less than or equal to 100 milliseconds based on the 95<sup>th</sup> percentile of measurements. <u>https://www.fcc.gov/general/measuring-broadband-america-measuring-fixed-broadband</u>

#### Table 1. Definition of Service Level

Service Level		Fastest speed available to the BSL (Mbps)
1	Unserved	0 ≤ speed ≤ 25/3
2	Underserved	25/3 < speed < 100/20
3	Served	Speed ≥ 100/20

The distribution, by county, of BSLs across the SCEDD region is shown in Figure 2. with Pueblo County containing ~45% of the BSLs in the thirteen-county area.



Figure 2. Number of Broadband Serviceable Locations within the SCEDD counties

Of these BSLs within the SCEDD region, access to high-speed broadband service via wireline or wireless infrastructure (*excluding satellite*) is shown in Figure 3. 27% of all locations in the SCEDD region lack access to the minimum standard of high-speed broadband internet service defined by the FCC (< 25 Mbps download/3 Mbps upload). Further, graphically wireline services levels are shown in Exhibit D by serviceable location.



**Figure 3**. Service levels of addresses served by wireline technologies (copper, cable, and fiber) within SCEDD region. Data from FCC Fabric March 15, 2023 update.

In order to serve the region with the most reliable, resilient broadband service, wireline infrastructure is prioritized above wireless while also being essential to improving wireless coverage throughout the most rural regions. Within the SCEDD region, access to wireline service is described in Exhibit C which shows 26% of the region classified as either unserved or underserved. This portion of the region lacks sufficient access to the minimum standards of high-speed wireline broadband service further illustrating the sizeable need for improved broadband in the region.



**Figure 4**. Service Levels of address served by all Terrestrial technologies (copper, cable, fiber, licensed fixed wireless, and unlicensed fixed wireless). Data from FCC Fabric March 15, 2023 update.

The SCEDD region is a large and diverse area, with each county having specific needs and challenges when it comes to broadband service. By county, the percentage of unserved, underserved, and served locations can be seen in Table 2.

County	Percentage of BSLs	Percentage of BSLs	Percentage of BSLs
County	Unserved	Underserved	Served
Pueblo	5%	9%	87%
Fremont	7%	9%	85%
Chaffee	10%	31%	59%
Otero	5%	14%	81%
Las Animas	35%	13%	52%
Prowers	6%	25%	69%
Huerfano	32%	21%	47%
Custer	27%	72%	1%
Lake	7%	21%	72%
Васа	28%	23%	49%
Bent	10%	36%	54%
Crowley	9%	58%	33%
Kiowa	30%	23%	47%

#### **Table 2**. Distribution of BSLs by service level for each county in SCEDD region.

Despite the number of unserved and underserved locations within the SCEDD region, there are at least 26 internet service providers providing some level of service. This indicates the primary issue to improve service in the area has been the capital investment required to add necessary infrastructure to improve broadband access. ISPs operating within the SCEDD region can be found in Table 3.

CenturyLink	Fusion Cloud Services	SECOM
Charter Communications	Hilltop Broadband	T-Mobile US
Choice Wireless	Jade Communications	TellerWifi
Ciello	Kellin Communications	UPN
Cityless Internet Services	N.E. Colorado Cellular	Verizon
Colorado Central Telecom (Aristata)	Pine Drive Telephone Co. (Beulahland Communications)	Xfinity
Consolidated Communications	Rebeltec Communications	BySky Inc
Eastern Slope Rural Telephone	Rise Broadband	
Forethought Net	Rye Telephone (Highline)	

# Table 3. Internet Service Providers within SCEDD region. Internet Service Providers Operating in SCEDD Region

When each of the provider's service areas are overlaid on a map, the majority of the SCEDD region is covered by at least one ISP, and in some areas, as many as eight ISPs provide some form of broadband service as illustrated in Figure 5.



**Figure 5**. ISP service areas overlaid to visualize the level of competition across the region. Darker areas indicate more ISPs operating within the same area. This dataset includes all terrestrial ISPs (wireline and wireless)

## 2. Impact of Active Grants in the Region

A potential obstacle to funding for additional broadband infrastructure is existing grant funding authorizations. Many of the federal grant programs fund a wide variety of broadband deployment projects across large regions of the United States. Some of these programs go unchecked for years yet tie up grant eligibility for other grant programs as they overlap unserved areas. This prevents broadband implementation to areas that would otherwise be deemed grant eligible. Unfortunately, this practice furthers the inability to efficiently bring broadband service to rural areas of the state and across the country.

#### a) Rural Digital Opportunity Fund

As an example, the Rural Digital Opportunity Fund (RDOF) Phase I auction, awarded \$16.4 billion in broadband implementation funding over a 10-year span (starting in 2022). This program is aimed at bringing broadband to unserved rural areas. The RDOF program's minimum required service (25/3) is less than the current standards (100/20) for broadband service potentially blocking future funding opportunities while not providing adequate broadband service. Two applicants have received funding from this program within the SCEDD Region as shown in Table 4.

Applicant	Number of funded Census Blocks within SCEDD Region
Resound Networks, LLC	1,597
Qwest Corporation	110

**Table 4.** RDOF Grant Award Recipients and number of census blocksto be served within SCEDD Region.

These awarded census blocks cover approximately 5,500 addresses within the region and are shown in Exhibit B. Within all of Colorado, Resound Networks has been awarded over \$29 million to connect 11,768 premises, which is approximately \$2,500 per premise. Given the rural nature of this area, it is unlikely that the current RDOF grant recipients will successfully bring broadband to these areas at this cost.

## D. Stakeholder Outreach

A key component to developing the SCEDD Broadband Blueprint was to implement a stakeholder outreach plan with the primary goal of engaging the member counties, towns and cities as well as ISPs throughout the region. This was done to ensure a community-based approach to broadband service that meets or exceeds Colorado Broadband Office (CBO) and Federal grant requirements. SCEDD developed an internal SCEDD Working Group responsible for stakeholder outreach and development of the Broadband Blueprint. This group was comprised of both SCEDD and Ditesco staff. For reference, the full Stakeholder Outreach Plan is provided in Appendix A. The Stakeholder Outreach Plan focused on building trust through proactive communication showcasing the team and tools being used to implement broadband. This included regular information sharing about program roll-out, operational elements and program status; as well as sharing information about national, statewide and local broadband initiatives and news (current events). Implementation of the Stakeholder Outreach Plan included the following:

- SCEDD distributed content through social media as well as the SCEDD newsletter to keep stakeholders and interested parties informed of current status.
- Town hall meetings and County Commissioner work sessions were held throughout the region to engage with as many stakeholders as possible. This included meetings and events in Pueblo, Lamar, Rocky Ford, Florence, Walsenburg, Westcliffe, Salida, and Poncha Springs.
- SCEDD attended a regional broadband workshop hosted by Region 10 as well as the CBO Broadband Summit in Westminster, CO to better communicate SCEDD's mission, learn from others around the State and gauge upcoming grant programs.
- SCEDD staff held regular monthly meetings with CDOT and CBO staff around current broadband planning in the region.

SCEDD coordinated ISP engagement through routine meetings and the use of non-disclosure agreements to obtain existing infrastructure asset data to better understand the middle and last mile broadband in the region.

## E. Middle Mile's Role in Internet Service

The leading focus of improving broadband access in the SCEDD region should be the design and construction of middle mile fiber between, and into, communities where no fiber currently exists. This middle mile fiber is the glue connecting communities to the nearest major data hubs distributed around the country. SCEDD, through project sponsorship and facilitation, and through use of broadband deployment grants, will enable private providers to build out a middle and last mile network to underserved premises. A high-level network representation showing the long haul, middle and last mile portions of the national network can be seen in Figure 6.



**Figure 6**. Visual representation of Middle Mile vs Last Mile Fiber [14]. Middle Mile networks between communities should be constructed to improve

## 1. Last Mile

Last mile is the final link in the network operated by an ISP using any technology that serves a premise. In a fiber network, the last mile fiber connects a subscriber to the ISP central office

using a Gigabit Passive Optical Network (GPON or similar) protocol. GPON networks are common in FTTP builds because they distribute the optical signal over cables using all nonpowered equipment (passively) between the central office and premises. The signal from the central office is transmitted through the GPON network on a fiber strand until is optically split between 32, 64, or even 128 fibers that reach directly to equipment installed at subscriber homes. SCEDD can foster the development of various types of networks by sponsoring new middle mile into areas where none exists, and then lease backhaul to the ISP at vastly reduced costs compared to building the middle mile network themselves (should SCEDD own the infrastructure).

## 2. Building for the Future

Any investment into broadband infrastructure must have an eye toward the future needs of the communities with SCEDD. As technology and the need for broadband networks has evolved, capacity and speed requirements have increased. Traditional telecommunication technologies such as DSL or coaxial cable infrastructure have reached their limit of scalability and capacity. Optical fiber network bandwidth and scalability are many orders of magnitude greater than copper, wireless, and satellite technologies. Generally, only a fiber optic network possesses the capacity to not only satisfy the increased demands of today's networks, but also allows continued growth far into the future without the need to install additional infrastructure.

