Broadband Master Plan

Prepared for the Placerville City Council

October 2021

– Prepared By –

ENTRY POINT NETWORKS

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Executive Summary

In addition to lowering costs and delivering significant improvements in network speeds, additional objectives for the network include positively impacting economic development, livability, public safety, education, healthcare, emergency communications, smart grid, efficient government services, universal access, environmental stewardship, and smart city initiatives.

Placerville's PEAC Broadband Subcommittee has worked with EntryPoint Networks to develop this Broadband Master Plan to assist with a planning and decision-making process as the Placerville Mayor and City Council determine whether it is feasible to deploy and operate broadband infrastructure for the residents, businesses, and anchor institutions within City limits. The information in this report will be used to assist in the planning and evaluation of feasibility for implementation of a network that seeks to lower broadband costs and increase network value for all stakeholders in Placerville. Additionally, this report is designed to assist City leaders in understanding the operational implications, important risk factors, and a realistic cost framework for developing and operating City owned fiber optic infrastructure.

The Broadband Master Plan is a living document that will define the strategies the City will follow, provide needed financial analysis for the evaluation, and establish the planning groundwork needed to be eligible for state and federal grant and loan opportunities. If the Mayor and City Council determine that the project has sufficient merit, the planning process will continue toward a formal process for selecting Engineering, Construction, and Network Management Tools. The recommended next steps are covered at the end of this document in the final section titled Next Steps.

The primary strategic priorities identified by City Leaders for this analysis include lowering costs, improving network speed and reliability, increasing competition, fostering economic development, and fixing the coverage gaps that exist in the City. City leaders also have an interest in the potential for this infrastructure to support emerging smart city applications.

This report seeks to provide the data needed for City leaders to thoughtfully plan and implement a communications infrastructure strategy that will benefit residents, businesses, and anchor institutions for years to come. City leaders will be able to use this document to lay the groundwork to address the challenges of a project of this size and scope. The key focus of the report is on the following primary activities:

1) Network Design & Architecture
2) Current Market Analysis
3) Business Model and Financing
4) Cost Analysis for Construction
5) Cost Analysis for Network Operations
6) Customer Acquisition
7) Risk Management

Key Findings – Placerville Broadband Plan

- Data collected from existing invoices shows that Xfinity/Comcast's standard residential billing for a 200/10 Mbps package is $94.00 in Placerville. AT&T's standard billing for a 18/2 Mbps package is $72.00. Comcast's Business advertised pricing is $109.99 for a 200/10 package. AT&T's Business advertised pricing is $60.00 for a 6/.5 package.
- According to mLAB data for El Dorado County, Xfinity/Comcast's average speed = 93.33 Mbps download / 7.8 Mbps upload. AT&T's average speed = 1.29 Mbps download / 0.38 Mbps upload.
- There is little to no fiber deployed to the premise within Placerville City limits.
- The network architecture for both Comcast and AT&T is a shared architecture. This typically means that at least 32 or 64 homes are sharing a connection, and this can negatively affect network reliability.
- Shared architectures will become a greater reliability problem as bandwidth consumption grows with 8K video, telepresence applications, and virtual reality applications.
- Coaxial cable displaced DSL because it offers greater speed and bandwidth. Fiber will likewise displace cable over time. If the City does not move forward with its Fiber-to-the-Home project, a fiber overbuilder will come in at some point. This will lead to lower pricing in the short term but will trend toward monopoly control and higher pricing over the long term unless the infrastructure is operated as an Open Access network.
- The City had 338 individuals respond to its broadband survey on the ConnectPlacerville.com website. This is not a statistically predictive sample size.
- Of those who responded, 75.44% said they would support a City initiative to deploy fiber if the City network lowered costs and increased speeds. Additionally, 23.37% said they would possibly support a municipal network, but they need more information.
- Like other industries, there is a significant amount of supply chain instability for conduit and other fiber-optic infrastructure materials. This instability is expected to continue for the foreseeable future.
- The City of Placerville had its legal counsel provide a legal memorandum addressing the key issues regarding legal authority for the City to build, own,

and operate municipal fiber optic infrastructure. Key findings from this memo include the following:

- The Public Utilities Code generally empowers a municipal corporation to operate "broadband Internet access services." Specifically, "any municipal corporation may acquire, construct, own, operate, or lease any public utility."
- The City may participate in the financing, owning, and operating of broadband internet infrastructure in various ways, for instance, as a municipal corporation, municipal utility district, or a public utility district.
- Assembly Bill 156 would allow individual property owners to apply for grants to offset the costs of connecting to an existing or proposed facility-based broadband provider.
- The bill also authorizes the California Broadband Office to distribute $2 billion for "last-mile" infrastructure projects that will connect consumers to local networks.

- The projected monthly cost for a 1,000 Mbps (download) x 1,000 Mbps (Upload) Open Access connection which is 100% aerial, with a 60% take-rate is:

Projected Residential Services Monthly Costs	100% Aerial
Infrastructure	$18.22
Maintenance and Operations (M&O)	$26.80
ISP Services (Dedicated 1 GB Symmetrical)	$9.99
Monthly Total	**$55.01**

- The projected monthly cost for a 1,000 Mbps (download) x 1,000 Mbps (Upload) Open Access connection which is 50% aerial and 50% buried, and a 60% take-rate is:

Projected Residential Services Monthly Costs	100% Aerial
Infrastructure	$23.03
Maintenance and Operations (M&O)	$26.80
ISP Services (Dedicated 1 GB Symmetrical)	$9.99
Monthly Total	**$59.82**

Note: In this model, once the infrastructure is paid off, that line item goes away.

Strategy

Careful strategic planning is needed to solve the limitations that are prevalent in the existing broadband market. Strategic planning is as important as feasibility analysis to develop a network that gives consumers what they need today and still adapt to technological change in the future.

Strategic Priorities for a Municipal Fiber Network

The following are strategic priorities established by the Broadband Committee as recommendations to the Mayor and City Council to guide the planning process:

1. **Promote Economic Development:** The City seeks to ensure that City residents and businesses have access to infrastructure that will foster innovation, economic development, and growth.

2. **Improve Affordability**: The City of Placerville seeks to promote policies and initiatives that will reduce the cost of internet access by 20% - 25% initially and as much as 50% once the new infrastructure is paid off.

3. **Improve Network Speed & Reliability**: City leaders seek to promote network attributes that will increase reliability for residents, businesses, and anchor institutions within City limits.

4. **Foster Innovation and Access to New Services:** The City will leverage technology advances and an open business model to encourage innovation and enable new services.

5. **Promote Abundant Bandwidth**: City leaders seek solutions that move from the current practice of treating bandwidth as a scarce resource toward policies and programs which treat bandwidth as an abundant resource. This means that the cost to consumers to use greater bandwidth will reflect actual costs rather than punitive pricing models that exploit bandwidth demand.

6. **Solve the Digital Divide**: The City of Placerville seeks to promote policies and business models that will address existing coverage gaps and make internet access universally available and affordable for all residents in Placerville.

7. **Foster Competition & Choice**: The City seeks to promote initiatives that will increase the number of service providers and types of services that are available to Placerville residents.

8. **Establish Local Control over Essential Infrastructure**: The economy is now an information economy, and the importance of digital infrastructure continues to grow. The City will promote and prioritize initiatives that will give the City ownership and control over this important infrastructure. The City also seeks to design the network in a way that strengthens the City's resources in the event of a natural disaster, public safety event or middle mile disruption.

Network Strategies

To advance its strategic priorities for broadband infrastructure, if the City Council supports going forward with City-owned infrastructure, the City of Placerville will seek to do the following:

Infrastructure Strategy

Treat broadband as essential infrastructure and begin the process of adopting policies which make broadband available and affordable for all City residents.

Treat broadband infrastructure as utility infrastructure. This means it will be operated under a cost recovery model rather than a for-profit model.

Adopt fiber optics as the preferred broadband media of the City because it provides orders of magnitude more capacity, reliability, and it is 50+ year infrastructure.

Business Model Strategy

Adopt policies which include the following Business Model elements:

- Broadband infrastructure is now essential infrastructure and should therefore be owned by the Public in the same way the Public owns other essential Infrastructure like sewer and water.
- Embrace an Open Access Model which allows multiple private sector service providers to compete across public infrastructure. This solves 1) the lack of competition, 2) the subscribers desire for more choices, and 3) has proven to have a meaningful impact on driving costs lower.
- Separate the Costs into the following categories to create transparency for all costs and accelerate competition at the services layer:
    - Infrastructure
    - Maintenance and Operations
    - Services

Finance Strategy

Optimize the risk and reward factors to determine whether the City or the Subscriber will own the debt? This work will be done by collaborating with Bond Counsel and/or the City Attorney.

Consider the following potential legal structures for Financing:

- A Municipal Corporation,
- A Municipal Utility District,
- A Public Utility District,
- Other.

Community Engagement Strategy

The City will use a combination of Professional Marketing experts and Grassroots Engagement to help residents understand what will be offered by the City and how it is different than alternative private programs. The goal will be to communicate to every resident in the City.

Technology Strategy

The City will pursue an Open Access architecture that maximizes flexibility, reliability, and accommodates new services.

Operations Strategy

The ongoing operation of the network must be self-sustaining and not dependent on any kind of subsidy from the City. The City may contribute to get the network started – but any contributions from municipal finances will be paid back over time.

The City has not yet decided whether it will Operate the network with a City department or utilize a 3rd party operator. Analysis is provided in the report to support this decision, but the actual decision will be downstream in the process.

Market Strategy

Incumbent operators will be invited and encouraged to operate their services across this new public infrastructure. The City will not discriminate against any service provider if they follow the code of conduct that will apply to all providers.

SWOT Analysis

The SWOT Analysis included here is not an analysis of current offerings within Placerville. Rather, the analysis considers the Strengths, Weaknesses, Opportunities and Threats related to advancing a municipally sponsored fiber optic network within the City of Placerville.

STRENGTHS	» Early indication of support from subscribers (Demand) » Frustration with current options » Awareness of importance of infrastructure (Pandemic) » Good Middle-Mile Options » Low Interest Rate Environment » 9-month Construction Season » Broad Authority Under California Law » Potential for Financing through California Fund
WEAKNESSES	» Access to poles – aerial » General resistance to change
OPPORTUNITIES	» Reduce costs » Introduce competition » Faster speeds » Increased reliability » Local customer service » Close coverage gaps (Digital Divide) » Economic development » Improved property values
THREATS	» Incumbent opposition » Potential for interest rates to rise » Fear of the unknown » Inertia » Risk Factors (Summarized at end of report)

Infrastructure

Comparison of Available Media

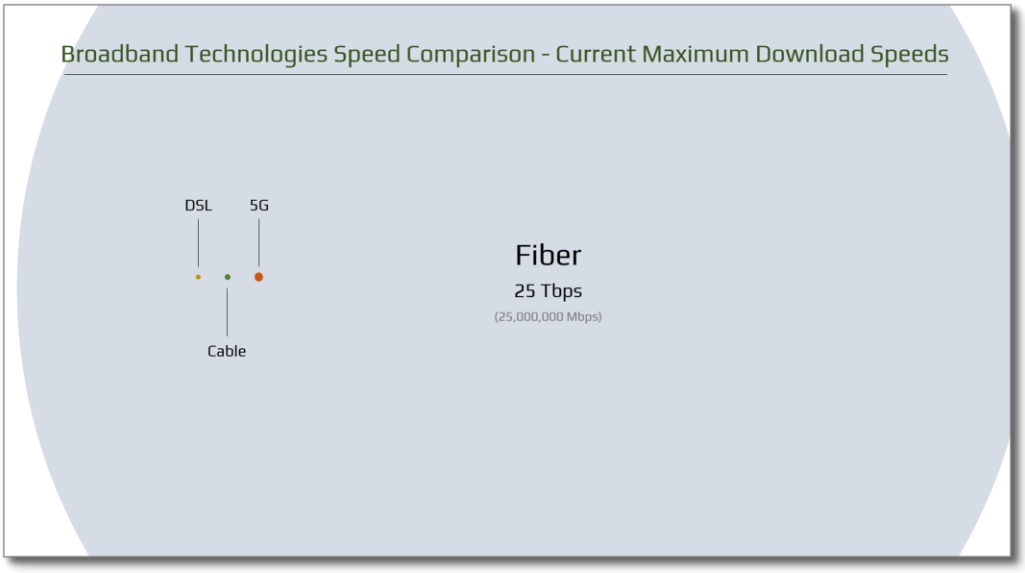
The primary media used for internet access today in the United States includes DSL, Coaxial Cable, Wireless and Fiber Optic cable.

