An Alternate Middle Mile Fiber Feasibility Study

Prepared for

County of Humboldt

in partnership with the

Redwood Coast Rural Action Committee

Redwood Region Economic Development Commission

Redwood Technology Consortium

Prepared by

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1. Executive Summary

> *Broadband connectivity is being called the single most important infrastructure that enables economic and community growth in the new millennium. Yet rural communities such as ours often have meager or no high speed connections, resulting in fewer jobs, poor government services, lack of access to quality medical care, poorer educational opportunities and lackluster quality of life.*
>
> *Chris Crawford, Times-Standard, April 4, 2006*

The Redwood Coast Rural Action (RCRA) Working Group requested the development of a study for building a redundant fiber route into Humboldt County and for obtaining services via the installed infrastructure. This request included researching, analyzing, and recommending ownership, financing, and operational models. The study will be a tool for the Working Group on Universal Regional Connectivity which is utilizing an iterative process to investigate communications options for the region. This study is a result of that request.

The middle mile fiber route proposed follows Highway 299, beginning in Eureka and ending in Redding. Section 3 of the report has more detail. We have provided two different build options – one for an aerial route using PG&E existing right-of-way and the other using a direct burial technique on Highway 299. Each option has its pros and cons. Further investigation into funding availability and user desires will help determine which option is optimal for construction, although financially the aerial route appears more attractive.

In the proposed middle mile structure, the anchor tenants are comprised of communication companies and companies that need large amounts of network resources for customer service and internal management purposes. Communications companies are also commonly called *carriers* in the industry. Carriers in the area who are likely users include: AT&T, CENIC, Frontier Communications, Level 3, PG&E, Sudden Link and Verizon. They buy conditioned circuits or dark fiber or something in between, depending on their requirements. They will generally interconnect via the AT&T or Level 3 intersecting fibers to traverse additional networks to their chosen point of termination.

To make it simple to understand, we have entitled the ownership structure “Neworg” short for *new organization*. We are recommending that the ownership of Neworg be a privately-held, for-profit C corporation with a focus on selling fiber services to communications companies (*carriers*) in the region including telephone companies, cable companies, wireless companies, Internet companies and cellular companies.

In general, the aerial build option appears to be the most cost effective over time and, as such, creates a good opportunity to provide a realistic return on investment (ROI) for investors. Over ten years, the aerial cost of building and operating the fiber is approximately $11M. The same route for the buried fiber build and operations is approximately $24M.

In order to determine the minimum revenue streams needed for the project to provide either a 5 year or 10 year ROI, we looked at expected expenses balanced against annual sales. The most interesting outcome of this revenue model is that it seems reasonable to assume a 5 year ROI for

the aerial fiber build. We found that an affordable annual lease fee per fiber can be charged. Utilizing the 10 year ROI model, the annual lease fee could be even less, giving Neworg market flexibility for sales pricing and profit potential.

Because we are recommending a privately-held, for-profit company, we recommend that investment capital should be raised to cover the initial build of the fiber. This will build confidence with carrier companies who will be purchasing fiber services. In the startup period, the monthly income generated by selling access to the fiber should be set such that ongoing expenses are covered and a repair and replacement reserve is funded.

2. Introduction

> *Place is peace and quiet, clean air, and fishable streams. It's the kind of town in which you want to raise your kids. It's a lower cost of living and three times the house for the same dollars. It's a sane pace of life, a walkable community, lower taxes, and a better business climate. It's what you and I treasure about the rural way of life. Now by this point, someone may be wondering what Place has to do with broadband and the information economy. The answer is, everything. The computer and broadband are producing nothing less than the greatest decentralization of information since the invention of the printing press. In a knowledge-based economy, that levels the playing field. It opens the door to everything else. To put it bluntly, the moment small towns and rural areas once again become economically competitive, people will vote with their feet.*
>
> *Thomas Dorr, USDA Under Secretary for Rural Development*

The Redwood Coast Rural Action (RCRA) Working Group requested the development of a study for building a redundant fiber route into Humboldt County and for obtaining services via the installed infrastructure. This includes researching, analyzing, and recommending ownership, financing, and operational models. The study will be a tool for the Working Group on Universal Regional Connectivity which is utilizing an iterative process to investigate communications options for the region.

The new middle mile infrastructure will not only ultimately significantly improve the quality of communications into and out of the region, but it will cement the foundation for sustainable economic development and growth. All communities in the region will directly benefit from the program -- from schools, hospitals, businesses, and residences to municipal organizations and agencies.