#### a) Fiber Optic Networks

Fiber optic cables consist of multiple strands of glass contained withing sheathing and jackets to protect the glass strands. As an example, outside plant cables with 288 fibers are common in the industry. Some 5G mobile operators are even installing larger cables within urban areas, enabling more communication bandwidth throughout the last mile technology deployed. Once fiber is installed, as technology advances, only the active equipment at either end of the fiber needs to be upgraded rather than replacing the cable in the ground. This allows fiber to easily scale to tomorrow's needs and carry more and more data at the speed of light.

#### b) Supporting Technologies: Wireless Middle Mile and Last Mile Solutions

Wireless technologies can be used in the last mile link, or as a redundant (although limiting) backhaul alternative. In a last mile link, wireless technologies need to be carefully considered with scalability in mind before deployment. The CBO has standardized 100/20 Mbps technologies that can scale to 100/100 Mbps. There are few wireless technologies that can deliver such speeds symmetrically to subscribers and often are limited by their ability to transfer data up from a service location. At the time of this report, 1 Gbps symmetrical point to point wireless has been deployed for in a last mile applications using unlicensed wireless frequencies operating in the millimeter-wave frequency (57-64 GHz, typically called "60 Ghz"). Wireless links operating in this band enable bandwidths that previously could only be accomplished with fiber optic cables [14] [15] [16]. These millimeter wave point to point (or point to multipoint) technologies, however, have a lower range before requiring additional nodes and also require a clear line of sight to function

properly. The 60 GHz technology is rapidly improving, and wireless last mile meshes can be a much cheaper solution compared to aerial or underground last mile fiber.

Throughout the state, various ISPs are evaluating deployment of 60 GHz technology. However, it is limited in its ability to serve large service areas effectively. The cost of deployment will likely limit the use of this technology to smaller, more dense areas communities. While wireless technology is evolving, it will continue to be less reliable than fiber networks that aren't subject to interference from terrain, vegetation, or weather. It is also worth noting that any wireless solution relies heavily on a fiber network along middle mile and backhaul routes. In the most rural areas of the SCEDD region, wireless solutions, supported by fiber networks, will be crucial to reach the more remote unserved locations.

#### 3. Network Redundancy

One optical cable linking a community to the greater internet is sufficient until the cable is cut or the fibers break. Redundancy is a critical consideration when operating networks, especially if the local ISP and regional mobile towers are served by the same optical cable with no backup links. Middle mile networks should therefore be planned with redundant data pathways so networking equipment and operators can reroute traffic around fiber breaks. This may not be achievable initially but should be considered as a standard design approach through the maturation of the network.

## III. Infrastructure in the SCEDD Region

Through the development of this blueprint plan, SCEDD has worked to collect as much data from providers as possible. Understanding who is operating where, as well as the location and type of existing infrastructure assets is an ongoing priority to avoid redundant and overbuilt infrastructure. To the greatest extent possible, existing infrastructure must be known in order to leverage and efficiently expand into unserved and underserved areas. The SCEDD region's existing infrastructure assets can be seen in Exhibit A.

## A. Existing Private Middle Mile Infrastructure in the Region

Partnering with private operators will help minimize overbuilding in the region with new projects. Through a Request for Proposal (RFP) process, projects and partners can be identified to minimize the construction of new middle mile, taking advantage of as much existing infrastructure as possible while remaining grant compliant. SCEDD and the region need to work collaboratively with middle mile providers such as Zayo, Tri-State Communications, and Mammoth Networks as well as ISPs operating their own middle mile in the region.

## B. Existing Public Middle Mile Infrastructure in the Region

CDOT's Intelligent Transportation System (ITS) is made up of 1,600 miles of fiber optic cable statewide. The infrastructure assists with operations through the connectivity of thousands of devices installed along roadways. To access CDOT's fiber or property, CDOT charges two fees 1) a Right-of-Way (ROW) access fee and 2) a dark fiber lease rate. Newly proposed rates for right of way property charges are shown in Table 5.

Route	Cost per foot
Interstate Highway	\$0.96
US Highway	\$0.84
State Highway	\$0.76

#### Table 5. CDOT ROW usage fee structure

CDOT also publishes a dark fiber lease rate calculator [17]. Their dark fiber can be accessed at existing CDOT splice points and there is a 30-mile minimum requirement to lease dark fiber. The initial upfront payment is 5% of the total lease value, which is the sum of all annual lease payments. Significantly, CDOT's lease rate is half (\$1,750 vs \$3,500 per strand/mile) for public entities who wish to access their fiber.

## 1. CDOT Proposed Middle Mile

CDOT has three proposed or planned fiber routes for their ITS system through the SCEDD region that would improve ISPs middle mile path diversity and capacity. Counties and municipalities in the SCEDD region should encourage the development of these projects to increase fiber options available.

Within the Huerfano County area, CDOT is in the early negotiation phase with Zayo to overpull an additional fiber optic cable along the existing ITS link on Highway 160 from Walsenburg to South Fork. CDOT estimates that this project is years away from completion. Currently, all 24 fibers on this cable are in use, thus driving the need to overpull more fiber cable.

CDOT is also negotiating a proposed public private partnership with Arcadian Infracom to construct long-haul fiber. CDOT has published this route in their ITS dataset along Highway 285 from southwest Denver, into Chaffee County through Buena Vista and Pagosa Springs into Saguache County. However, like the proposed overpull along Highway 160, this project is estimated to be several years away from a firm agreement and construction.

In 2022 CDOT submitted a proposal for a \$119.8 million project to the Enabling Middle Mile Broadband Infrastructure Program to construct seven new middle mile routes within the state. Two of those routes are within the SCEDD region, connecting Pueblo to Lamar on US 50 and the other connecting Lamar to Burlington. These two routes could create a redundant middle mile link for SECOM's network in the area. CDOT's existing and planned fiber network is shown in Exhibit E.

## C. Other Middle Mile Infrastructure

In addition to CDOT's ITS network, there are other middle mile plans developed by various communities. Over the past several years, the planning and management regions (see Figure 7) in Southern Colorado have developed broadband strategic plans. These plans have made numerous recommendations on desired middle mile routes. These routes are very briefly summarized below, the full broadband strategic plans can be found on each organization's website.



Figure 7. Planning and Management Regions in Southern Colorado.

#### Region 6 – Colorado Southeast Region Broadband Strategic Plan. Published in 2017

The plan notes that SECOM is the only middle mile fiber operator within the six member counties of Region 6 and the Southeast Colorado Business Retention, Expansion, and Attraction (SCBREA) group. The plan recommends leveraging current service providers to improve coverage.

# **Region 9 - Southwest Colorado Council of Governments Strategic Broadband Plan**. *Published in* 2017

Region 9's plan outlines the Southwest Colorado Network Access project and middle mile between communities and anchor institutions within the region. The plan estimates capital costs to build out ~230 miles of new fiber along CDOT right-of-way for approximately \$53 million. This open access fiber operator model is funded by member contributions, internet access subscriptions, and dark fiber leases.

# **Upper Arkansas Area Council of Governments Regional Broadband Strategic Plan**. *Updated in* 2019

The plan advocates for the "Tri-County Fiber Optic Middle Mile System" which is a proposed new fiber build between Cañon City and Walsenburg via Texas Creek, Westcliffe, Silver Cliff, and Gardner. The plan indicates that this route would greatly improve capacity and path diversity, as well as serving many of the unserved addresses within the region.

#### **Region 14 - South Central Council of Governments Regional Strategic Broadband Plan**. *Published in 2017*

For Region 14, their plan describes existing middle mile network through the region along Interstate 25 from Pueblo to Raton NM, and an east-west path from Walsenburg to Alamosa. The plan says that middle mile fiber is missing on Highway 160 between Trinidad and Kim, along highway 350, and along highway 69 from Walsenburg into Custer County.

#### Huerfano County Broadband Plan. Updated in 2023

This plan advocates for an FTTP project into Gardner to support 100 Mbps symmetrical service. This project would require new middle mile from the existing fiber along HWY 160. The plan also describes new middle mile fiber installed along State Highway 12 from La Veta into Cuchara to support a FTTP network installed by Jade Communications.

## IV. Project Identification and Prioritization

This section outlines the steps taken to develop a list of fiber middle mile projects in the SCEDD region. First, communities within the region were characterized and scored based on their broadband and economic need. Proposed middle mile fiber routes were then plotted through and between high scoring communities, running to and from known middle mile fiber routes. Then each of the proposed middle mile fiber routes were characterized and scored based on impact, feasibility, and grant applicability.

The routes are presented graphically on the map in Exhibit G and numerically on the spreadsheet in Appendix D. Details about how the communities and routes were prioritized are in the following section.