DSL stands for Digital Subscriber Line, and it is one of the technologies used to provide Internet connectivity to homes and businesses. DSL uses existing telephone lines and a transceiver to bring a connection into a home or business and allows the household to use the Internet and make telephone calls at the same time. AT&T is the incumbent telephone company in Placerville and uses DSL technology. DSL is asymmetrical (the download speed is much faster than the upload speed), is typically shared between 32 or 64 homes, and is capable of download speeds up to 100 Mbps. However, most consumers accessing the internet via DSL experience speeds between 5 – 25 Mbps.

Coaxial Cable uses copper cable designed with one physical channel that carries the signal surrounded by a layer of insulation and then another physical channel, both running along the same axis – hence the coaxial name. Coaxial cable is primarily used by cable TV companies to connect transmission facilities to customer homes and businesses to deliver cable TV and internet access. Comcast/Xfinity is the incumbent cable company in the Placerville area. Coaxial Cable is asymmetrical, is typically shared between 32 or 64 homes, and is capable of download speeds up to 940 Mbps. A limitation of coaxial cable is that the signal begins to degrade after 360 feet.

Fiber Optic Cable sends information down strands of glass known as optical fibers which are about the size of a human hair. These fiber optic strands can transmit 25 Tbps today and researchers have successfully demonstrated a transmission experiment over 1045 km with a data-rate of 156 Tbps *(https://phys.org/news/2018-04-fiber transmission.html)*. Fiber-optic cables carry information between two places using optical (light-based) technologies which convert electrical information from the computer into a series of light pulses. Fiber Optic Cable is capable of symmetrical speeds up to 25 Tbps and the signal can travel as far as 60 kilometers without degrading.

Because the difference in capacity between fiber optics and alternative media is so significant, fiber optics should be the foundational media for any new broadband infrastructure project when financially feasible.



Wireless Internet access is made possible via radio waves communicated to a person's home computer, laptop, smartphone, or similar mobile device. Wireless Internet can be accessed directly through providers like AT&T Wireless, Verizon Wireless, T-Mobile or by a Wireless Internet Service provider (WISP).

5G is the 5th generation of technology used in cellular networks and refers to a standard for speed and connection. Because of the extensive marketing around the emergence of 5G, many people wonder whether 5G will replace fiber optic cables. In fact, 5G depends on fiber optic infrastructure. All wireless technologies work better the faster they get back to fiber optics. The graphic above is not to scale (fiber has much greater capacity than the illustration represents) but this illustrates the magnitude of the difference between the different media types. Cellular networks can be symmetrical or asymmetrical and are sometimes capable of download speeds up to 2,000 Mbps.

Satellite internet is a wireless internet connection that is available virtually everywhere in the country. While it is relatively slow in comparison to cable or fiber optic connections, satellite internet access is faster than some DSL options but slower than cable and fiber optic infrastructure. This makes it a good choice for rural premises, which is as much as 10% - 20% of U.S. premises.

Satellite internet does require special equipment, including a satellite dish that connects to a communication satellite in space.

Satellite internet speeds range from 1 Mbps – 100 Mbps for download speeds and it is common to have latency and packet loss issues because the signal has to travel to space and back. Satellite internet providers include HughesNet, Viasat, and Starlin.

Wi-Fi is common in homes and commercial buildings and is a way to deliver a network connection from a network hub over a wired connection to wireless devices via a wireless access point. Most people access the internet over a wireless connection, but it is important to remember that wireless connectivity ultimately depends on a wired connection and wireless access works best the faster it gets back to a wire.

Impact of Bandwidth on Applications

Length & Type of Media	Approx Size	10 Mbps	20 Mbps	100 Mbps	1,000 Mbps
4-Minute Song	4 MB	3 sec	1.5 sec	0.3 sec	0.03 sec
5-Minute Song	30 MB	26 sec	13 sec	2.5 sec	0.2 sec
9-Hour Audio Book	110 MB	1.5 min	46 sec	9.2 sec	0.9 sec
45-Minute TV Show	200 MB	3 min	1.5 min	16 sec	1.7 sec
45-Minute HDTV Show	600 MB	8.5 min	4 min	50 sec	5 sec
2-Hour Movie	1.0-1.5 GB	21.5 min	10.5 min	1.5 min	8 sec
2-Hour HD Movie	3.0-4.5 GB	60 min	32 min	4.5 min	25 sec
Large Archive File	10 GB	Too Long	Slow	Better	80 sec

Upload vs Download Speeds

In addition to the fact that fiber optic cable will offer exponentially greater bandwidth than DSL and coaxial cable, fiber optic cable also offers the ability to deliver symmetrical speeds. In an asymmetrical connection, the download speeds are much faster than upload speeds.

Upload speed is the amount of data a person can ***send*** in one second and download speed is the amount of data a person can ***receive*** in one second. Upload speeds can be especially important for businesses, including home-based businesses or people who work from home. Applications that depend on good upload speeds include sending large files, cloud applications like Google Docs and Dropbox, VoIP, FaceTime, Skype, hard drive backups and In-house web hosting.

Transmission Distance

As described above, an additional benefit of fiber optic infrastructure is that a communication signal sent over fiber starts to degrade after 45 miles while a signal sent over coaxial cable starts to degrade after 360 feet.

Assessment of Existing Broadband Infrastructure

Deloitte.

"The United States requires between $130 and $150 billion over the next 5–7 years to adequately support broadband competition, rural coverage and wireless densification."

"The primary finding of the Deloitte report is that legacy infrastructure needs to be replaced with Fiber Optic cable in the near-term to meet bandwidth demands."

A 2017 Deloitte Consulting analysis summarizes the current needs and realities for legacy broadband infrastructure in the United States this way:

"The United States requires between $130 and $150 billion over the next 5–7 years to adequately support broadband competition, rural coverage and wireless densification.

Despite the demand and potential economic benefits of fiber deployment, the United States lacks the fiber density in access networks to make the bandwidth advancements necessary to improve the pace of innovation and economic growth.

Some wireline carriers are reluctant or unable to invest in fiber for the consumer segment despite the potential benefits. Expected wireline capital expenditures range between 14–18 percent of revenue. Wireline operating expenditures can be 80 percent of revenue. Fiber deployment in access networks is only justified today if a short payback period can be guaranteed, a new footprint is being built, repairs from rebuilding after a storm or other event justifies replacement, or in subsidized geographies where Universal Service funds can be used. The largest US wireline carriers spend, on average, five to six times more on operating expenses than capital expenditures. Excessive operating expenditures caused, in part, by legacy network technology restrict carriers' ability to leverage digital technology advancements. Worse, as legacy networks continue to descale, the percentage of fixed costs overwhelms the cost structure leading to even greater margin pressure."

Citation: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-5GReady-the-need-for-deep-fiber-pov.pdf

The Deloitte report is not specific to infrastructure in Placerville but the conclusions from the Deloitte report are generally applicable. Telco and Cable operators in U.S. cities often have fiber to an aggregation point and then legacy infrastructure from the aggregation point to the premise.

The primary finding of the Deloitte report is that legacy infrastructure needs to be replaced with Fiber Optic cable in the near-term to meet bandwidth demands. There is no indication that incumbents intend to replace legacy infrastructure with Fiber Optic infrastructure in the near term and even if they did, this upgrade would solve the base infrastructure problem, but it would not solve for the lack of competition or premium pricing for Gig speeds.

Legacy copper and coaxial infrastructure will need to be replaced with state-of-the-art infrastructure to meet the ever-growing demands for greater bandwidth and faster speeds. An important question is whether unique value can be derived by having the City and its residents own and control this infrastructure or whether private companies should continue to own and operate all communications infrastructure.

Ideal infrastructure includes more than just the fiber optic cables running throughout the City. Important infrastructure considerations include the electronics at both ends of the fiber as well as systems that manage and control the network. As the City deploys its infrastructure, the following are important considerations that should guide decision making:

- Capacity & Speed: The demand for bandwidth and speed will continue to grow.

- Emerging Services and Applications: Connected vehicles, 8K video, edge computing, and virtual reality are all examples of emerging applications that have infrastructure dependencies (Edge computing is a distributed computing model that brings computation and data storage closer to the sources of data to improve response times and save bandwidth). An important consideration is how flexible the business model and technology systems are to enable whatever may come.

- Privacy & Security: Subscribers are becoming increasingly sensitive to security, privacy, and confidentiality controls.

California Legislation

A recent article summarizing the 2021 California Broadband legislation underscored the importance of the legislation, stating that "large national private ISPs will forgo 21st-century fiber infrastructure in as many places they can to pad their short-term profits. Government subsidies to build in different areas do not change this behavior. The future of broadband access depends on the placement of fiber optic wires. Fiber is an investment in long-term value over short-term profits. Fiber optics [provides] future-proof infrastructure [and] no other transmission medium for broadband even comes close, which makes its deployment essential for a long-term solution."

An important thesis of this article is that local communities need to understand what is available to them and take action. The large national incumbents will "try to take advantage of this program by making offers that sound nice. But they will leverage existing legacy infrastructure that is rapidly approaching obsolescence. While they may be able to offer connectivity that's "good enough for today" at a cheaper price than delivering fiber, there is no future in those older connections. It's clear that higher uploads are becoming the norm, and at ever-increasing speeds. **As California's tech sector begins to embrace distributed work, only communities with 21st-century fiber broadband access will be viable places for those workers to live.** Fiber optics' benefits are clear. The challenge of fiber optics is that its high upfront construction costs require very long-term financing models to deliver on its promise." The state's new program makes that financing possible.

https://www.eff.org/deeplinks/2021/09/how-californias-broadband-infrastructure-law-promotes-local-choice

Market Analysis

In Placerville, most residents and businesses subscribe to wireline internet services from the cable operator (Comcast/Xfinity) and telephone incumbent (AT&T). There is also a fixed wireless provider (RockyRidge) offering connectivity in south Placerville.

Note: Triple Play = Internet + TV + Voice. Double Play = Internet + TV

Xfinity

Xfinity advertises the following residential ISP services in Placerville:

Speed (Mbps) [Down / Up]	12-24 Mo. Rate [+ Taxes and Fees]	Standard Pricing [+ Taxes and Fees]	Install [Fee]	Internet [Billings]	Triple Play [Billings]
50 / 5	$30.00	$55.00	$0-$500	$88.11	N/A
100 / 10	$45.00	$55.00	$0-$500	No Data	No Data
200 / 12	$60.00	$70.00	$0-$500	$94.00	$190.45
400 / 20	$60.00	$80.00	$0-$500	$104.00	$225.24
800 / 35	$70.00	$90.00	$0-$500	No Data	No Data
1200 / 50	$80.00	$100.00	$0-$500	No Data	No Data
2000 / 50	$300.00	$300.00	$0-$500	No Data	No Data

Taxes and Fees often represent an additional (20%-30%) of Standard Pricing.
Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – No data published (In some markets Xfinity applies a 1.2 TB per/mo. cap).
xFi Gateway Modem - $14.00 per month.
Availability depends upon location – not available in all areas. Not available in SE Placerville.