2.1 Process Overview

The work plan focused on a two-pronged approach. The first task engaged the community through a series of group and individual meetings, both in person and on the phone. These sessions focused on the key stakeholders and anchor tenants in order to assure that the models and recommendations "fit" the community. The participants are listed in the meetings are listed in Appendix A.

The second task utilized computer models, research abilities and market-knowledge of the team to provide a complete, sensible set of models and recommendations.

The report is organized by topic beginning with a general overview of the recommended routes and structures needed. A discussion of who comprises anchor tenants and high volume users follows, with an emphasis on typical buying patterns in the region. The ownership model is covered in detail followed by a discussion of the expected financial model. We conclude with a discussion about service provisioning and a high-level implementation project plan.

3. The Middle Mile

> *As its name suggests, middle mile facilities provide relatively fast, large-capacity connections between backbone and last mile. Middle mile facilities can range from a few miles to a few hundred miles. They are often constructed of fiber optic lines, but microwave and satellite links can be used as well.*
>
> *Federal Communications Commission definition of the middle mile*

Humboldt County is isolated. Located in the beautiful North Coast region of California and named by the USDA as America's Most Scenic Rural County, Humboldt County is a place of grandeur. But its isolated location also creates infrastructure problems particularly for communications into and out of the county.

Business continuity and disaster recovery should mean something to Humboldt County residents. As residents experienced this year, Mother Nature can be unforgiving. With its heavy rain and snow damage, mudslides, earthquakes and as a known target for tidal waves, Humboldt County must find a way to accommodate its residents and visitors with resources for both everyday and emergency communications. As business and government become increasingly dependent on the Internet and other data connectivity for day-to-day business, it becomes essential to have a solid, reliable, scalable communications infrastructure into the county. Redundancy is the one important way to gain reliability and solidity.

A region's public and private technology infrastructure attracts the high-tech companies that create jobs. In turn, these companies contribute still more communications, health, education, transportation and research infrastructure.[1] The alternate middle mile fiber provides an essential piece of the "hard' infrastructure that companies require when considering location. Consider the impact of fiber infrastructure on Grant County, WA, where Microsoft is building a large data center and The Dalles, Oregon, where Google is building a large data center expected to employ 50-100 people. The availability and reliability of the communications infrastructure was one of the key decision factors for choosing these locations.

Half of all adult Americans who live in non-rural areas can get online with a fast connection at home or work. By contrast, just more than one-third of rural Americans can do this.[2] A recent Pew report concluded that three demographic factors are behind this difference: 1) rural America has a greater share of older Americans, 2) more rural Americans fall in the lower end of the nation's income distribution and 3) rural Americans are, on average, less educated.

That brings us to the alternate middle mile that was studied for this report. Providing an alternate route benefits the County and region by locating interconnection points in underserved areas such as Blue Lake, Willow Creek and Weaverville making it easier for industry and individuals to access the wealth of resources available online. The middle mile fiber can be the catalyst for new educational and economic opportunities in the region.

In the RFP, it stated "All telecom vendors in Humboldt County, including Frontier, Cox, Almega, Starstream, and Verizon, are dependent upon SBC's single fiber route in/out of the

[1] From "What is Technology-Based Development"
[2] Pew Internet & American Life Project, Rural Broadband Internet Use

county. Where available, access costs are high for many residential customers and some commercial customers due to lack of competition." AT&T (SBC's new name) stated at the 2006 Broadband Forum that their fiber has had numerous close calls or near misses.

It is time for the community to grasp the importance of data connectivity as an essential infrastructure that keeps organizations open be they government, schools, hospitals or small businesses. It is also time to provide a catalyst for affordable broadband access in Humboldt and the region. It is time for an alternate middle mile path.

3.1 Proposed Route

The route proposed follows Highway 299, beginning in Eureka and ending in Redding. We have provided two different build options – one for an aerial route using PG&E existing right-of-way and the other using a direct burial technique on Highway 299. Each option has its pros and cons. Further investigation into funding availability and user desires will help determine which option is optimal for construction.

3.1.1 Choice of Route

The route chosen, Highway 299 from Eureka to Redding, is the same route that CENIC[3] chose as 'most desirable' in 2004. The major advantages are that the route:

- Travels a completely redundant path from the current AT&T fiber which runs south from Eureka to Santa Rosa
- Provides an opportunity to connect other cities on path including Blue Lake, Willow Creek and Weaverville
- Intersects with multiple commercial fiber carriers to maximize opportunities for customer interconnect points and redundancy through the creation of fiber rings
- Provides the most desirable alternative redundant route to communications companies

Other routes were investigated and discarded because they had less revenue potential and greater distances. In most cases, the geology along those routes made construction costs completely unpredictable.