It is important to note that these proposed middle mile fiber routes have been developed at a high level. The intention of this Blueprint is to set the middle mile projects focused at a regional scale. The exact route and end points of proposed fiber are not intended to be explicitly defined herein. The route in general, between communities, regardless of the final form, is what this plan defines.

## A. Community Need

In this plan, communities are defined as the region within 5 miles of the center of a named town or city. Only community areas that contain more than 50 addresses are considered in this plan. These communities were evaluated based on key factors to help identify infrastructure gaps that would ultimately define potential middle mile routes. The communities identified and evaluated are shown in **Figure 8**. More than 77% of addresses within the region are contained by the community areas shown.



**Figure 8**. 98 characterized communities across the region. Data within 10-mile diameter areas (all BSLs within 5 miles from center of city or town) centered on the community are used to rank broadband need.

Using ArcGIS tools, a community-based Broadband need score was calculated by:

- Quantifying the criteria shown in Table 6 for each community.
- Normalizing scores for each criterion across all communities between 0% (lowest) and 100% (highest).
- Multiplying the normalized score for each criterion by a weighting (i.e., importance) factor
- Adding together all the weighted scores to calculate the overall community score.

**Exhibit F** visualizes the results on a map by symbolizing communities using their overall score. The scores are graduated in five groups from the lowest ranking (symbolized with dark blue) communities to the highest-ranking (symbolized with yellow) communities. **Appendix B** shows the community decision criteria analysis and calculated scores for each community in the SCEDD region.

Criteria	Description	
Distance to Existing Fiber	Score is based on the community distance from existing fiber infrastructure. Communities furthest from known existing fiber score highest.	0.5
Unserved and Underserved Addresses	Fraction of addresses that are unserved and underserved under community area. Communities with the most addresses with the fastest available speed less than 100/20 score highest.	4
Median Income	Average income level by census tract within community area based on American Community Survey published by the Census Bureau. Communities with the lowest income score highest.	2
Density	Density of addresses per square mile. Dense areas score highest.	1
Unserved and Underserved Anchor Institutions	Number of anchor institutions that are shown as unserved and underserved within the community area. Areas with underserved and unserved anchor institutions score the highest.	1
Ability to Partner with last mile ISP	Value that indicates ISP interest of operating within community area.	0.5

#### Table 6. Community Area Score Criteria and Weights

These criteria and weights are designed around identifying areas with the highest broadband service need. The ability to partner with a last mile ISP was a useful criterion to differentiate amongst communities in the region based on existing ISP service areas. After stakeholder outreach sessions and correspondence, all communities in the region appear to have willing ISP partners to serve last mile need. Therefore, this scoring criteria contributes equally to all.

The communities with the highest score have the most need, but also the best chance for successful partnerships, and therefore middle mile routes that connect high scoring communities will have the greatest impact on the region.

## B. Proposed Middle Mile Routes

Scoring and prioritization of an individual community's access to broadband within the SCEDD region was utilized along with data collected identifying existing middle mile fiber infrastructure to identify gaps in middle mile fiber across the region. By correlating these gaps in infrastructure with the regional priorities, middle mile projects could be defined and prioritized. These are shown in **Exhibit G**.

New fiber routes were initially considered if the proposed route:

- Connected communities that score high in the broadband needs assessment.
- Aligned with strategies outlined in previous regional plans.
- Enabled redundancy by creating a ring on an existing network.

Based on these factors, the routes developed across the region form a comprehensive list that are scored in a similar manner to the communities. The scoring matrix for routes is shown in Table 7.

Criteria	Description	Weight
Count of unserved addresses within 3 miles of route	Number of unserved addresses (fastest available speed ≥ 25/3 Mbps) within 3 miles of route. Routes near more addresses that meet this criterion score higher.	3
Underserved addresses within 3 miles of route	Number of underserved addresses (fastest available speed greater than 25/3 but less than 100/20 Mbps) within 3 miles of route. Routes near more addresses that meet this criterion score higher	2
Estimated Cost	High level cost estimates for each route where the lowest estimated cost route scores the highest	1
Unserved and underserved addresses per route mile	The total number of unserved and underserved addresses within 3 miles of the route, divided by the total length of the route, similar to density. Routes with more unserved and underserved addresses score the highest	1
Percentage of route within TierThe percentage of the route within Tier 1 Counties as define CBO. Routes that are completely within Tier 1 Counties as highest.		3

#### **Table 7**. Proposed Middle Mile Route Scoring Criteria and Weights

The scoring matrix for evaluating middle mile routes prioritizes the number of unserved and underserved addresses based on their relative importance to the CBO in achieving their priority of serving unserved addresses before underserved addresses. It also prioritizes routes that ultimately enable last mile service to the most locations per mile of middle mile fiber to further prioritize efficient projects that serve the most people.

As with the scoring of individual communities, the score in each category is multiplied by its weight (relative importance) and added together for a total score for each middle mile route. The resulting prioritized middle mile routes are visualized on the map shown in **Exhibit G** and tabulated in **Appendix C**.

To further analyze middle mile route projects around grant eligibility, the percentage of a route within a Tier 1 County, specific to the *Advance Colorado Broadband Capital Project Fund (ACBCPF)* was defined. The CPF grant program will allocate \$162 million for broadband projects. As part of the classification of eligible locations, the CBO has scored Counties as either "Tier 1" or "Tier 2" and will allocate roughly 75% of funding towards Tier 1 counties. Matching fund requirements are also lower within Tier 1 counties (25% vs 50%). Tier 1 and Tier II counties are shown in Figure 9. For this reason, routes that are located within Tier I counties are prioritized due to funding availability.



**Figure 9**. The ACBCPF County Tiers as defined by the CBO. There is more funding available for projects in Tier 1 counties, and they have a lower match requirement.

## V. Operational Model

To facilitate broadband network expansion throughout the region, SCEDD evaluated two operational models. Each model provided a different role for SCEDD to play when assisting the region with broadband deployment. As a foundational purpose of this Blueprint, SCEDD's role definition became critical for establishing a successful relationship with member counties, the CBO and private ISPs.

## A. Developer/Connector Model

The Developer/Connector model is one where SCEDD would play an active role in broadband deployment throughout the region. SCEDD would apply for grants, perform duties as the grantee, manage P3 agreements, partner with member counties to identify broadband needs and target funding and projects to accomplish those needs. This model was reviewed by the SCEDD Board and is the desired operational model they selected.



## B. Facilitator Model

The Facilitator model is one where SCEDD plays a minor role connecting communities throughout the region with grant opportunities and coordinated communication across projects but does not take an active role in broadband implementation, funding or management through agreements with private ISPs. Here, SCEDD would play a secondary role to the member counties with the counties actively applying for grant funding, working with private ISPs and administering the broadband programs in each separate county. This model was discussed by the SCEDD Board but was not chosen as the model to assist in broadband implementation.



## C. Financial Models

Through the operational models discussed above, the roles SCEDD could play as a developer/connector would be to:

- facilitate grant applications with ISP partners that will own the infrastructure
- offer dark fiber leases of SCEDD owned fiber infrastructure
- offer last mile "meet me" or carrier neutral locations to connect ISPs to last mile networks

#### 1. ISP Partnerships

SCEDD will partner with local ISPs to extend their existing networks to unserved communities in the region. ISPs have existing infrastructure and expertise in the region, whereby SCEDD should leverage their resources and knowledge to extend high-speed broadband coverage more efficiently and cost-effectively without overbuilding the network(s).

SCEDD will plan to assist with grants applications and matching funds from counties to encourage local ISPs to invest in network expansion specifically focused on critical middle mile connections. In this model, SCEDD can play a leadership/grantee role or a subservient role to the ISPs to ensure local coordination and collaboration across the public and private sectors. SCEDD can leverage existing relationships with local governments and regulatory authorities to streamline permitting processes and remove barriers that may hinder deployment.

Overall, this plan contemplates SCEDD connecting with multiple ISPs through a request for proposal (RFP) process and potential public-private partnerships (P3) to further middle-mile infrastructure deployment to the region. Through this model, SCEDD and the local governments can retain ownership of some of the infrastructure assets and potentially gain revenue from these assets. There are many derivations of P3 models that exist in the industry, and they change routinely. SCEDD can outline the initial terms of a P3 arrangement in their RFP to ensure the proper level of control, risk and reward is allocated to all parties. Very simply, SCEDD could ultimately gain a fee back from the P3 agreement and share this revenue with participating government partners.

Each of the P3 agreements and associated projects will need to be analyzed closely for capital expense, grant offsets, operational expenses, revenue and fees to ensure SCEDD's and the participating government's interests are maintained.

This will be no small task as the region's 23 middle mile projects total over \$82 million in capital costs with over \$20 million in potential local match requirements. It is expected that SCEDD will focus on the middle mile, highest prioritized routes first as part of the upcoming Capital Project Fund grant rollout. See **Appendix D** for a detailed list of projects, costs and local match requirements.