AT&T

AT&T advertises the following residential services in Placerville:

Speed (Mbps) [Down / Up]	Intro Pricing [+ Taxes and Fees]	Regular Price	Activation [Fee]	Internet [Billings]	Double Play [Billings]
1.5 / .2	$55.00	$55.00	$99.00	$50.00	$162.99
5 / .5	$55.00	$55.00	$99.00	$36.50	$85.52
10 / 1	$55.00	$55.00	$99.00	No Data	No Data
18 / 2	$55.00	$55.00	$99.00	$73.00	No Data

Taxes and Fees often represent an additional (10%-15%) of Standard Pricing.
Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – 50 GB download monthly data cap.
Availability depends upon location – not available in all areas.

Rocky Ridge Wireless [Residential]

Rocky Ridge advertises the following residential services in Placerville:

Speed (Mbps) [Down / Up]	Intro Pricing [+ Taxes and Fees]	Regular Price	Activation [Fee]	Internet [Billings]
3-5 / 1	$60.00	$60.00	$100.00	No Data
6-10 / 2	$80.00	$80.00	$100.00	No Data
10-15 / 3	$100.00	$100.00	$100.00	$100.00

Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – No data caps.
Availability depends upon location – Only available in South Placerville.

Rocky Ridge Wireless [Working from Home]

Rocky Ridge advertises the following residential services in Placerville:

Speed (Mbps) [Down / Up]	Intro Pricing [+ Taxes and Fees]	Regular Price	Activation [Fee]	Internet [Billings]
15-20 / 4	$125.00	$125.00	$100.00	No Data
20-25 / 5	$150.00	$150.00	$100.00	No Data
25-30 / 6	$175.00	$175.00	$100.00	No Data

Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – No data caps.
Availability depends upon location – Only available in South Placerville.

Comcast Business

Comcast advertises the following business ISP services in Placerville:

Speed (Mbps) [Down / Up]	Promo Pricing [+ Taxes and Fees]	Standard Pricing [+ Taxes and Fees]	Install [Fee]	Internet [Billings]	Triple Play [Billings]
35 / 5	$70.00	$70.00	No Data	No Data	No Data
200 / 20 + SE	$91.54	$109.99	$150.00	No Data	No Data
600 / 35 + SE	$106.54	$134.99	$150.00	No Data	No Data
1000 / 35 + SE	$357.50	$385.95	$150.00	No Data	No Data

Taxes and Fees often represent an additional (20%-30%) of Standard Pricing.
SE = Security Edge.
Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – No information published.
Availability depends upon location – not available in all areas.

AT&T Business

Frontier advertises the following DSL business ISP services in Placerville:

Speed (Mbps) [Down / Up]	Intro Pricing [+ Taxes and Fees]	Regular Price [+ Taxes and Fees]	Activation [Fee]	Internet [Billings]	Double Play [Billings]
1 / .2	$60.00	$60.00	$99.00	No Data	No Data
6 / .5	$60.00	$60.00	$99.00	No Data	No Data

Taxes and Fees often represent an additional (10%-15%) of Standard Pricing.
Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – No information published.
Availability depends upon location – not available in all areas.

Rocky Ridge Wireless Business

Rocky Ridge advertises the following business services in Placerville:

Speed (Mbps) [Down / Up]	Intro Pricing [+ Taxes and Fees]	Regular Price	Activation [Fee]	Internet [Billings]	Triple Play [Billings]
3-5 / 1	$90.00	$90.00	$200.00	No Data	No Data
6-10 / 2	$120.00	$120.00	$200.00	No Data	No Data
10-15 / 3	$150.00	$150.00	$200.00	No Data	No Data
15-20 / 5	$200.00	$200.00	$200.00	No Data	No Data
20-25 / 7	$250.00	$250.00	Call	No Data	No Data
25-30 / 10	$300.00	$300.00	Call	No Data	No Data

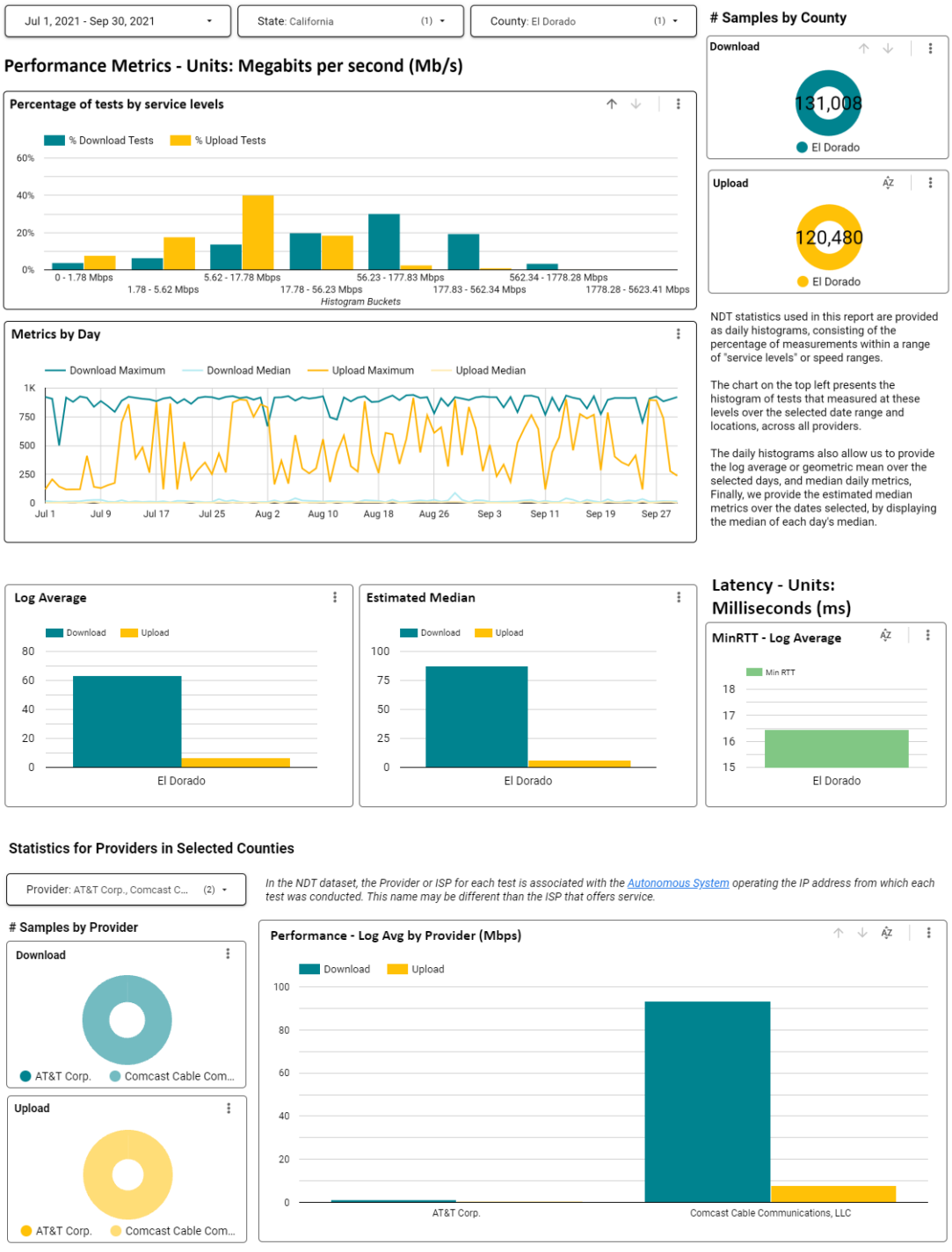
Shared Network – Speeds are "Up To" and are not guaranteed.
Speeds are not Symmetrical.
Data Caps – No data caps.
Availability depends upon location – Only available in South Placerville.

[Note: Market research performed in August 2021]

Speed Test Data

mLABS is an academic group that provides authoritative data from speed tests on a County-by-County basis across the United States. Academic and scientific research organizations rely on mLAB data. Every time an individual runs a speed test through an affiliate of mLABS, the data is saved in Cloud Storage hosted by Google and available to the public. It is important to note that the data below is for El Dorado County and not just Placerville. However, the sample size for a 3-month period is statistically predictive with 131,000 samples.

Broadband Master Plan



Market Analysis Conclusion

Comcast/Xfinity has the equivalent of an ISP Monopoly in Placerville. Because of this, residents and businesses in Placerville are exposed to the common limitations of monopolies.

Community Engagement Plan

The sample Community Engagement Plan that follows is built on an assumption that Placerville will take the next step toward a City Sponsored project by aggregating demand through a Community Engagement process. It is our recommendation that Placerville consider hiring a professional Marketing / PR firm to help drive the Community Engagement efforts.

Goals & Objectives

The objective of a *Placerville Community Engagement Plan* is to achieve a minimum 40% take-rate for homes and businesses within Placerville City limits. Additionally, a scale of 2,500 subscribers is an important target for the project to be operationally sustainable. In the financial section later in this report, the financial models are built to a target of a 60% take-rate. The modeling can easily be adjusted to match actual take-rates.

Evaluation & Education

Document the current state of broadband and determine the level of interest among residential users and business owners.

Community Survey

A survey for residents and business owners is in place to determine the level of interest in a municipal fiber network. Education and promotion programs should be influenced by survey engagement and response.

Publish Educational Information

Leverage the website specific to the municipal fiber program to outline the core message of broadband as a utility that will support an environment of choice and subscriber control. Additionally, use customized videos to educate online visitors on the following:

a. Functionality of the community fiber network
b. Options for services
c. Frequently Asked Questions (FAQ's)
d. Inquiry Form where community members can submit questions to the municipality

Mapping Community Interest

Distribute an "I am interested" sign-up form with associated heat map where residential and business property owners can register as someone interested in municipal fiber.

Marketing & Promotion

Placerville can issue Press Releases and use inserts in monthly utility bills to promote the municipal fiber program, driving traffic to the fiber website with the goal of educating community members and generating interest and encouraging community participation.

Use all available social media platforms (Facebook, Twitter, etc.) to promote the fiber network.

Neighborhood Entrance and Yard Signs

As construction (fiber build) begins in a neighborhood, Placerville can post signs at neighborhood entrances announcing the construction and letting residents know they can still sign-up to get connected while crews are in the neighborhood.

As homes are connected in the neighborhood, yard signs are placed in the yards of subscribers indicating that the home now enjoys a fiber broadband connection.

Grassroots Engagement

Webinars & Open House Events

Placerville can use Webinars and Open House events to educate residents and business owners can hear an educational presentation about the fiber project, ask questions about the fiber project, become educated about the Placerville fiber plan, business model, etc.

Webinars and Open Houses are promoted using utility bill inserts, press releases, public service announcements, local news reports, City websites, social media platforms, etc.

Webinars and Open House events are intended to educate residents, promote the network, and identify Fiber Champions in the various neighborhoods (fiber zones). Fiber Champions are individuals that are committed to promoting the network within their neighborhood. Fiber Champions are also incentivized to be the first neighborhood to get connected (initial fiber zones are connected in order of take-rates – highest to lowest).

Fiber Champions

Fiber Champions assist sales efforts within their designated neighborhood (fiber zone). They organize and lead Cottage Meetings where neighbors come together to discuss the Placerville fiber program. Placerville leaders and employees provide support to the Fiber Champions in their efforts. Fiber Champions drive

conversations and contractual commitments of neighbors via the Door-to-Door Sales and Education campaign.

Door-to-Door Campaign

Network sales agents (typically an independent group representing the network) contact residents and business operators within the planned network footprint to answer questions about the network and ascertain the potential subscribers' intentions regarding their participation in the network. [Yes (Opt-in) or No (Opt-out)].

This direct person-to-person contact gives everyone in the community an opportunity to ask questions, clarify their understanding and express their level of interest in participating.

To maximize the effectiveness of this process, prior to canvassing a neighborhood, door hangers are distributed to every home and business informing property owners that a representative will be stopping by to explain the value proposition, answer questions and the interest of individual property owners.

Door-to-Door Campaigns are very effective in giving people an opportunity to learn and ask questions in a personal interaction. The COVID pandemic impacts the timing of utilizing this tool.

It is important that Placerville supports this effort through public notifications, press releases, mass emails, websites, social media sites, mobile applications, and other community outreach venues available to Placerville. This may include outside professional marketing and/or PR firms.

Door-to-Door Sales Effort Budget = $50 - $100 per Premise that Subscribes
[Sign-up Fee or Wrapped into the Infrastructure Installation Costs]

Please Note – The work outlined in the various Steps of this Community Engagement Plan, in whole or part, can be managed by internal Placerville personnel or can be outsourced to a professional marketing and promotions organization.

Sacramento State University

The City of Placerville is collaborating with a Marketing Professor at Sacramento State University to engage marketing students via class projects and internships to assist with the community engagement plan for a Placerville Broadband Network.

And the Survey Says…

Placerville Broadband Survey Results

In February 2021, the City deployed a website to begin the process of educating the Public regarding its evaluation of the feasibility of a City sponsored fiber optic network. The City distributed an initial survey to Placerville residents assessing current sentiment regarding existing services and the level of interest in a municipal network. The survey was not developed by professional survey administrators. To date key findings from the survey, include the following:

Total Responses	338		
Support Network			
	4	No	1.18%
	79	Possibly	23.37%
	255	Yes	75.44%
	338	Yes/Possibly	98.81%
Internet Speed Importance			
	0	Not Important	0.00%
	96	Important	28.40%
	242	Very Important	71.60%
	338	Important/Very Important	100.00%
Average Business Speeds			
	17	Download	48.76 Mbps
	17	Upload	6.12 Mbps
Average Residential Speeds			
	317	Download	112.72 Mbps
	317	Upload	7.33 Mbps
Rate Current ISP			
	55	Poor	16.27%
	101	Fair	29.88%
	113	Good	33.43%
	56	Very Good	16.57%
	13	Excellent	3.85%
	156	Poor/Fair	46.15%

Municipal Broadband Models Comparison

The Institute for Local Self Reliance has mapped municipal networks throughout the United States using an interactive map that can be found at the following link:

https://muninetworks.org/communitymap

To compare the various models that exist in the United States today, a mix of prominent municipal fiber optic projects were selected to illustrate the types of models that have been deployed. The following comparison summarizes different approaches to funding and operating municipal broadband infrastructure and services followed by a description of the advantages and disadvantages of each:

Municipality	Population	Model Type	Electric Utility	Take-Rate	Cost of 1 Gig
Chattanooga, TN	179,139	Electrical Utility ISP	Yes	60%	$68.00
Lafayette, LA	126,000	Electrical Utility ISP	Yes	40%	$99.95
Westminster, MD	19,000	City Fiber, Private ISP	No	20%	$89.99
Huntsville, AL	194,585	Dark Fiber Open Access	Yes	Not Published	$70.00
Sandy, OR	10,000	Municipal ISP	No	60%	$59.95
Longmont, CO	86,000	Electrical Utility ISP	Yes	55%	$69.95
Ammon, ID	17,000	Automated Open Access	No	60%	$47.50
Monmouth, OR	15,083	Municipal ISP	No	80%	$129.65
Lexington, KY	321,959	Private Partner Owned	No	Not Published	$59.95
Santa Monica, CA	110,000	Dark Fiber Business Only	No	N/A	N/A
Fort Collins, CO	165,000	Electrical Utility ISP	Yes	Early Stage	$59.95
UTOPIA	150,000+	Manual Open Access	No	15%-20%	$70.00

Municipal Broadband Models Defined – Summary | Pros | Cons

City Owned & Operated, Single ISP

Summary: The City owns and operates the network and is also the sole service provider on the network.

Pros: This model can be successful when incumbent operators have some combination of the following: monopoly or near monopoly status, high prices, poor infrastructure, slow speeds, a poor reputation, and widespread customer resentment.

Cons: A single ISP does not significantly expand choice or competition. There have been very few *City Owned & Operated, Single ISP* deployments that have been successful. The City is essentially replicating the incumbent model and competing against the incumbent head-to-head. This model leaves the City vulnerable to the incumbent dropping their price to influence the municipal take-rate and destabilize the municipal network.

Examples of this model include Sandy, OR and Monmouth, OR.

Municipal Electrical Utility Owned & Operated, Single ISP

Summary: The Municipal Electrical Utility owns and operates the network and is also the sole service provider on the network.

Pros: The most common municipal model that has been successful using a Single ISP approach has been the Electrical Utility model. A measure of this success can be attributed to the fact that the Electrical Utility has the advantage of having an established reputation in the community. Also, electrical Utilities often have financial, customer service, and engineering expertise that may be beneficial to the network and the skill set for Outside Plant personnel for a municipal network is similar in kind to the existing range of skills in an Electrical Utility. The likelihood of success increases in instances where the incumbent operator has monopoly or near monopoly status, higher than average prices, poor infrastructure, slow speeds, a poor reputation and/or widespread customer resentment.

Cons: A single ISP does not significantly expand choice. Expertise in network operations will need to be enhanced or developed. This model is essentially replicating the incumbent model and involves competing against the incumbent head-to-head. This model leaves the City / Electrical Utility vulnerable to the incumbent dropping their price to impact the take-rate and destabilize the network.

Examples of this model include Chattanooga, TN and Longmont, CO. Fort Collins, CO. is in the early stages of deployment and is replicating this model.

Dark Fiber, Open Access

Summary: Dark Fiber Open Access is a model where the City builds infrastructure to the curb and the subscriber then selects an ISP as its provider and the ISP finishes the connection to the home with its own infrastructure and electronics.

Pros: Open Access increases choice for consumers. Operating a dark fiber network is less complicated than operating a lit network. The Dark Fiber model enables Public ownership of infrastructure.

Cons: The Dark Fiber model gives up control over last mile infrastructure, i.e., the drop from the curb to the premise. The Dark Fiber model therefore limits the usability of each strand of fiber. With an isolated dark fiber connection, it is impossible to connect to other services that may not be available through the ISP that controls the drop to the customer premise. The Dark Fiber Model may not scale easily due to difficulty in anticipating the required fiber count to meet the demand. This can create significant complications for the network operator.

An example of this model is Huntsville, AL.

Manual Open Access

Summary: Manual Open Access is a model where the network is lit end to end. This means that the network operator places and controls the electronics at both ends of the network. In this model, switching service providers can be requested from a web portal and may appear to be automated but the network provisioning is not automated.

Pros: A manual Open Access network increases choice for consumers.

Cons: Operating a Manual Open Access network is more complex than operating a Single ISP network because of the requirement for human management of network tasks. Any increase in the number of service providers operating on the network adds to network complexity.

An example of this model is the UTOPIA Network. UTOPIA is the largest manual open access network in the United States with just over 20,000 premises connected. UTOPIA struggled under heavy debt obligations for 15 years but is now operating on a sustainable trajectory. In addition to UTOPIA, there are several Manual Open Access networks throughout Europe.

Automated Open Access

Summary: Automated Open Access is a model where the network operator places electronics at both ends of the network (lit infrastructure) and subscribers can dynamically select service providers in real-time. Software Defined Networking is used to automate various network management tasks.

Pros: Multiple service providers can deliver services simultaneously and independently across a single wire. When a subscriber selects a new service provider, the provisioning is done using automation and therefore happens on-demand. The automated provisioning creates a marketplace for services which includes ISP's and private networks for other services. The ability to switch service providers on demand increases choice and competition. This network model also

includes the ability to provide local network resilience via local communications if connections over the middle mile are down.

Cons: The model was first implemented in late 2016. Ammon, ID, Elkhart, IN, and Nevada County, CA are the only implementations that are up and running today. There are 25 cities that are in the planning or construction phases of implementation of this model.

Disclosure: EntryPoint Networks owns and operates a Software as a Service, Automated Open Access solution and is the technology solution provider in these networks.

Private Sector Owner & Operator, Single ISP

Summary: A private builder designs, builds and operates a network. The private entity is also the sole ISP on the network – replicating the incumbent model.

Pros: A private builder and operator assumes all the risk and does the work of overseeing design, project management, construction, customer acquisition and operations. This model increases the choices available to consumers with minimal obligation or burden for the City.

Cons: The new operator is replicating the incumbent model. There is no local control over infrastructure and ISP choices increase by just one new provider. There is no guarantee that the operator will address the digital divide. The network can be sold to another operator.

There are many examples of over-builders but Lexington, Kentucky is a recent example.

Private Sector Owner & Operator, Open Access

Summary: A private builder designs, builds and operates a network. The private entity uses an Open Access model rather than the incumbent model for service delivery.

Pros: A private builder and operator assumes all the risk and does the work of overseeing design, project management, construction, customer acquisition and operations. This model provides an increase in the choices available to consumers at almost no cost to the City. Risk exposure to the City is very low. The private builder/operator builds and stabilizes the network and may give the City the option to acquire the network after an agreed upon number of years for a premium price above the actual cost to develop.

Cons: There is no local control over infrastructure. There is no guarantee that the operator will address digital divide issues. A private owner will be free to sell the network to a new operator that may or may not be aligned with community objectives for the network.

An example of this model is Fullerton, CA (SiFi).

Cooperative Owned & Operated, Open Access ISP

Summary: A fiber-optic infrastructure cooperative owns and operates the network using an Open Access model.

Pros: The subscribers to the network are the owners of the infrastructure. This creates local control over infrastructure. The speed to market can be much faster than municipal ownership because the model is established up front. The model gives subscribers choice and competition among service providers which will likely lead to lower pricing in comparison to incumbent operators. Probability of success increases when incumbent operators have some combination of the following: monopoly or near monopoly status, high prices, poor infrastructure, slow speeds, a poor reputation, and widespread customer resentment.

Cons: It is more difficult to obtain financing because the cooperative has no assets for collateral at the beginning of the project. If financing can be obtained, the cost of money will be more expensive than a city or town sponsored project.

Network Design

The two main network designs are Switched (Active) Ethernet and Passive Optical Networks (PON). The key difference between these two models is that PON is a shared infrastructure (16, 32, or 64 neighbors share a connection) and Ethernet gives subscribers their own connection.

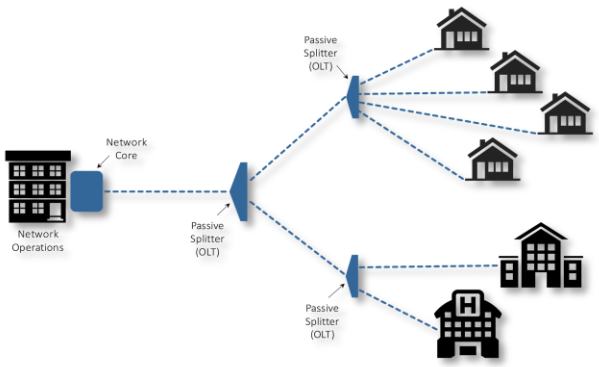
Switched Ethernet Network

The Switched Ethernet architecture provides a dedicated connection for each customer rather than a shared connection and the customer experience is significantly better than in a shared architecture during periods of network congestion because the throughput of switch-based architecture is superior to a bus-based architecture during times of network congestion.

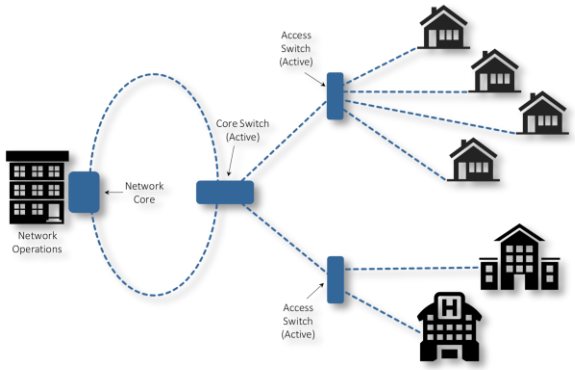
Passive Optical Network (PON)

Passive Optical Networks (PON) and Coaxial (Cable) networks follow a Bus architecture which is a shared infrastructure. A splitter is placed in the field and a connection is often shared between 32 or 64 premises. The Bus Architecture leads to more packet collisions on the network which can result in high amounts of packet loss during congestion. Additionally, it is more difficult to isolate and troubleshoot faults in the network with a bus topology and PON often leads to long term vendor lock-in.