#### 2. Dark Fiber Leases

SCEDD will certainly have the ability to retain ownership of fiber cable assets throughout the region. When doing so, SCEDD can then lease dark fiber to various service providers to enhance broadband service throughout the region. Fiber ownership may come from projects SCEDD and

the local governments uniquely fund and own; through P3 agreements or through acquisition of existing fiber assets that ISPs may deem no longer useful for their network. In any scenario, the revenue associated with dark fiber leases can vary greatly depending on the region, demand and availability. In this model, SCEDD would lease dark fiber strands (2 strands minimum) to private or public entities. SCEDD would enter into license/lease or IRU agreements with these entities. Dark fiber is generally priced on a per mile basis, per strand of fiber, per month of the lease term. Common lease rates are shown below in Table 8. For the purposes of forecasting revenue, Appendix D includes an average \$125.00 per strand/mile per month revenue calculation.

Source	Monthly Lease Rate per Strand/Mile
CDOT	\$145.83
SWCOG	\$144.75
Centennial	\$137.50
Weld County (private ISP)	\$78.00 - \$122.00

**Table 8**. Proposed Middle Mile Route Scoring Criteria and Weights

In addition to the monthly lease rates, depending on fiber ownership, there is typically a maintenance fee and upfront fee charged to use the fiber. Maintenance fees are also billed on a per mile per year basis and can range from \$150 to \$800 per mile. Upfront set up charges also are highly variable and can range from \$1,500 to over \$3,000. Often, initial cash payments can be made on the lease/IRU to offset the long-term lease costs.

Finally, when leasing dark fiber, the SCEDD will need to address the following operational issues to ensure a robust leasing program.

- Maintain a current map and inventory of all fiber infrastructure assets leased and available to be leased
- Establish a plan in for third-party network access through template agreements and legal terms
- Establish maintenance policies and procedures that address outage and repair procedures

#### 3. Meet Me or Carrier Neutral Locations

Another model that may prove useful in the SCEDD region is one where Carrier Neutral Locations (CNLs) are established in underserved communities. These CNLs are physical locations where backhaul, middle mile fiber is brought to a node in the network whereby single or multiple ISPs can then distribute last mile network(s) to premise customers. This model has been implemented across Colorado in Region 10 and in the Northwest Council of Governments (NWCOG) through project Thor. These facilities lower overall cost to deliver broadband service to a community. Often, cost reductions on the order of 3 to 4 times less are realized through implementation of a CNL.



Figure 11. Schematic Diagram of how a Carrier Neutral Location (CNL) fits into the network

For SCEDD, the opportunities to develop CNL locations may be limited as private ISPs have a large network of fiber cable available across the region. However, there are underserved communities that have been left behind due to the cost of last mile service. Well placed CNLs may solve this problem by allowing ISPs to deploy last mile service.

The primary revenue associated with CNLs come from two primary elements.

- Revenue from members of the CNL paying a share of the network costs (potentially the local communities)
- Commercial revenue coming from private ISP use of the CNL through rack space rental, access charges, maintenance charges, etc.

The primary costs for establishing CNLs comes from:

- Space rental or construction of a hut or building
- Capital construction costs for the CNL equipment (racks, etc.)
- Operations and maintenance costs

Table 9 and 10 below summarizes some high-level costs and revenue for establishing a CNLlocation. Costs and revenue for these facilities can be highly variable depending onpartnerships, co-locations and network access charges.

\$10,000 to \$20,000 per year

Item	Cost/Expanse
	COSt/ Expense
CNL Facility	\$125,000 to \$200,000 (one time)

#### Table 9. CNL Expenses

**Operating Costs** 

Item	Revenue
Access	\$7.00 to \$10.00 per Mbps per month
Share of Networking Costs	\$8,000 to \$10,000 per month
Rental Costs	Variable depending on space and use

#### Table 10. CNL Revenue

The costs and revenue provided above, again, can be highly variable. Should SCEDD consider a CNL model in a community, final evaluation of the establishment, operation and maintenance of the facility can be evaluated through an individual proforma.

#### 4. Grant Opportunities

The grant landscape surrounding broadband is very active since the Biden Administration passed the Infrastructure Investment and Jobs Act (IIJA) in 2021. The law authorizes \$1.2 trillion for transportation and infrastructure spending with \$550 billion of that figure going toward new investments and programs. Of this, \$42.45 billion will expand high-speed internet access across the nation through the BEAD program of which Colorado will see approximately \$500 to \$700 million. Additionally, Colorado has received approximately \$160 million from the Capital Projects Fund to deploy middle and last mile broadband in rural, underserved areas.

The SCEDD region is well positioned to apply and win grants through both the CPF and BEAD programs. Of the 13-county region, seven (or 54%) of the counties are considered Tier I identifying a higher need and lower local match participation for the CPF grant program. The CPF program will allow grant applications starting in June 2023. Applicants will be limited to a \$20 million project size and will have to provide a minimum of 100 Mbps download/20 Mbps upload speeds with their projects.

The BEAD program is expected to be rolled out in early 2024 with a distinct focus on last mile infrastructure. This program will likely have different project criteria and application requirements.

In addition to the CPF and BEAD programs, the USDA, NTIA, DOLA and others have routine grant programs that fund rural broadband projects.

## VI. Recommendations

SCEDD has a large responsibility and opportunity to help the 13-county region with expanded broadband service. Through the foundational aspects of this Blueprint, SCEDD has the tools necessary to identify, fund, partner and implement middle mile fiber projects across the region. This Blueprint recommends SCEDD continue its work to act as a developer/connector throughout the region refining broadband projects, collaborating with ISPs, pursuing grant opportunities and helping deliver last mile solutions to rural, unserved areas of the region.

- Adopt the SCEDD Broadband Blueprint Plan
- Share the plan widely with member counties and communities throughout the region
- Share the plan with the CBO

- Develop Request for Proposal documents for regional ISP partnerships to pursue grant opportunities and projects
- Identify and target grant opportunities through the CPF, BEAD, DOLA and USDA Reconnect grant programs
- Continue to refine middle mile fiber projects with input from additional stakeholders and partners; develop proforma documents for operations should SCEDD own infrastructure in the region
- Once funded, implement the broadband infrastructure and set up the appropriate operational components to own, lease and operate a network (or partner with an ISP to do so through a P3 agreement)
- Continue to identify and map fiber infrastructure assets throughout the region
- Work with various ISPs and fiber ownership groups to develop middle mile access across the region
- Continue leadership in the region in the broadband space to ensure collaboration and cooperation

END REPORT



# **Exhibit A** Existing Middle Mile Infrastructure





## County Boundaries

Ν

(i) Microwave Service Towers (Homeland Infrastructure Foundation Level Data)

- Existing Fiber (Publicly Available Data)
- State Highways
- Interstate Highways
- Local Roads

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# Southern Colorado Economic Development District (SCEDD)



# <u>Broadband Stakeholder</u> <u>Outreach Plan</u>

Prepared By:



January 23, 2023

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## 1. Outreach Plan Goals

The Southern Colorado Economic Development District (SCEDD) has embarked on a plan to expand high-speed broadband service to the southeast region of the state. Since 1980, SCEDD has served its thirteen member counties – Baca, Bent, Chaffee, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Otero, Prowers, and Pueblo. SCEDD, at its most basic level, was formed to provide a Comprehensive Economic Development Strategy (CEDS) to its member counties ensuring they remain compliant to receive Economic Development Administration (EDA) funding. Now, SCEDD is leveraging its regional presence providing a central agency that can deliver broadband to a highly underserved area of the state.

This outreach plan has a primary goal of engaging the member counties, towns and cities throughout the region to ensure a community-based approach to broadband service that meets or exceeds Colorado Broadband Office (CBO) and Federal grant requirements.

SCEDD has a unique opportunity to develop a regional broadband plan that will leverage existing ISP resources and relationships, regional providers and upcoming grant programs to effectively deliver broadband to member communities.

## 2. Stakeholder Outreach Strategies

This Stakeholder Outreach Plan has been developed as part of an overall plan to develop a Broadband Blueprint for the SCEDD region. One of the initial steps to ensure broadband implementation success is to understand the region's desires when deploying broadband resources. To properly understand the region's needs, existing assets and how to best deploy broadband this stakeholder outreach plan was developed to ensure proper engagement of the member communities.

One of the initial steps and recommendations of this Outreach Plan was to develop an internal SCEDD Working Group. This team would be the primary group responsible for stakeholder outreach and development of the Broadband Blueprint. This group would be comprised of both SCEDD and Ditesco staff. Ditesco has been hired by SCEDD to assist with overall Blueprint development and implementation.

SCEDD	Leslie Mastroianni, Executive Director Heather Brown, Office Manager Tracy Gutierrez, Community Development Specialist Mike Wimmer, Community Development Specialist
Ditesco	Keith Meyer, President Nathan Hoople, Senior Project Manager Paul Colasuonno, Associate Project Manager

The Working Group is designed to meet regularly, plan outreach, engage with all stakeholders and implement the Broadband Blueprint.