Passive Optical Network (PON) Design



Switched Ethernet Network Design



Proponents of PON Architecture will argue that PON is less expensive than an ethernet design. That was true historically. The illustration below shows that the variable costs of a switched ethernet deployment is now equal to PON. This change in pricing differences was driven by the fact that all Data Center deployments use Switched Ethernet architectures and the enormous growth of Data Centers over the past 20 years has driven down the cost of Ethernet electronics.

Broadband Master Plan

PON - Network Access Equipment

Description	Unit Cost	Qty	Extended Cost
Install Package	$696.50	1	$696.50
Splitter Shelf	$84.00	8	$672.00
OLT	$4,196.50	2	$8,393.00
10GE SFP+	$837.90	2	$1,675.80
2x 1GE BIDI CSFP	$157.50	24	$3,780.00
Access Line-up			$15,217.30
Number of Subscribers Served			96
Average Cost per subscriber			$158.51

Ethernet - Network Access Equipment

Description	Unit Cost	Qty	Extended Cost
Switch	$1,300.00	2	$2,600.00
SFP	$12.00	96	$1,152.00
Access Line-up			$3,752.00
Number of Subscribers Served			96
Average Cost per subscriber			$39.08

PON - Premise Equipment

Description	Unit Cost	Qty	Extended Cost
Indoor ONT	$225.15	1	$225.15
Power supply for 700GE ONT	$12.00	1	$12.00
Premise Line-up			$237.15
Number of Subscribers Served			1
Average Cost per subscriber			$237.15

Ethernet - Premise Equipment

Description	Unit Cost	Qty	Extended Cost
White Box VBG	$330.00	1	$330.00
1000Base 1310nm-Tx/1550nm RX 10km	$9.00	1	$9.00
Premise Line-up			$339.00
Number of Subscribers Served			1
Average Cost per subscriber			$339.00

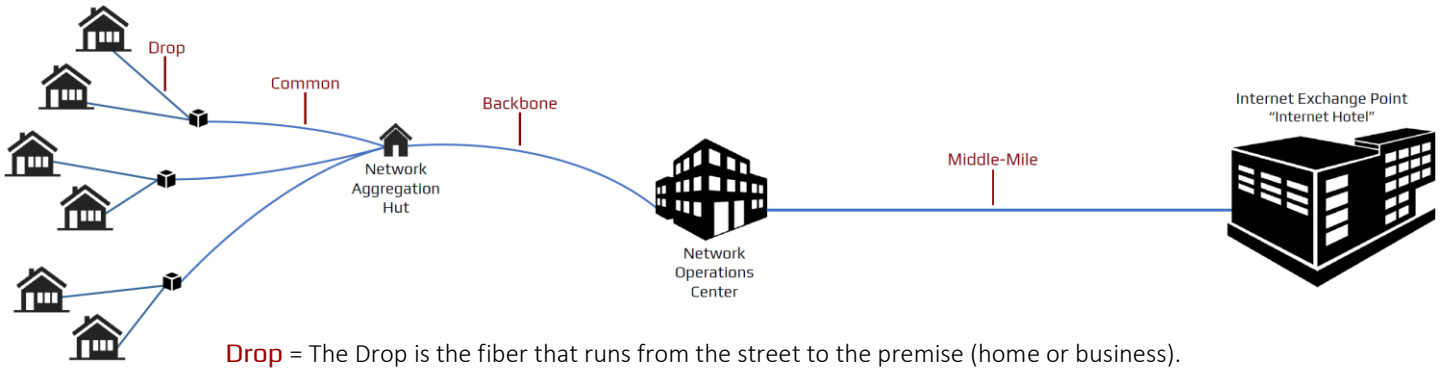
Per Premise PON Equipment Costs

Total cost per Subscriber	**$395.66**

Per Premise Ethernet Equipment Costs

Total cost per Subscriber	**$378.08**

Network Segments – Definitions & Costs Allocations



Drop = The Drop is the fiber that runs from the street to the premise (home or business).

Common = The Common is the shared fiber infrastructure in a neighborhood that runs from a Drop to the closest Aggregation Hut.

Backbone = The Backbone fiber runs from an Aggregation Hut back to the Network Operations Center.

Middle-Mile = The Middle Mile is usually 3rd-Party fiber that runs from the Network Operations Center to the closest Internet Exchange Point. The cost of the Middle-Mile is included in the Monthly M&O Utility Fee and is borne by all network subscribers.

Project Partners

Middle Mile

"Middle-mile" is an industry term that describes the network infrastructure that connects local networks to an Internet Exchange Point – usually in a large city. The "last mile" is the local part of a communication network which connects a service provider at the Network Operations Center to a residential or business customer.

Because of Placerville's proximity to Sacramento, there are middle mile options back to an Internet Exchange point in Sacramento. For this report, we have solicited and received one middle mile proposal to date, and it is competitively priced. The cost of the middle-mile connection should be allocated on a per subscriber basis, included in the monthly Maintenance & Operation (M&O) utility fee.

Internet Service Providers (ISP) Partners

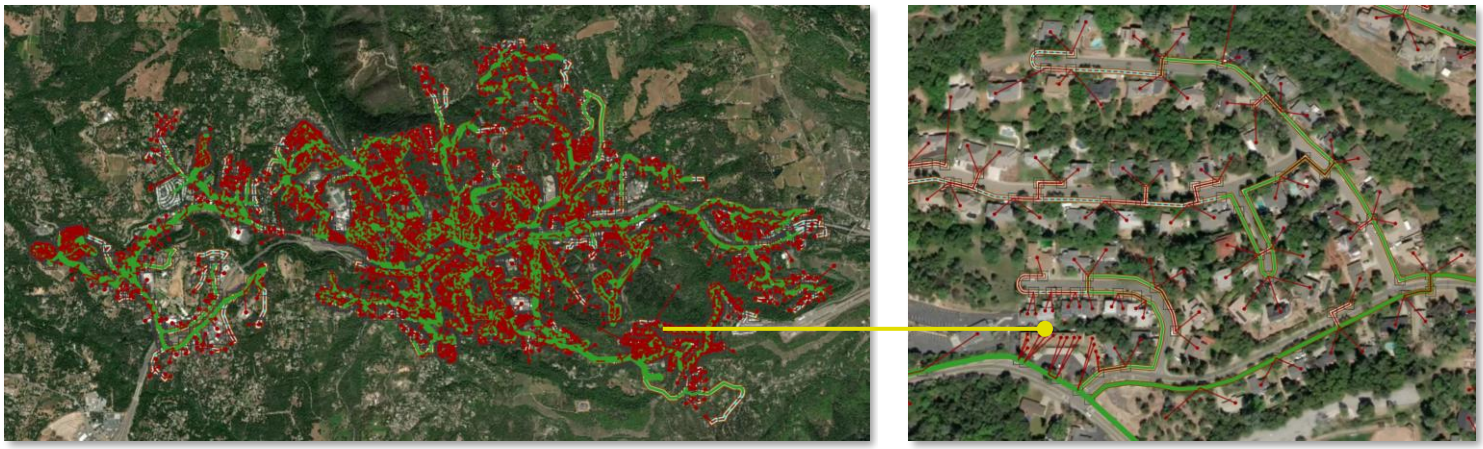
An Internet Service Provider gives subscribers access to the internet. EntryPoint has contacted a number of ISP's about the Placerville project and each is willing and interested to participate if Placerville moves forward with an Open Access network. The participation of these ISP's could be formalized through a Memorandum of Understanding (MOU) process.

Cost Analysis & Phasing

High Level Network Design

A high-level network design was done for a residential neighborhood to build a cost model for that project. The Biarri Networks Fiber Optic Network Design Tool was used to create the design and calculate materials costs for these designs. The main cost categories for deploying and operating broadband networks are separated to optimize the costs in each of the following categories:

- Infrastructure Capital Costs *(Financed over 20-30 years)*
- Network Maintenance & Operations
- Services



Monthly Infrastructure Cost Modeled from 4,015 Premises

The first illustration of Infrastructure Capital Costs per premise assumes a 60% take-rate and a project that is 100% aerial. The data in the line items in this model comes from a combination of the Biarri Network Design tool, actual bids for materials, and network buildout experience.

The second illustration of Infrastructure Capital Costs per premise assumes a 60% take-rate and a project that is 50% aerial and 50% underground. We can adjust these variables on a neighborhood-by-neighborhood basis as needed.

The third illustration of Infrastructure Capital Costs per premise assumes a 60% take-rate and a project that is 100% underground.

Broadband Master Plan

Costs at 60 % Take Rate			
100% Aerial			
Description	**Common**	**Drop**	**Total**
Labor – Hours	10.42	2.50	12.92
Labor – Dollars	$697.92	167.50	$865.42
Equipment	$240.97	37.21	$278.18
Materials	$367.78	121.73	$489.51
Supplies	$121.25	$7.32	$128.57
Restoration	$62.53	$2.29	$64.82
Hut/Cabinet	$140.49	$0.00	$140.49
Feeder Fiber	$36.02	$0.00	$36.02
Engineering	$37.10	$15.03	$52.13
Professional Services	$148.42	$15.16	$163.58
Electronics	$166.67	$350.00	$516.67
Subscriber Acquisition	$0.00	$0.00	$0.00
Total	**$2,019.13**	**$716.24**	**$2,735.37**
Backbone Cost per Premise			$370.93
Total w/ Backbone			**$3,106.30**
Short Term Interest			$145.89
Total Capitalized			**$3,252.18**

Monthly Infrastructure Per Premise Cost	$18.22

Costs at 60 % Take Rate			
50% Buried | 50% Aerial			
Description	**Common**	**Drop**	**Total**
Labor – Hours	15.63	3.75	19.38
Labor – Dollars	$1,046.88	$251.25	$1,298.13
Equipment	$361.45	$55.82	$417.27
Materials	$551.67	$182.60	$734.27
Supplies	$121.25	$7.32	$128.57
Restoration	$62.53	$2.29	$64.82
Hut/Cabinet	$140.49	$0.00	$140.49
Feeder Fiber	$36.02	$0.00	$36.02
Engineering	$37.10	$15.03	$52.13
Professional Services	$148.42	$15.16	$163.58
Electronics	$166.67	$350.00	$516.67
Subscriber Acquisition	$0.00	$0.00	$0.00
Total	**$2,672.46**	**$879.46**	**$3,551.92**
Backbone Cost per Premise			$370.93
Total w/ Backbone			**$3,922.85**
Short Term Interest			$189.44
Total Capitalized			**$4,112.29**

Monthly Infrastructure Per Premise Cost	$23.03

Broadband Master Plan

Costs at 60 % Take Rate			
100% Buried			
Description	**Common**	**Drop**	**Total**
Labor – Hours	20.83	5.00	25.83
Labor – Dollars	$1,395.83	$335.00	$1,730.83
Equipment	$481.93	$74.43	$556.36
Materials	$735.56	$243.46	$979.03
Supplies	$121.25	$7.32	$128.57
Restoration	$62.53	$2.29	$64.82
Hut/Cabinet	$140.49	$0.00	$140.49
Feeder Fiber	$36.02	$0.00	$36.02
Engineering	$37.10	$15.03	$52.13
Professional Services	$148.42	$15.16	$163.58
Electronics	$166.67	$350.00	$516.67
Subscriber Acquisition	$0.00	$0.00	$0.00
Total	**$3,325.79**	**$1,042.69**	**$4,368.48**
Backbone Cost per Premise			$370.93
Total w/ Backbone			**$4,739.41**
Short Term Interest			$232.99
Total Capitalized			**$4,972.39**

Monthly Infrastructure Per Premise Cost	$27.85

Why Take-Rate is Important to Total Infrastructure Cost

Take-rate is a variable that is critical to project success because the operational sustainability of a project depends on crossing a certain take-rate threshold and take-rate has a meaningful impact on the cost per premise.