## 2.1 Target Stakeholder and Audiences

Stakeholders will be empowered to participate in a robust two-way communication process. The public will be engaged through a variety of communications tools. Key stakeholders include:

#### Internal:

- SCEDD Staff
- SCEDD Board Members
- SCEDD Member Counties

#### External:

- Internet Service Providers (ISPs)
- Cities and Towns in the SCEDD region
- Colorado Department of Transportation (CDOT)
- Colorado Broadband Office (CBO)
- General Public
  - o Business organizations
  - o Advocacy groups
  - Anchor institutions (schools, government facilities, fire, police)
- Media
  - $\circ$  TV, print, radio
  - o Social media outlets

## 2.2 Regional Stakeholder Groups

SCEDD will also plan to coordinate and communicate with regional partners in their broadband initiative including:

- Region 10
- Northwest Council of Governments (NWCOG)
- Colorado Department of Transportation

These regional partners have implemented similar broadband programs that can benefit SCEDD in their evaluation of program alternatives and implementation strategies.

## 2.3 Messaging and Tactics

OBJECTIVE: Maintain a positive sentiment of the SCEDD Broadband Blueprint initiative across all stakeholders throughout program implementation.

GOAL #1 - *Live the Brand*. Develop a brand that communicates SCEDD's broadband initiative and is included on all public touchpoints to strengthen the community's perception and understanding of the initiative.

STRATEGIES and TACTICS:

 Build trust through proactive communication publicly showcasing the team and tools being used to implement broadband. Regularly share information about program rollout, operational elements and program status. Share information about national, statewide and local broadband initiatives and news (current events). Share appropriate information to affected communities.

- Meet regularly with member counties to connect with government officials, businesses and anchor institutions.
  - Allow for digital communications including social media, website and email.
  - Hold events and town hall meetings as necessary.
  - Develop "broadband on the road" presentations to collect information, inform key stakeholders and disseminate program updates.
  - Partner with local media for news articles and TV spots.

GOAL #2 – *Regional Recognition*. Ensure SCEDD's broadband initiative remains forefront. Be recognized as a regional leader, collaborator and connector in the broadband space.

STRATEGIES and TACTICS:

- Collaborate regularly with Region 10, NWCOG, CDOT, CBO and other organizations on broadband programs.
- Regularly attend and present at regional, statewide and national conferences and events about SCEDD broadband programs.
- Coordinate regular ISP engagement meetings to strengthen and develop partnerships.

GOAL #3 – *Consistent Member Support*. Develop learning tools and on-boarding strategies to educate, inform and achieve Board and Member support for on-going broadband program implementation, expansion and operations.

STRATEGIES and TACTICS:

- Develop an on-boarding program for all new Board members regarding broadband.
- Develop regular Board updates on broadband program.
- Engage member counties in "lunch and learn" sessions on SCEDD broadband programs, local, state and national broadband initiatives.
- Develop and distribute branded broadband materials (quarterly reports, etc.) to member counties and communities on broadband implementation and ongoing program elements.

## 3. Broadband Implementation Strategy

To successfully understand implementation of broadband across the SCEDD region and ensure its success, an early outreach step to the SCEDD membership and Board was to present various broadband operational models. Two models were presented that outlined what SCEDD's role might be in implementation of broadband across the region.

- The Facilitator Model
- The Developer/Connector Model

**Facilitator Model** In this model, SCEDD would simply play a facilitator role connecting various broadband providers, initiatives and programs to member communities. They would act as a connector and facilitator and may assist with grant applications and programs. SCEDD would not play an active role in broadband implementation or management.



**Developer/Connector Model** In this model, SCEDD would play an active role in broadband implementation and management. They would actively pursue grants and partnerships with ISPs to leverage existing fiber assets and connect communities. SCEDD would run the broadband business model. Initially, this business model would mirror that of Region 10 and NWCOG where SCEDD would provide a regional broadband middle-mile network to carrier neutral locations (CNLs) that could then connect communities through ISPs and further deployment of fiber to the premise or wireless service solutions to the home or business.



The SCEDD Board of Directors selected the Developer/Connector model at their December 19, 2022 meeting defining SCEDD's role in development of the Broadband Blueprint. This decision has allowed completion of this Stakeholder Outreach Plan and developed the foundation for SCEDD's role in broadband deployment.

## 3.1 Data Collection

As another critical, initial step to understand broadband implementation is raw data collection to develop a comprehensive dataset of existing fiber and broadband assets across the region. The stakeholder engagement necessary to achieve this data collection is be no small task. Much of the infrastructure assets throughout the SCEDD region are privately owned and, some held by large national companies.

#### STRATEGIES and TACTICS:

- Communicate to regional ISPs SCEDD's role to ensure they see SCEDD as a collaborator, not competition.
- Request data that may not, or does not, lessen competition for the ISPs. Sign the necessary nondisclosure agreements to ensure confidentiality.
- Request data from all member counties and communities to build on work already completed.
- Develop regular communication strategies with stakeholders to build trust in the Blueprint process and expected outcomes.
- Hold subregion meetings and take the Blueprint data collection "on the road" to fill any remaining data gaps, survey the landscape and develop a better understanding of infrastructure across the region.

## 4. High Level Blueprint Plan Development

The last step in stakeholder outreach is to develop a high level Blueprint Plan for stakeholder consideration. Ideally, this plan is roughly developed prior to any final subregion meetings to have a draft for public review and comment. This plan would include:

- Maps of all infrastructure/fiber assets
- Rough gap analysis in infrastructure assets
- Technologies available to fill infrastructure gaps
- High level cost estimates to inform business model
- Draft business model of middle mile network; CNL deployment
- Revenue and grant considerations
- Expenses of the program

## 5. Board Engagement

Finally, after member county engagement, presentation of high-level Blueprint Plans and public engagement, the Blueprint Plan will be presented to the SCEDD Board in draft and final formats for final review and approval.

Criteria	Weight
Distance to known Fiber	0.5
Unserved and Underserved Addresses	4
Median Income by Census Tract	2
Density	1
Unserved and Underserved Anchor Institutions	1
Ability to partner with last mile ISP	0.5

Community	County	Total Addresses	Distance to known Fiber Score	Unserved and Underserved Addresses Score	Median Income Score	Density Score	Unserved and Underserved Anchor Institutions Score	Ability to partner with last mile ISP Score	Community Total Score
Hasty	Bent	225	0.05	4.00	1.52	0.01	0.67	0.5	6.7
Westcliffe	Custer	981	0.50	3.93	0.86	0.03	0.67	0.5	6.5
Sugar City	Crowley	391	0.01	4.00	1.54	0.01	0.67	0.5	6.7
Silver Cliff	Custer	964	0.49	3.93	0.86	0.02	0.67	0.5	6.5
Two Buttes	Baca	111	0.05	4.00	1.48	0.00	0.67	0.5	6.7
Weston	Las Animas	186	0.17	4.00	1.16	0.00	0.67	0.5	6.5
Gardner	Huerfano	150	0.19	4.00	0.56	0.00	1.00	0.5	6.3
Segundo	Las Animas	286	0.04	4.00	1.16	0.01	0.67	0.5	6.4
Coaldale	Fremont	284	0.41	3.45	0.88	0.01	1.00	0.5	6.2
Boone	Pueblo	424	0.00	3.52	1.88	0.01	0.67	0.5	6.6
Cotopaxi	Fremont	197	0.49	3.33	0.88	0.01	1.00	0.5	6.2
Branson	Las Animas	62	0.00	4.00	0.59	0.00	1.00	0.5	6.1
Stonewall	Las Animas	222	0.30	4.00	1.16	0.01	0.33	0.5	6.3
Gulnare	Las Animas	198	0.09	4.00	2.00	0.01	0.00	0.5	6.6
Haswell	Kiowa	88	0.42	3.77	1.30	0.00	0.33	0.5	6.3
Howard	Fremont	601	0.25	3.82	0.88	0.02	0.67	0.5	6.1
Caddoa	Bent	159	0.00	3.97	1.52	0.00	0.33	0.5	6.3
Towner	Kiowa	96	0.09	4.00	1.30	0.00	0.33	0.5	6.2
Hartman	Prowers	178	0.00	3.91	1.56	0.00	0.33	0.5	6.3
Hillside	Fremont	228	0.48	3.86	0.86	0.01	0.33	0.5	6.0
Ludlow	Las Animas	149	0.00	3.92	2.00	0.00	0.00	0.5	6.4
Boncarbo	Las Animas	209	0.06	4.00	1.16	0.01	0.33	0.5	6.1
Valdez	Las Animas	323	0.00	3.98	1.16	0.01	0.33	0.5	6.0
Greenwood	Custer	203	0.25	3.98	0.24	0.01	0.67	0.5	5.6
Vigil	Las Animas	182	0.30	4.00	1.16	0.00	0.00	0.5	6.0
Rosita	Custer	828	0.49	4.00	0.24	0.02	0.33	0.5	5.6
Cokedale	Las Animas	341	0.00	3.91	1.16	0.01	0.33	0.5	5.9
Texas Creek	Fremont	78	0.35	3.95	0.88	0.00	0.00	0.5	5.7
Hoehne	Las Animas	326	0.00	3.47	0.59	0.01	1.00	0.5	5.6