The following table illustrates the impact of take-rate on total cost per premise under a 50% buried and 50% arial network with a take-rate of 60% as neutral on impact.

Take-Rate	Cost/Sub	Subscribers	Difference	vs. 60% Take-Rate
5.00%	$40,952.17	215	-	($36,583.69)
10.00%	$20,997.43	430	$19,954.74	($16,628.95)
15.00%	$14,345.85	645	$6,651.58	($9,977.37)
20.00%	$11,020.06	860	$3,325.79	($6,651.58)
25.00%	$9,024.58	1,075	$1,995.47	($4,656.11)
30.00%	$7,694.27	1,290	$1,330.32	($3,325.79)
35.00%	$6,744.04	1,505	$950.23	($2,375.56)
40.00%	$6,031.37	1,720	$712.67	($1,662.90)
45.00%	$5,477.07	1,935	$554.30	($1,108.60)
50.00%	$5,033.63	2,150	$443.44	($665.16)
55.00%	$4,670.82	2,365	$362.81	($302.34)
60.00%	$4,368.48	2,580	$302.34	$0.00
65.00%	$4,112.65	2,795	$255.83	$255.83

70.00%	$3,893.36	3,010	$219.28	$475.11
75.00%	$3,703.32	3,225	$190.05	$665.16
80.00%	$3,537.03	3,440	$166.29	$831.45
85.00%	$3,390.30	3,655	$146.73	$978.17
90.00%	$3,259.88	3,870	$130.42	$1,108.60
95.00%	$3,143.18	4,085	$116.69	$1,225.29
100.00%	$3,038.16	4,300	$105.02	$1,330.32

Full City-Wide Network Operations

The following Table summarizes the anticipated cost structure for Network Maintenance & Operations (M&O) on a city-wide basis. This schedule produces a projected monthly M&O fee for the Broadband Utility at $26.80 per month. This could be staffed with City employees or a contracted 3rd party operator. The key thing is that the City owns and controls this infrastructure. Depending on the speed of the buildout, the City may need to subsidize network operations until enough scale is established to achieve sustainability. An accelerated deployment schedule will minimize a subsidy from the City. Any subsidy from the City would be paid back over time.

Residential M&O	Subscriber	Monthly	Annual	Percentage
Costs/Accruals/Reserves	**$26.80**	**$69,155**	**$829,860**	**100.00%**
Power	$1.41	$3,638	$43,654	5.26%
Co-Lo Fees	$0.35	$903	$10,836	1.31%
Labor	$9.00	$23,220	$278,640	33.58%
Office	$0.58	$1,496	$17,957	2.16%
Vehicles	$0.73	$1,883	$22,601	2.72%
Tools	$0.21	$542	$6,502	0.78%
Equipment	$1.18	$3,044	$36,533	4.40%
Supplies	$0.12	$310	$3,715	0.45%
Dig-line	$0.19	$490	$5,882	0.71%
Maintenance	$1.18	$3,044	$36,533	4.40%
Call Center	$0.36	$929	$11,146	1.34%
Network Operations Monitoring	$0.36	$929	$11,146	1.34%
Equipment Refresh (Reserves)	$4.00	$10,320	$123,840	14.92%
Licenses Fees (SaaS, Etc.)	$2.50	$6,450	$77,400	9.33%
Rentals	$1.18	$3,044	$36,533	4.40%
Business Insurance	$0.12	$310	$3,715	0.45%
Bad Debt	$0.46	$1,187	$14,242	1.72%
Equipment Replacement	$0.02	$63	$751	0.09%
Taxes and Fees (Property)	$0.00	$0	$0	0.00%
Middle Mile	$1.30	$3,354	$40,248	4.85%
Reserves	$1.55	$3,999	$47,988	5.78%
Total	**$26.80**	**$69,155**	**$829,860**	**100.00%**

Network Management & Operations Cost Structure

The numbers and categories in this model are derived from many years of experience with actual costs for Broadband projects. Labor costs are modeled to reflect California wages.

Staffing Modeling for Internal Network Operations

The following Table models the cost structure for the positions needed for the City of Placerville to operate the network as a Department within the City structure. The model is conservative in the staffing estimates needed to operate the network in a sustainable manner. The model does not include resources for construction. The analysis assumes that the City will build the entire network over a 36-month period. This timeline would mean that the City will need to subsidize this department for less than 24 months. After that, the investment will be paid back by operational surpluses as the number of subscribers grows beyond the target of 2,580. This subsidy can be reduced by building the network in 12-18 months instead of 3 years.

The work that will be done by a Fiber Network Department includes network monitoring, network management, outside plant repairs, & new customer installations.

The City has the option of operating the network with internal staffing resources or an 3rd Party network operations partner. The following staffing model provides anticipated fully burdened salary information, years to profitability, and the revenues and expenses from the operation.

Staffing Projections

Position	Fully Compensated Hourly Rate	Fully Compensated Monthly Cost	Fully Compensated Annual Cost
Manager	$90	$15,600	$187,200
Network Admin	$46	$7,973	$95,680
I.T. Technician	$35	$6,067	$72,800
Outside Manager	$40	$6,933	$83,200
Outside Plant Tech	$29	$5,027	$60,320

Subscriptions & Staffing Projections

Subscribers	Year 1	Year 2	Year 3	Year 4
New Subscribers	500	1,000	1,080	-
# of Subscriber at Year End	500	1,500	2,580	2,580
Labor Allocation	$9.00	$9.00	$9.00	$9.00
Cash Flow from Labor	$27,000	$108,000	$220,320	$278,640

Staffing Projections	Year 1	Year 2	Year 3	Year 4
Manager	0.0	0.0	0.0	0.0
Network Admin	0.0	0.0	0.0	0.5
IT Technician	0.5	0.75	1.0	1.0
Outside Plant Manager	0.0	0.0	0.5	0.5
Outside Plant Laborer	0.5	1.0	1.5	1.5

Position	Year 1	Year 2	Year 3	Year 4
Manager	$0	$0	$0	$0
Network Admin	$0	$0	$0	$47,840
IT Technician	$36,400	$54,600	$72,800	$72,800
Outside Plant Manager	$0	$0	$41,600	$41,600
Outside Plant Laborer	$30,160	$60,320	$90,480	$90,480
Total	**$66,560**	**$114,920**	**$204,880**	**$252,720**
Net	**-$39,560**	**-$6,920**	**$15,440**	**$25,920**

Project Pro-Forma

Financial Pro-Forma of Full Project Costs - 3 Year Build - Ethernet Architecture

Projected Backbone	Included
Projected Cost Per Premise (Common and Drop) [1]	$4,112.29
Estimated Subscribers	2,580
Total Cost (Common & Drop)	$10,609,703.45
Professional Services	Included
Total Projected Project Costs	$10,609,703.45

[1] *Assumes 50% Buried / 50% Aerial, 60% take rate & short-term interest rate of 8% and long-term bond rate of 3% for 20 Years.*

Projected Subscription Cost

Projected Residential Services Monthly Costs	100% Aerial
Infrastructure	$18.22
Maintenance and Operations	$26.80
ISP Services (Dedicated 1 GB Symmetrical)	$9.99
Monthly Total	**$55.01**

Projected Residential Services Monthly Costs	50% / 50% Split
Infrastructure	$23.03
Maintenance and Operations	$26.80
ISP Services (Dedicated 1 GB Symmetrical)	$9.99
Monthly Total	**$59.83**

Projected Residential Services Monthly Costs	100% Buried
Infrastructure	$27.85
Maintenance and Operations	$26.80
ISP Services (Dedicated 1 GB Symmetrical)	$9.99
Monthly Total	**$64.65**

Note: The Residential $9.99 monthly ISP fee listed above is based upon current pricing from the list of ISPs interested in providing services.

Projected Income & Cash Flow

Timeline	Year 1	Year 2	Year 3	Year 4 +
Subscribers				
New Subscribers	500	1,000	1,080	0
# of Subscriber at year end	500	1,500	2,580	2,580
Income Statement (Revenue)				
Infrastructure Fees	$69,102.59	$276,410.36	$563,877.13	$713,138.73
Maintenance and Operations	$80,412.75	$321,651.00	$656,168.04	$829,859.58
Total Revenue	$149,515.34	$598,061.36	$1,220,045.17	$1,542,998.31
Operating Costs (Expenses)				
Maintenance and Operations	-$63,762.75	-$255,051.00	-$520,304.04	-$658,031.58
M&O Labor Difference	-$39,560.00	-$6,920.00	$15,440.00	$25,920.00
Equipment Refresh/Replacement	$0.00	-$1,665.00	-$6,493.50	-$12,937.05
Interest Reserve	-$132,997.92	-$189,435.84	-$204,590.71	$0.00
Debt Service Reserve	-$69,102.59	-$138,205.18	-$149,261.59	$0.00
M&O Reserve	-$16,650.00	-$64,935.00	-$129,370.50	-$158,890.95
Total Expenses	-$322,073.26	-$656,212.02	-$994,580.35	-$803,939.58
Net (Revenue vs Expenses)	-$172,557.92	-$58,150.67	$225,464.83	$739,058.73
Loan Payment				
Backbone	$0.00	$66,898.45	$66,898.45	$66,898.45
Build Out	$0.00	$125,739.01	$377,217.03	$628,695.05
Total Loan Payments	$0.00	$192,637.46	$444,115.48	$695,593.50
Net	-$172,557.92	-$250,788.12	-$218,650.65	$43,465.22
Cash Flow				
Capital Expenditures	-$2,732,961.04	-$3,551,922.08	-$3,836,075.85	$0.00
Net Money Borrowed	$2,732,961.04	$3,646,640.01	$4,025,511.69	$204,590.71
Net	$0.00	$94,717.92	$189,435.84	$204,590.71
Revenue	$149,515.34	$598,061.36	$1,220,045.17	$1,542,998.31
Cash Expenses	-$103,322.75	-$263,636.00	-$511,357.54	-$645,048.63
Loan Payments	$0.00	-$192,637.46	-$444,115.48	-$695,593.50
Net Cash	$46,192.59	$141,787.90	$264,572.15	$202,356.17
Accrued Interest	-$132,997.92	-$189,435.84	-$204,590.71	$0.00
Unrestricted Cash	-$172,557.92	-$156,070.20	-$29,214.81	$248,055.94
Reserves				
Interest Reserve	$132,997.92	$189,435.84	$204,590.71	$0.00
Debt Service	$69,102.59	$138,205.18	$149,261.59	$0.00
Maintenance and Operations	$16,650.00	$64,935.00	$129,370.50	$158,890.95
Total Reserve	$218,750.51	$392,576.02	$483,222.81	$158,890.95
Total Cash	**$46,192.59**	**$236,505.82**	**$454,008.00**	**$406,946.89**

Projected Capital Expenditures & Funding

Timeline	Year 1	Year 2	Year 3	Year 4 +	Total
Capital Costs					
Backbone	$957,000.00	$0.00	$0.00	$0.00	$957,000.00
Subscriber Drops	$439,731.88	$879,463.75	$949,820.85	$0.00	$2,269,016.48
Subscriber Common	$1,336,229.17	$2,672,458.33	$2,886,255.00	$0.00	$6,894,942.50
Interest Reserve (Drops)	$94,717.92	$189,435.84	$204,590.71	$0.00	$488,744.48
Interest Reserve (Backbone)	$38,280.00	$0.00	$0.00	$0.00	$38,280.00
Total	$2,865,958.96	$3,741,357.93	$4,040,666.56	$0.00	$10,647,983.45
Short Term Financing (Build Out)					
New Backbone	$957,000.00	$0.00	$0.00	$0.00	**$957,000.00**
Retired		-$957,000.00	$0.00	$0.00	**-$957,000.00**
Total	$957,000.00	-$957,000.00	$0.00	$0.00	**$0.00**
New Build	$1,775,961.04	$3,551,922.08	$3,836,075.85	$0.00	**$9,163,958.98**
Retired	$0.00	-$1,775,961.04	-$3,551,922.08	-$3,836,075.85	**-$9,163,958.98**
Total	$1,775,961.04	$1,775,961.04	$284,153.77	-$3,836,075.85	**$0.00**
Long Term Funding					
New Backbone		$995,280.00	$0.00	$0.00	**$995,280.00**
New Build		$1,870,678.96	$3,741,357.93	$4,040,666.56	**$9,652,703.45**

Financial Modeling Assumptions

EntryPoint based its analysis on the following demographic information for the City of Placerville:

Population:	11,397 residents
Households:	4,100
Families:	59% of households
Population Density:	1,888 inhabitants per square mile
Potential Subscribers:	4,100 (Households and businesses)
Subscribers @60%:	2,580

Legal Structure & Financing Considerations

The legal structure for financing is organized around the following objectives:

1. Nobody will be forced to participate as a subscriber to the network. Rather, subscription will be on a voluntary, opt-in basis.
2. Taxes will not be increased to finance the network.
3. The ongoing operation of the network must be self-sustaining and not dependent on a long-term subsidy from the City.
4. The City may contribute to get the network started but will be paid back over time.