Criteria	Weight
Distance to known Fiber	0.5
Unserved and Underserved Addresses	4
Median Income by Census Tract	2
Density	1
Unserved and Underserved Anchor Institutions	1
Ability to partner with last mile ISP	0.5

Community	County	Total Addresses	Distance to known Fiber Score	Unserved and Underserved Addresses Score	Median Income Score	Density Score	Unserved and Underserved Anchor Institutions Score	Ability to partner with last mile ISP Score	Community Total Score
Bristol	Prowers	250	0.00	3.28	1.36	0.01	0.33	0.5	5.5
Crowley	Crowley	504	0.00	3.34	1.78	0.01	0.00	0.5	5.6
Stonington	Baca	84	0.00	3.48	1.48	0.00	0.00	0.5	5.5
Granite	Chaffee	111	0.00	4.00	0.60	0.00	0.00	0.5	5.1
Twin Lakes	Lake	330	0.10	4.00	0.42	0.01	0.00	0.5	5.0
Wetmore	Custer	220	0.19	3.18	0.24	0.01	0.67	0.5	4.8
Nathrop	Chaffee	548	0.00	2.85	0.96	0.01	0.67	0.5	5.0
McClave	Bent	195	0.00	3.16	1.52	0.00	0.00	0.5	5.2
Garfield	Chaffee	89	0.08	4.00	0.00	0.00	0.00	0.5	4.6
Hawley	Otero	293	0.00	3.04	1.37	0.01	0.00	0.5	4.9
Maysville	Chaffee	246	0.06	3.82	0.00	0.01	0.00	0.5	4.4
Olney Springs	Crowley	405	0.00	2.82	1.54	0.01	0.00	0.5	4.9
Vilas	Baca	169	0.00	2.67	1.67	0.00	0.00	0.5	4.9
Granada	Prowers	399	0.00	2.41	1.36	0.01	0.33	0.5	4.6
Sheridan Lake	Kiowa	101	0.00	2.50	1.30	0.00	0.00	0.5	4.3
Ordway	Crowley	942	0.00	1.82	1.78	0.02	0.33	0.5	4.5
Avondale	Pueblo	661	0.00	2.51	0.61	0.02	0.33	0.5	4.0
Campo	Baca	152	0.00	2.21	1.48	0.00	0.00	0.5	4.2
Aguilar	Las Animas	483	0.00	1.76	2.00	0.01	0.00	0.5	4.3
Kim	Las Animas	100	0.00	2.56	0.59	0.00	0.00	0.5	3.7
Lynn	Las Animas	462	0.00	1.65	2.00	0.01	0.00	0.5	4.2
Cuchara	Huerfano	636	0.00	1.94	0.90	0.02	0.33	0.5	3.7
Cheraw	Otero	328	0.00	2.07	0.94	0.01	0.00	0.5	3.5
Wiley	Prowers	491	0.00	2.48	0.11	0.01	0.00	0.5	3.1
La Veta	Huerfano	770	0.00	1.84	0.90	0.02	0.00	0.5	3.3
Manzanola	Otero	498	0.00	1.81	0.94	0.01	0.00	0.5	3.3
Fowler	Otero	977	0.00	0.99	1.45	0.02	0.33	0.5	3.3
Swink	Otero	828	0.00	1.60	0.96	0.02	0.00	0.5	3.1
Walsh	Baca	507	0.00	1.20	1.48	0.01	0.00	0.5	3.2

Criteria	Weight
Distance to known Fiber	0.5
Unserved and Underserved Addresses	4
Median Income by Census Tract	2
Density	1
Unserved and Underserved Anchor Institutions	1
Ability to partner with last mile ISP	0.5

Community	County	Total Addresses	Distance to known Fiber Score	Unserved and Underserved Addresses Score	Median Income Score	Density Score	Unserved and Underserved Anchor Institutions Score	Ability to partner with last mile ISP Score	Community Total Score
Pritchett	Baca	213	0.00	0.98	1.48	0.01	0.00	0.5	3.0
Holly	Prowers	606	0.00	0.81	1.56	0.02	0.00	0.5	2.9
Beulah	Pueblo	689	0.18	1.43	0.25	0.02	0.00	0.5	2.4
Trinidad	Las Animas	4756	0.00	0.30	2.00	0.12	0.00	0.5	2.9
Las Animas	Bent	1649	0.00	0.66	1.52	0.04	0.00	0.5	2.7
Walsenburg	Huerfano	1927	0.00	0.39	1.82	0.05	0.00	0.5	2.8
Vineland	Pueblo	2579	0.00	0.80	0.61	0.07	0.33	0.5	2.3
Rocky Ford	Otero	2619	0.00	0.60	1.37	0.07	0.00	0.5	2.5
Buena Vista	Chaffee	3346	0.00	0.78	0.96	0.09	0.00	0.5	2.3
Springfield	Baca	1162	0.00	0.39	1.67	0.03	0.00	0.5	2.6
Cedarwood	Pueblo	51	0.12	1.18	0.25	0.00	0.00	0.5	2.0
Poncha Springs	Chaffee	1865	0.00	1.40	0.00	0.05	0.00	0.5	1.9
Pueblo	Pueblo	39175	0.00	0.13	0.36	1.00	0.00	0.5	2.0
Lamar	Prowers	3941	0.00	0.38	1.36	0.10	0.00	0.5	2.3
La Junta Gardens	Otero	4096	0.00	0.29	0.94	0.10	0.33	0.5	2.2
North La Junta	Otero	4004	0.00	0.28	0.94	0.10	0.33	0.5	2.2
Johnson Village	Chaffee	2612	0.00	0.62	0.96	0.07	0.00	0.5	2.1
Starkville	Las Animas	2570	0.00	0.44	1.16	0.07	0.00	0.5	2.2
El Moro	Las Animas	1709	0.00	0.80	0.59	0.04	0.00	0.5	1.9
Jansen	Las Animas	4714	0.00	0.33	1.16	0.12	0.00	0.5	2.1
Salt Creek	Pueblo	28256	0.00	0.13	0.36	0.72	0.00	0.5	1.7
Eads	Kiowa	610	0.00	0.16	1.30	0.02	0.00	0.5	2.0
Leadville	Lake	3284	0.00	0.32	0.42	0.08	0.33	0.5	1.7
La Junta	Otero	4016	0.00	0.29	0.96	0.10	0.00	0.5	1.8
Blende	Pueblo	23028	0.00	0.17	0.36	0.59	0.00	0.5	1.6
Salida	Chaffee	4439	0.00	0.81	0.00	0.11	0.00	0.5	1.4
Coal Creek	Fremont	2873	0.04	0.07	0.89	0.07	0.00	0.5	1.6
Williamsburg	Fremont	3200	0.01	0.09	0.89	0.08	0.00	0.5	1.6
Rockvale	Fremont	3004	0.02	0.08	0.89	0.08	0.00	0.5	1.6

Criteria	Weight
Distance to known Fiber	0.5
Unserved and Underserved Addresses	4
Median Income by Census Tract	2
Density	1
Unserved and Underserved Anchor Institutions	1
Ability to partner with last mile ISP	0.5

Community	County	Total Addresses	Distance to known Fiber Score	Unserved and Underserved Addresses Score	Median Income Score	Density Score	Unserved and Underserved Anchor Institutions Score	Ability to partner with last mile ISP Score	Community Total Score
Florence	Fremont	2922	0.00	0.08	0.89	0.07	0.00	0.5	1.5
Colorado City	Pueblo	1238	0.00	0.39	0.25	0.03	0.00	0.5	1.2
Greenhorn	Pueblo	1061	0.00	0.37	0.25	0.03	0.00	0.5	1.1
Rye	Pueblo	1306	0.03	0.34	0.25	0.03	0.00	0.5	1.1
Pueblo West	Pueblo	8984	0.00	0.89	-1.15	0.23	0.00	0.5	0.5
Penrose	Fremont	1841	0.00	0.10	-0.01	0.05	0.00	0.5	0.6
Portland	Fremont	1630	0.00	0.09	-0.01	0.04	0.00	0.5	0.6
Lincoln Park	Fremont	10495	0.00	0.10	-0.42	0.27	0.00	0.5	0.4
Cañon City	Fremont	10497	0.00	0.10	-0.42	0.27	0.00	0.5	0.4
Prospect Heights	Fremont	10242	0.00	0.10	-0.42	0.26	0.00	0.5	0.4
Brookside	Fremont	9556	0.00	0.09	-0.42	0.24	0.00	0.5	0.4

# Appendix C - Proposed Middle Mile Fiber Route Information and Multiple Criteria Decision Analysis (MCDA) Scores

Criteria	Weight
Unserved addresses within 3 miles of route	3
Underserved addresses within 3 miles of route	2
Cost	1
Unserved and Underserved BSLs per route mile	1
Percentage of route within Tier 1 County	3