Voluntary Participation – The alternative to taxing all residents is to deploy a business model that allocates network costs to voluntary participants. Allowing subscribers to voluntarily opt-in to network participation honors individual preferences for residents and businesses, eliminates Political Risk and can increase Public support for the network. Allowing subscribers to voluntarily opt-in or opt-out of network participation is less efficient and more expensive than a model that mandates universal participation.

Ongoing Operations – The City views its roles as enabling the development and implementation of a potential network and then may choose at the appropriate time whether to operate the network on behalf of Placerville residents. However, the network must become self-sustaining during the first 3-5 years of operations.

Use of ARPA Funds for Municipal Broadband Infrastructure Projects

On June 17, 2021, the US Treasury Department clarified the rules for using money from the American Rescue Plan Act (ARPA) that is being given to states, counties, and cities from the federal government. The new FAQs provide important clarity for cities considering using ARPA funds for broadband projects.

Building to Homes that are not Underserved

FAQ 6.8: "*Unserved or underserved households or businesses do not need to be the only ones in the service area funded by the project*." While the goal of a broadband project must be to provide service to unserved or underserved areas, the Treasury recognizes in its FAQ's that it may be necessary to serve a larger area for a project to be economical and sustainable. This is a significant clarification - that unserved and underserved locations need not be the only places funded by the ARPA funding.

Rationale for Broadband Projects

FAQ 6.11 The Treasury FAQ's also make it clear that advertised speeds do not define broadband speeds, but rather the actual broadband performance experienced by customers is the standard that can be the basis of decision making.

Further, our interpretation of the decision on whether an area is deserving of an infrastructure upgrade is up to the local authority contemplating using ARPA funding to address specific needs in their City or county. There is no specific standard or process described or defined. Therefore, the local entity determines whether current infrastructure is sufficient. The municipality needs to document how it rationalizes the decision (which could simply be in the minutes of a City Council meeting) is to provide some reference to the process and rationale applied if challenged to show that they did consider the need and what was available in reaching their decision.

Reliability

The use of "reliably" in the guidance from Treasury provides recipients with significant discretion to assess whether the households and business in the area to be served have access to wireline broadband service that can actually and consistently meet the specified threshold of at least 25/3 Mbps – i.e., to consider the actual experience of current broadband customers that subscribe to a service at or above the 25/3 Mbps threshold. Whether there is a provider serving the area that advertises or otherwise claims to offer speeds that meet the 25 Mbps download and 3 Mbps upload speed threshold is not dispositive.

FAQ 6.11 Governments can consider a wide range of information to use as proof that broadband is not reliably meeting the 25/3 threshold including federal or state broadband data (State broadband maps or the newly released NTIA broadband map), speed tests, interviews with residents, surveys, analysis on whether speeds are adequate at all times of the day, analysis on whether both the download and the upload is satisfactory, etc.

Significantly, the FAQ's also allows municipalities to overbuild neighborhoods still being served by DSL only networks. There are thousands of Census blocks where telcos claim rural DSL speeds of 25/3 Mbps and these claims are no longer sufficient to designate an area as adequately served.

FAQ 6.10 also says that the ARPA funding can be used to fund middle-mile fiber as long as it is done with a goal of supporting last-mile fiber.

The FAQ's also give the City clarity on the fact that backbone infrastructure can be funded as long as it is built to support these neighborhoods. Lastly, the community engagement work that has been done – specifically the survey data

supports a rationale to move forward with a project that is supported with the use of ARPA funds.

The above is EntryPoint's understanding of the ARPA FAQ's specifically addressing using funds for broadband deployment. EntryPoint has not consulted a Broadband Attorney in coming to the above conclusions. City leaders and the City Attorney should review the following sources and focus on FAQ#'s 6.8 - 6.11 to corroborate our findings.

Sources – https://home.treasury.gov/system/files/136/SLFRPFAQ.pdf
https://potsandpansbyccg.com/2021/06/21/treasury-makes-it-easier-to-fund-broadband/

California Broadband Funding

A concise breakdown of the New California Broadband Infrastructure Program was provided by Ernesto Falcon with the Electronic Frontier Foundation.

https://www.eff.org/deeplinks/2021/09/how-californias-broadband-infrastructure-law-promotes-local-choice

The infrastructure law has four mechanisms in place to help finance and plan new, local options: a grant program for the unserved; long-term financing designed around public, non-profit, and tribal entities; a state-run middle-mile program; and a state technical assistance program. Let's get into the weeds on each of them.

Broadband Infrastructure Grant Account – The State of California is making more than $2 billion (and possibly up to $3.5 billion) available in grants, over the coming years, to finance (at 100% of the state's cost) the construction of broadband networks in areas that need them. To qualify, such areas must lack the following three traits, premised on federal and state mapping data:

- Broadband service at speeds of at least 25 mbps downstream and 3 mbps upstream (this is mostly folks reliant on DSL copper access or less)
- Latency (A measure of delay.) that is sufficiently low to allow real-time interactive applications
- Is not currently receiving money from, and is carrying out the objectives of, the Rural Digital Opportunity Fund

To focus the grant funds, priority is placed on areas that do not even have 10 mbps downstream and 1 mbps upstream—this is mostly areas that only have satellite internet. This program is focused on having the state paying the

construction costs for people who have no internet access at all, as opposed to those with slow, useless, or inadequate access.

Loan Loss Reserve Fund – The State Treasury will establish this fund to enable long-term financing by cities, counties, community service districts, public utilities, municipal utility districts, joint powers authority, local educational agencies, tribal governments, electrical cooperatives, and non-profits. It will be designed to help these entities obtain very low interest rates with low debt obligations. Think of this program like our mortgage-lending system. 30-year fixed mortgages enable many people to purchase homes, even if they could never gather the cash necessary to make the purchase all at once. Fiber is well-suited for this type of financing vehicle; it will be able to deliver speeds useful for multiple decades and carries lower maintenance costs than other broadband options.

State Open-Access Middle-Mile – The State of California, overseen by the Department of Technology, will deploy fiber infrastructure on an open-access basis—meaning on non-discriminatory terms and accessible by ISPs— with an emphasis on developing rural exchange points. The goal behind this infrastructure is to deliver multi-gigabit capacity to areas building broadband access, and also to bring down the cost to affordable rates for obtaining backhaul capacity to the global internet. To use an analogy, the state is building the highways to connect communities to the airport—and the world. The option to connect to these internet highways will be made available to all comers. So, for example, small local businesses or local townships can connect a fiber line to these facilities to build a local broadband network.

Technical Assistance by the State – Fiber infrastructure is a game-changer on the ground. Echoing the way the federal government advised local governments and communities on the deployment a similarly revolutionary technology—electricity— the new broadband infrastructure law deputizes the California Public Utilities Commission to provide technical assistance for these plans. The CPUC will provide local governments and providers with assistance for grant applications to other federal programs and participate in the development of infrastructure plans with county governments.

Financing Dependencies

Because project feasibility is ultimately a function of getting people to sign up and remain loyal to the network, there needs to be a value proposition that mobilizes customers to subscribe. For that to happen, subscribers need a compelling solution, and the network needs to create cash flow predictability and bankable contracts to attract financing for the project. NetEquity in San Francisco visualizes these dependencies in this way:

NetEquity Stack

NetEquity

People	are hungry for	Services
Services	are hungry for	Infrastructure
Infrastructure	is hungry for	Capital
Capital	is hungry for	Cash Flow Predicta
Cash Flow Predictability	is hungry for	Bankable Contracts
Bankable Contacts	result from	Aligned Incentives
Aligned Incentives	requires	Trust

*Isfandiyar (Asfi) Shaheen developed the **NetEquity Stack** above. Mr. Shaheen is a Global Broadband Infrastructure Thought Leader based in San Francisco.*

Legal Authority

The Placerville City Attorney has prepared a legal summary describing the City's right to build, own, and operate broadband infrastructure under California State law. Those findings are included in an addendum to this Plan. The City has decided not to engage Bond Counsel until the City decides to move forward with full community engagement.

[Note: The City Attorney's legal memo is attached at the end of this report.]

10

Risk Factors >

Likelihood
Impact
Mitigation

Risk Analysis

The following is an analysis of the main risk factors facing the City of Placerville as it pursues its fiber-to-the-premise deployment. Nine Risk Factors are analyzed:

1. Subscriber Churn Risk
2. Take-Rate Risk
3. Project Execution Risk
4. Equipment and Technology Risk
5. Community Engagement Risk
6. Cost Modeling Risk
7. Timeline Risk
8. Regulatory Risk
9. Middle Mile Risk
10. Pole Attachment & Make-Ready Risk

Subscriber Churn

Subscriber Churn is the risk that customers sign up and then do not remain subscribers to the network.

Likelihood: Today customers are primarily driven by cost, speed, and customer service. Churn is possible and is a consequence of the customers pursuing an option to get better value from an alternative solution. The likelihood of churn is high if a new market solution simply replicates the incumbent model. The likelihood of churn goes down under a Business Model where 1) the customer is financially responsible for the drop to their property and 2) where the value proposition is strong enough to make the customer voluntarily committed to the network.

Impact: The impact of churn on the network is potentially catastrophic if it reaches a level where the capital and operational cost of the abandoned infrastructure cannot reasonably be shared by remaining subscribers.

Mitigation: Churn can be mitigated by implementing a business model that makes customers voluntarily committed to the network and by assigning financial responsibility to customers for their lateral connection.

Take-Rate Risk

Take-rate risk (Demand Risk) is the risk that the City builds out the network and ends up with a take-rate that is lower than expected.

Likelihood: Take-rate risk is possible and is a function of the value proposition of the network and how well that value proposition gets communicated and managed before construction starts. High take-rates lead to lower network costs for subscribers. This creates a virtuous cycle where lower costs lead to higher take rates. The reverse is also true.

Impact: The worst-case scenario is one where lower take rates lead to higher costs and churn which create a death spiral that negatively compounds until the network is not sustainable.

Mitigation: Manage demand aggregation before construction begins and give consumers a value proposition that makes them voluntarily committed to the network infrastructure.

Project Execution Risk

Project Execution includes strategy, planning, project management and fulfillment of the project plan and operational execution.

Likelihood: Project execution failure is possible and is a function of the effectiveness of project planning, management, controls, and execution.