Route Identificaiton Number	Route Description	County (s)	Count of Unserved Addresses Within 3 Miles of Route	Unserved Addresses Score	Count of Underserved Addresses Within 3 Miles of Route	Underserved Addresses Score	Route Length (miles)	Route Length Score	Unserved and Underserved Addresses Per Mile	Linear Density Score	Percent of Route Within Tier 1 County	Tier 1 County Score	Total Route Score
1	La Veta to Gardner	Huerfano	240	0.60	519	0.83	26.6	0.67	28	0.41	100%	3.00	5.51
2	Silver Cliff to Gardner	Custer, Huerfano	204	0.51	1188	1.91	33.1	0.56	42	0.60	100%	3.00	6.58
3	Florence to Rosita	Fremont, Custer	512	1.28	1244	2.00	40.7	0.44	43	0.61	67%	2.02	6.36
4	Silver Cliff to Hillside	Fremont, Custer	180	0.45	1217	1.96	23.7	0.72	59	0.84	54%	1.62	5.58
5	Cañon City to Texas Creek	Fremont	322	0.81	10	0.02	24.1	0.71	14	0.20	0%	0.00	1.73
6	Salida to Texas Creek	Fremont, Chaffee	468	1.17	1109	1.78	29.7	0.62	53	0.76	0%	0.00	4.33
7	Pueblo to Beulah	Pueblo	274	0.69	205	0.33	18.6	0.80	26	0.37	0%	0.00	2.18
8	Parkdale to West of SH9	Fremont	20	0.05	13	0.02	15.9	0.84	2	0.03	0%	0.00	0.95
9	Eads to Haswell	Kiowa	44	0.11	90	0.14	21.7	0.75	6	0.09	0%	0.00	1.09
10	Sheridan Lake to Towner	Kiowa	98	0.25	9	0.01	7.6	0.98	14	0.20	0%	0.00	1.44
11	Granada to Bristol and Hartman	Prowers	44	0.11	445	0.72	14.5	0.87	34	0.48	0%	0.00	2.18
12	McClave to Las Animas	Bent	92	0.23	460	0.74	17.6	0.82	31	0.45	100%	3.00	5.23
13	Ordway to Cheraw	Otero, Crowley	43	0.11	742	1.19	21.7	0.75	36	0.52	100%	3.00	5.57
14	Two Buttes	Васа	45	0.11	117	0.19	18.2	0.81	9	0.13	100%	3.00	4.24
15	Elmoro to Hoehne	Las Animas	33	0.08	255	0.41	6.7	1.00	43	0.62	100%	3.00	5.11
16	Hoehne to Kim	Las Animas	52	0.13	49	0.08	46.8	0.34	2	0.03	100%	3.00	3.58
17	HWY 160 to Branson	Las Animas	75	0.19	0	0.00	10.4	0.93	7	0.10	100%	3.00	4.22
18	La Junta to Kim	Las Animas, Otero, Bent	118	0.30	81	0.13	49.4	0.30	4	0.06	100%	3.00	3.78
19	La Junta to Hoehne	Las Animas, Otero	246	0.62	363	0.58	67.5	0.00	9	0.13	100%	3.00	4.33
20	Cokedale to Aguilar	Las Animas	541	1.36	315	0.51	28.7	0.64	30	0.43	100%	3.00	5.92
21	Cokedale to Cuchara	Las Animas, Huerfano	1197	3.00	145	0.23	41.8	0.42	32	0.46	100%	3.00	7.11
22	HWY 24 to Twin Lakes	Lake	54	0.14	396	0.64	6.4	1.00	70	1.00	0%	0.00	2.77
23	Poncha Springs to Garfield	Chaffee	210	0.53	523	0.84	12.7	0.90	58	0.82	0%	0.00	3.09

#### Appendix D - Middle Mile Cost Estimates and Scores

Route Number	Score	Route Description	County (s)	Route Length (miles)	Route Length (feet)	Cost to Build (\$)	Average Number of Poles	Cost for Pole Lease (10 year term)	Total Cost (Build plus Pole Lease)	Tier I Local Match Requirement	Potential Annual Income - Dark Fiber Lease	One Time Revenue (set up fee)
1	5.51	La Veta to Gardner	Huerfano	26.64	140,685	\$3,664,560	469	\$81,091	\$3,745,651	\$936,413	\$15,987	\$2,100
2	6.58	Silver Cliff to Gardner	Custer Huerfano	33.09	174,726	\$4,551,260	582	\$100,712	\$4,651,973	\$1,162,993	\$19,855	\$2,100
3	6.36	Florence to Rosita	Fremont Custer	40.74	215,127	\$5,603,638	717	\$123,999	\$5,727,637	\$1,431,909	\$24,446	\$2,100
4	5.58	Silver Cliff to Hillside	Fremont Custer	23.71	125,204	\$3,261,307	417	\$72,167	\$3,333,475	\$833,369	\$14,228	\$2,100
5	1.73	Cañon City to Texas Creek	Fremont	24.06	127,030	\$3,308,881	423	\$73,220	\$3,382,101	\$845,525	\$14,435	\$2,100
6	4.33	Salida to Texas Creek	Fremont Chaffee	29.68	156,730	\$4,082,508	522	\$90,339	\$4,172,848	\$1,043,212	\$17,810	\$2,100
7	2.18	Pueblo to Beulah	Pueblo	18.64	98,414	\$2,563,479	328	\$56,726	\$2,620,205	\$655,051	\$11,183	\$2,100
8	0.95	Parkdale to West of SH9	Fremont	15.88	83,863	\$2,184,461	280	\$48,339	\$2,232,799	\$558,200	\$9,530	\$2,100
9	1.09	Eads to Haswell	Kiowa	21.70	114,576	\$2,984,488	382	\$66,042	\$3,050,530	\$762,633	\$13,020	\$2,100
10	1.44	Sheridan Lake to Towner	Kiowa	7.58	40,016	\$1,042,340	133	\$23,065	\$1,065,406	\$266,351	\$4,547	\$2,100
11	2.18	Granada to Bristol and Hartman	Prowers	14.49	76,495	\$1,992,548	255	\$44,092	\$2,036,640	\$509,160	\$8,693	\$2,100
12	5.23	McClave to Las Animas	Bent	17.64	93,159	\$2,426,602	311	\$53,697	\$2,480,299	\$620,075	\$10,586	\$2,100
13	5.57	Ordway to Cheraw	Otero Crowley	21.72	114,702	\$2,987,757	382	\$66,114	\$3,053,871	\$763,468	\$13,034	\$2,100
14	4.24	Two Buttes	Васа	18.21	96,162	\$2,504,817	321	\$55,428	\$2,560,244	\$640,061	\$10,927	\$2,100
15	5.11	Elmoro to Hoehne	Las Animas	6.66	35,171	\$916,145	117	\$20,273	\$936,418	\$234,104	\$3,997	\$2,100
16	3.58	Hoehne to Kim	Las Animas	46.82	247,222	\$6,439,628	824	\$142,499	\$6,582,127	\$1,645,532	\$28,093	\$2,100
17	4.22	HWY 160 to Branson	Las Animas	10.44	55,137	\$1,436,201	184	\$31,781	\$1,467,982	\$366,996	\$6,266	\$2,100
18	3.78	La Junta to Kim	Las Animas Otero Bent	49.39	260,759	\$6,792,256	869	\$150,302	\$6,942,558	\$1,735,639	\$29,632	\$2,100
19	4.33	La Junta to Hoehne	Las Animas Otero	67.52	356,505	\$9,286,247	1,188	\$205,490	\$9,491,737	\$2,372,934	\$40,512	\$2,100
20	5.92	Cokedale to Aguilar	Las Animas	28.69	151,499	\$3,946,236	505	\$87,324	\$4,033,560	\$1,008,390	\$17,216	\$2,100
21	7.11	Cokedale to Cuchara	Las Animas Huerfano	41.76	220,475	\$5,742,931	735	\$127,082	\$5,870,012	\$1,467,503	\$25,054	\$2,100
22	2.77	HWY 24 to Twin Lakes	Lake	6.42	33,885	\$882,646	113	\$19,532	\$902,178	\$225,544	\$3,851	\$2,100
23	3.09	Poncha Springs to Garfield	Chaffee	12.72	67,155	\$1,749,253	224	\$38,708	\$1,787,961	\$446,990	\$7,631	\$2,100
		Totals		584	3,084,697	\$80,350,192	10,282	\$1,778,019	\$82,128,211	\$20,532,053	\$350,534	\$48,300

Average Aerial Construction Cost (inc. make ready):	\$26.05 per foot
Pole Lease:	\$17.29 per pole per year
Average Pole Spacing (rural):	300 feet
Pole Lease Term:	10 years
CBO Capital Project Fund (CPF) Tier I Local Match:	25%
Dark Fiber Set Up Fee:	\$2,100
Dark Fiber Lease Rate:	\$125.00 per strand/mile per month (2 strand min.); 5-year term
Lease Term:	5 years

## E. Glossary of Terms

The following definitions, terms, and abbreviations are applicable to this blueprint report.

#### **Broadband Industry and Technology terms:**

**Backhaul** – Principal routes between strategically interconnected access points of the internet, covers long distances such as submarine cables, often made from optical fibers, internet backbone

**Bandwidth** – Historical term for the number of frequencies used to transmit data. These days, bandwidth is used as a term for "speed" and the rate (or amount) of data transferred over time

Bit – most basic unit of digital data, encoded 1s and 0s, "on" and "off"

**Broadband** –Historical term for a faster data transmission technique. These days broadband is synonymous with "high speed internet". Defined by the FCC as 25 Mbps download and 3 Mbps upload. Defined by the Colorado Broadband Office as 100 Mbps download and 20 Mbps upload

**Broadband Serviceable Location** – The NTIA defines a "Broadband Serviceable Location" (BSL) as any business or residential location at which fixed broadband Internet access service is, or can be, installed.

**Dark Fiber** – Unused fiber in a cable or network. The fiber is "dark" because there is no signal on the fiber meaning it is available for lease

<u>Eligible Community Anchor Institution</u> – Community Anchor Institution that lacks access to Gigabit-level broadband service (e.g., schools, fire stations, police stations, hospitals)

<u>Fixed Broadband Technologies</u> – Categories of fixed broadband technologies that deliver broadband service to a serviceable location:

- Copper Broadband service delivered over copper wireline including DSL, ADSL, VDSL, xDSL, etc.
- 2) **Cable –** Broadband service provided over coaxial cable wireline.
- 3) **Coax** Coaxial cable, shielded copper conductor used to transmit high frequency electrical signals
- 4) **Fiber** Broadband service offered to the end user with optical wireline equipment.
- 5) Unlicensed Wireless Broadband service delivered over unlicensed wireless frequencies, meaning any provider can use the spectrum if they comply with FCC regulations. Unlicensed frequencies relevant to modern speed requirements include channels in the 2.4 GHz, 5 GHz, 6 GHz, and 60 GHz frequency range.
- Licensed Wireless Broadband service provided by radio frequencies that are allocated by the FCC and NTIA for auction and exclusive use by the licensed carrier (Verizon, T-Mobile, AT&T, Dish Wireless, etc.) These technologies are sometimes referred to as LTE, 2G, 3G, 4G, 5G.

- 7) Geostationary Satellite (GSO) Broadband service provided from satellites in a geostationary orbit. GSO broadband is the traditional service offered from satellites beginning with communications and television covered dating back to 1960s.
- 8) Non-Geostationary Satellite Broadband service provided from satellites orbiting much closer to the Earth than GSO satellites, and therefore capable of providing broadband services at a much lower latency and higher bandwidth than previously available via GSO service.

**Fixed Broadband Service** – Any broadband service offered to a location that does not physically move. This includes DSL, Cable, Fiber, Licensed Wireless, Unlicensed Wireless, and Satellite services. Fixed broadband is defined as a category in comparison to *mobile broadband service* offered to mobile phones.

**<u>FTTH</u>** - **F**iber **To T**he **H**ome.

**<u>FTTP</u>** – **F**iber **To T**he **P**remise.

**<u>FTTx</u>** - Fiber To The X ("anything").

Gbps - Gigabit per second (Gbps), (1,000 Mbps)

<u>GIS</u> – Geographic Information system. Software that combines maps and databases to manage, analyze, and visualize data. Many different programs offer GIS functionality, common software is ESRI's "ArcGIS", such as ArcMap or ArcPro

**Latency** – Time taken for source-to-destination data transfer.

Mbps – Megabit per second (Mbps), one million bits per second.

<u>Middle Mile Infrastructure</u> – Any broadband infrastructure that does not connect directly to an end-user. This includes leased dark fiber, backhaul, carrier-neutral internet exchange facilities, transport connectivity to data centers, and wired or private wireless broadband infrastructure, including microwave capacity, radio tower access, and other services or infrastructure for a private wireless broadband network, such as towers, fiber, and microwave links.

<u>Municipal Fiber</u> – Publicly owned Internet Service Provider classified as a utility, fully accountable to voters, "future proofed" with easily scalable bandwidth.

**National Broadband Map** - The national broadband map<sup>2</sup> shows all broadband service offerings to all BSLs in the United States. This is the map replaced the previous form 477 broadband data collection method. Using the fabric dataset, the National Telecommunication and Information Administration (NTIA) will apportion federal dollars to the states and the CBO will award grants to agencies using this data.

<sup>&</sup>lt;sup>2</sup> <u>https://broadbandmap.fcc.gov/home</u>

<u>Open Access</u>— The term "open access" refers to an arrangement in which nondiscriminatory access to and use a network on a wholesale basis to other providers seeking to provide broadband service to end-user locations.

<u>**Optical Fiber**</u> – Typically made from glass (silica/quartz) approximately same size as a strand of hair: 0.002'' - 0.005'' (50 – 125 µm).

**<u>Reliable Broadband Service</u>** – The NTIA defines "Reliable Broadband Service" as a broadband service shown available to a serviceable location on the National Broadband Map.

**<u>ROW</u>** – (Right-of-way) A strip of land used to construct, operate, maintain and repair transmission line utilities. Right of way is the legal right to pass along a specific route through property belonging to another.

<u>Terrestrial Broadband</u> – Terrestrial broadband is any fixed wireless or wireline (cable or fiber) broadband service offered to a serviceable location. This term is in comparison to satellite broadband technologies.

<u>Wireline Broadband</u> – Wireline broadband is any service delivered to a serviceable location over a wire or cable. This includes copper wires, coaxial cables, and optical fiber cables.

#### **Grants, Organizations and Regulations**

<u>Affordable Connectivity Program (ACP)</u> – The Affordable Connectivity Program is an FCC monthly benefit program that helps ensure households can afford the broadband they need for work, school, healthcare, etc. The stipend provides up to \$30 per month for eligible households or \$75 per month on qualifying Tribal lands.

**Broadband Equity, Access, and Deployment (BEAD)** - The Broadband Equity, Access, and Deployment Program, provides \$42.45 billion to expand high-speed internet access by funding planning, infrastructure deployment and adoption programs in all 50 states.

**Colorado Broadband Office (CBO)** – The Colorado Broadband Office<sup>3</sup> is part of the Governor's Office of Information Technology (OIT) and is charged with overseeing and coordinating broadband activity across state agencies. The agency has developed a five-year strategic plan outlining how Colorado will invest \$500 to \$700 million to connect 99% of households to high-speed broadband.

**Colorado Senate Bill 152** - In 2005, the Colorado General Assembly passed Senate Bill 05-152, which excludes local governments from entering the broadband market and prohibits most uses of municipal or county money for infrastructure to improve local broadband service without voter permission. This took away local governments' ability to compete with the private sector within the broadband marketplace. More than 100 municipalities have opted out of this restriction as of 2022 through local ballot initiatives.

<u>Colorado Senate Bill 22-083</u> – Signed into law in 2022, Senate Bill 22-083 required CDOT to develop an electronic application, permitting, contract, and fee structure to facilitate access by

<sup>&</sup>lt;sup>3</sup> <u>https://broadband.colorado.gov/</u>

nongovernmental entities to public rights-of-way for the deployment of broadband and requires acceptances and denials of such access by CDOT to be provided in writing and made available to the public.

**Department of Local Affairs (DOLA)** – The Department of Local Affairs<sup>4</sup> earmarks \$5 million each year to assist local government efforts to enhance broadband access. The majority of grant funding is directed to smaller and more rural communities where sufficient broadband service is lacking.

**Infrastructure Investment and Jobs Act (IIJA)** – The Infrastructure Investment and Jobs Act<sup>5</sup> was signed into law by President Biden on November 15, 2021. The law authorizes \$1.2 trillion for transportation and infrastructure spending with \$550 billion of that figure going toward new investments and programs.

**National Telecommunications and Information Administration (NTIA)** - The NTIA<sup>6</sup> is the Executive Branch agency that is principally responsible for advising the President on telecommunications and information policy issues.

<u>USDA Reconnect Program</u> - The ReConnect Program<sup>7</sup> offers federal loans, grants, and combinations thereof to facilitate broadband deployment in rural areas. ReConnect loans and grants provide funds for the costs of construction, improvement, or acquisition of facilities and equipment needed to provide broadband service to rural areas without sufficient broadband access.

<sup>&</sup>lt;sup>4</sup> <u>https://cdola.colorado.gov/funding-programs/broadband-program</u>

<sup>&</sup>lt;sup>5</sup> <u>https://www.gfoa.org/the-infrastructure-investment-and-jobs-act-iija-was</u>

<sup>6</sup> https://www.ntia.doc.gov/

<sup>7</sup> https://www.usda.gov/reconnect

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