Impact: The severity of impact is in proportion to the effectiveness of project management and execution. A worst-case scenario is one where project execution affects the value proposition, which in turn affects take-rate and churn.

Mitigation: Hire or partner with skilled project managers and key strategic partners. Create alignment among key team members on the project plan and operational plan. Develop project controls that are monitored and reported to senior leadership monthly.

Equipment & Technology Risk

Equipment & Technology Risk includes both software and hardware solutions and is the risk that equipment failure rates are higher than expected, major software bugs are unresolved, operational reliability is lower than expected, and/or that the technology lifecycle leads to faster obsolescence than is expected. For a network, the size of Placerville, an additional risk is scalability risk.

Likelihood: Solutions with short deployment histories, unreliable references, unclear quality control and test procedures, weak professional teams, and poorly architected scalability abstractions present increased equipment and technology risk.

Impact: The impact of this risk category is moderate because it is possible to vet both software and hardware systems to assess this risk. The base technology of the network will be fiber optic cable and that has sufficient history to present a minor risk to the project. Remaining risks include electronics and software systems.

Mitigation: Implement thorough due diligence processes with trained professionals to scrutinize references, architecture, software abstractions, quality control systems and the professional histories of vendors being considered.

Community Engagement

Community Engagement is the marketing, education and communication processes and strategies used to inform residents and businesses about the value proposition offered by the network.

Likelihood: Community Engagement risk is possible but nonetheless a risk that can be managed and monitored. Poor planning, management and execution increases the level of risk. Community engagement can be handled by internal City staff, but risk increases if staff member resources are inadequate for a project of this size. There is an abundant supply of marketing professionals available to assist with community engagement processes.

Impact: Community engagement is a key driver of project success due to the relationship between community engagement and take-rate.

Mitigation: Leverage the skills of competent marketing professionals and provide sufficient resources to make it easy for every resident to learn the basic value proposition for the network in comparison to alternatives through a variety of marketing, education, and communication strategies.

Cost Modeling Risk

Cost Modeling Risk is the risk that cost modeling significantly underestimates actual design, construction, and/or operational costs.

Likelihood: There is enough industry data to reasonably validate cost estimates. However, there is significant market volatility currently due to supply chain disruptions.

Impact: Cost overruns can have a moderate to disastrous impact on network sustainability.

Mitigation: Validate financial assumptions against industry assumptions, market conditions, and account for local economic variables.

Timeline Risk

The benefits of building the network in an accelerated pace include the following:

1) Each phase requires legal, financing and accounting transaction costs. Building the network with fewer phases will lower the overall transaction costs for the project.
2) Building at a faster pace will result in an accelerated period to break-even.
3) Interest Rates are at an unprecedented low currently and building over an extended period may expose later project years to some interest rate risk.

Likelihood: Costs are certain to be higher for an extended buildout period. However, there may be execution risk exposure for accelerating the buildout, depending on the experience and capacity of the construction partner. These trade-offs need to be weighed by City leaders.

Impact: Costs will be incrementally higher for an extended build-out schedule and M&O will have a longer ramp to sustainability.

Mitigation: The City can control the buildout schedule following a cost / benefit analysis of the options. An important consideration is alignment with construction partners. If the City is going to outsource construction, it should consult with potential construction partners about the alternative construction schedules to make sure that the City's strategy is amenable to key construction partners.

Regulatory Risk

Regulatory Risk is the risk that State or Federal regulations become an impediment or barrier to the City successfully building or operating a municipal network. The Placerville City Attorney has prepared a separate analysis describing the City's legal authority to build, own, and operate broadband infrastructure as well as information on the legal structures that are available to cities in the State of California to house the operation.

Likelihood: Historically, incumbent operators have taken legal action to stop a number of municipalities from building a competing network whenever they have

a legal basis for doing so. According to the Placerville City Attorney, the City does have the authority from the State to own and operate a fiber optic network.

Impact: If a claim were to be brought against Placerville, it is unlikely that process will take an extensive amount of time and cost to contest or appeal the claim – given the broad authority from the State of California.

Mitigation: Collaboration with legal advisors is key to risk mitigation. The Placerville City Attorney has conducted a review of California law related to municipal ownership and control over telecommunications and concluded that the City has the authority to proceed. The City Attorney does not assert that this authority would stop incumbents from responding with some legal action to deter the City from going forward.

Middle Mile Risks

Middle Mile risks include the following:

1) Lack of redundant options on divergent paths,
2) Pricing risk, and
3) The risk of being stranded or isolated without a viable path to an internet exchange point.

Likelihood: Because of Placerville's proximity to Sacramento, there is at least one middle mile path back to the Internet Exchange point. For this report, we have solicited and received one middle mile proposal and it is competitively priced.

The risk of getting isolated or cut off from internet access is possible but has a low likelihood of occurring.

Impact: Each of the Middle Mile Risks could have a significant impact on network success but all of them have a low likelihood of occurring because of Placerville's location.

Mitigation: The way the City can mitigate and possibly eliminate Middle Mile Risk is by building in redundancy to the network by having multiple backhaul providers along independent paths back to an internet exchange point. The State of California is funding a statewide open access Middle Mile network.

Pole Attachment & Make Ready Risk

This is the risk that pole owners cause unexpected and significant impact on costs or timeline due to delays in make ready and pole attachment work.

Likelihood: Because Placerville does not own the utility poles within City limits, this risk is a potential problem and will have to be actively managed if the City decides to have some portion of the network be aerial.

Impact: Make Ready work for Pole Attachment can have a meaningful impact on costs and timeline if the pole owners are non-responsive or want the City to replace old poles.

Mitigation: The City can mitigate this risk by installing a buried network or by assigning a project manager to apply continuous pressure to the pole owners to prevent unnecessary delays in make ready work.

Next Steps

Business Model

Conduct public process (Request for Proposal, Information, or Qualifications - RFP, RFI, or RFQ) to Select Open Access Partner. This partner will also provide project oversight, including design, quality control, construction, provisioning, and turn-up.

Legal

Create a legal checklist and timeline to work through legal requirements prior to construction.

Explore legal pathways available to fund the infrastructure under the different ownership models?

- Municipal corporation,
- Municipal utility district,
- Public utility district,
- Other.

Community Engagement

Collaboratively Refine Community Engagement Plan. Community Engagement is the most important sub-project toward deploying a successful network.

- Determine whether the City will use an outside professional marketing firm.
- Develop Project Plan for participation from Sacramento State University.
- Grassroots initiatives.
  - Implement Community Engagement and demand aggregation process.
  - Deploy competitive process to establish initial take-rate.

Financing

Refine strategy for use of ARPA funds and potential funds from the State of California.

Design / Engineering

Refine the City-wide Design provided with this report and take the next step by following a public selection process to obtain construction ready design documents and to refine cost modeling based on the strategy.

Launch make-ready process for utility pole attachments if some portion of the network is aerial.

Construction

Identify Construction Manager. Key skills and knowledge include, but are not limited to:

- Manage the fiber optics project and budget, direct construction in accordance with the approved design, and coordinate work with other staff and design team members.
- Be a key point of contact with clients, contractors, and local government officials.
- Review project design aspects as needed and coordinate adjustments to support constructability and budget outcomes.
- Review work products, quality control, and budgeting.
- Mentor, develop, and supervise staff.

Evaluate Construction Project Management software options.

Conduct RFP/RFQ for materials and labor for construction.

- Create RFP/RFQ Documents.

City Leadership Approval

Prepare to advance full initiative to City Council for approval.

Deploy network when approved by the Mayor and City Council.

KRONICK

KRONICK
MOSKOVITZ
TIEDEMANN
& GIRARD

MEMORANDUM

ATTORNEY WORK PRODUCT

TO: Cleve Morris, City Manager

FROM: City Attorney's Office

DATE: August 26, 2021

RE: Authority to Finance, Own and Operate Broadband Internet Infrastructure

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The City is interested in knowing whether it has authority to finance, own, and operate broadband internet infrastructure.[1] The purpose of this memo is to opine on the City's authority to do so.[2] This memo is drafted with the intention of being an addendum to the City's Broadband Plan and Feasibility Report.

A. Background

Public Utilities Code section 10001 et seq. generally empowers a municipal corporation to operate "broadband Internet access services." Specifically, "any municipal corporation may acquire, construct, own, operate, or lease any public utility." (Pub. Utilities Code, § 10002.) "Public utility" is broadly defined to mean "the supply of a municipal corporation alone or together with its inhabitants, or any portion thereof, with water, light, heat, power, sewage collection, treatment, or disposal for sanitary or drainage purposes, transportation of persons or property, means of communication, or means of promoting the public convenience." (*Id.* at § 10001.) A "means of communication" includes "broadband Internet access service." (See, *id.* at § 10001.5.) "Broadband Internet access service" means "a mass-market retail service provided by a local agency in California by wire or radio that provides the capability to transmit data to and receive data from all or substantially all internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up internet access service." (Gov. Code, § 53167(a).) Thus, a public utility includes broadband internet infrastructure.

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1 Note that the City may participate in the financing, owning, and operating of broadband internet infrastructure in various ways, for instance, as a municipal corporation, municipal utility district, or a public utility district. (Pub. Utilities Code, §§ 10001, 12801, and 16461.) This memo is limited to opining on if the City has such authority as a municipal corporation.

2 If the Council or staff wishes, we can conduct research on the process to finance, own, and operate broadband internet infrastructure.

The authority to operate a public utility includes "the power to complete, reconstruct, extend, change, enlarge, and repair a public utility acquired, constructed, owned, or operated by a municipality." (*Id.* at § 10003.) This also includes the authority to complete real estate transactions to do the same. (*Id.* at § 10004.) Thus, the power to operate a public utility like broadband internet infrastructure includes a broad range of authority – including construction, ownership, and operation.

A "municipal corporation" is a city, county, or incorporated city. (See, Public Utilities Code, § 2904.) An "incorporated city" includes a general law city organized pursuant to California Government Code. (See, Gov. Code, § 34102.) Thus, a general law city may finance, own, and operate broadband internet infrastructure.

B. Analysis

The City of Placerville is a municipal corporation, formed and organized under the California Government Code. Broadband infrastructure is a type of public utility which a municipal corporation may provide. Specifically, it is analogous with "broadband Internet access services." Thus, the City is authorized to finance, own, and operate broadband infrastructure.

Note that, if the City were to provide broadband internet access services, it will be required to comply with net neutrality requirements detailed in Government Code section 53167 et seq. (Pub. Utilities Code, § 10001.5.) However, unlike for other public utilities, the City may advertise for use of its broadband internet access services and infrastructure. (*Id.* at § 10007.) Further, State funding may be available specifically for the City's broadband internet infrastructure projects. [3]

If approved, Assembly Bill 156, would transfer $300,000,000 into the Broadband Infrastructure Grant Account, an existing annual grant program where service providers and municipalities are eligible to apply for funds. AB 156 would also allow individual property owners to apply for grants to offset the costs of connecting to an existing or proposed facility-based broadband provider.

The bill significantly modifies the focus of this existing grant program to broaden eligibility for funds. Projects funded through the Broadband Infrastructure Grant Account must focus on last-mile broadband access to households that are underserved or unserved by an existing facility-based broadband provider. “Underserved areas” include areas where there is no service provider offering at least one tier of broadband service with at least a 25 megabits per second download speed, 3 megabits per second upload speed, and a latency that is sufficiently low to allow real-time interactive applications.

If Placerville has areas within the city that are underserved, as defined, and if this legislation passes, the City could apply for grants (in an amount not to exceed $5,000,000 for any one project) to offset costs.

[3] As of the date of writing this memo, Assembly Bill 156 is pending before the State Senate. If passed, the bill will establish the Office of Broadband and Digital Literacy within the Department of Technology – including the "broadband czar" and nine-member council to oversee development of a statewide broadband network. The bill also allocates $2 billion for the Office to distribute for "last-mile" infrastructure line projects that will connect consumers to local networks.