Another option that was considered but ruled out involves laying fiber in the PG&E natural gas pipe which runs between Eureka and Red Bluff. Large feeder pipes like this one are cleaned by a plug technique called a PIG. The PIG plug is forced through the pipe. As a result, fiber cannot be installed since it would be "eaten" by the PIG.

3.1.2 Choice of Installation Methodology

Two different methods of installing the fiber were studied – one involves aerial fiber and the other involves buried fiber. Both routes travel east/west along the 299 corridor between Eureka and Redding. We priced both options so to provide a clear understanding of the tradeoffs

[3] CENIC is the Corporation for Education Network Initiatives in California and operates education networking in the state.

between the two types of builds and to give the community a choice of how to proceed based on these tradeoffs. Tradeoffs that should be considered include:

- Potential customer preferences
- Cost to install
- Cost to operate
- Ease of adding connection points in small cities on the route
- Building time
- Permitting time and costs
- Cost of right of way
- Time to repair and cost of repair
- Probability of failure due to Acts of God or other natural phenomenon (fire, flood, slide, etc.)

The first installation choice utilizes aerial fiber via PG&E power poles that run power transmission lines between Arcata and Redding. Each of the ends of the fiber build will likely be buried fiber, utilizing existing conduits in Humboldt County and Redding, so this build is essentially a dual aerial and buried build.

The second installation choice buries the fiber on Route 299. Because of the geology of Route 299, the financial information included in this study is an approximation. Detailed engineering studies need to be conducted on the highway to refine the burial requirements, especially in the areas where there is rock and where there are known slides.

3.1.3 Choice of Termination Points

When installing a middle mile fiber like the one studied, one of the most important criterions to consider is the location of the termination points of the fiber – that is where does the fiber begin and end? The fiber must begin and end in places where it is easy, safe and secure for the proposed customers to interconnect. Interconnection points need to be in a communications facility where nominal features like backup power, fire suppression and secure, possibly guarded access are available. In addition, the interconnection points need to be close to where others have terminated their fiber or other communication connections to make it easy for them to get from their locations to the interconnection point.

Based on these considerations, we are recommending that Eureka be chosen as the western terminating point of the fiber since most of the carriers that we believe might be customers have easy access into this area. In addition, we are recommending that a collocation facility be built in Eureka for encouraging this access. Colocation facilities, as described below, are data centers where carriers can install equipment and make direct connections to simplify interconnection.

At the collocation point, the community should contemplate the implementation of a local peering point, a place where local data can be exchanged without leaving the area. There are many advantages to a local peering point, the strongest is that in the event of a disaster, the community would still be able to communicate with each other, even if all outside paths were

down. More information about local peering points and their advantages is included in Appendix B.

We are recommending that the Redding termination be placed in the Level 3 colocation facility that currently exists. This will make it easy for fiber customers to interconnect to the rest of the country. Section 4 of this report discusses customer interconnect points in more detail.

What is a Colocation Point?

From Wikipedia at http://en.wikipedia.org/wiki/Colocation

A colocation centre ("colo") or carrier hotel is a type of data center where multiple telecommunications network or service providers, such as telcos or internet service providers, site their connections to one another's networks (points of presence) and where users of these services can interconnect to the service provider(s) with a minimum of cost and complexity.

Increasingly organizations are recognizing the benefits of colocating their mission-critical equipment -- including networking gear, servers and storage devices -- within a data centre. Colocation is becoming popular because of the time and cost savings a company can realize as result of using shared data centre infrastructure. With IT and communications facilities in safe, secure hands, telecommunications, internet, ASP and content providers, as well as enterprises, enjoy less latency and the freedom to focus on their core business.

Additionally, customers reduce their traffic back-haul costs and free up their internal networks for other uses. Moreover, by outsourcing network traffic to a colocation service provider with greater bandwidth capacity, web site access speeds should improve considerably.

Most colocation centres offer different types of services to customers ranging from dedicated suites/rooms or cages to smaller racks or partial racks. Some colocation centres also offer some degree of SLAs (service level agreements) to support a wide range of computer and network related services, for example server reboots, hardware replacements, software updates etc. Some colocation centres feature a "meet-me-room" where the different carriers housed in the centre can efficiently exchange data. Most peering points sit in colocation centres.

Most colocation centres have high levels of physical security and multiple redundant power and humidity / air-conditioning systems.

A typical Colocation centre setup would consist of the following hardware and services:

- Building:
  - Usually built near a GlassFibre ring.
  - Fibre has multiple access points into building to prevent back hoe cuts.
  - Guarded 24/7 and secured with closed circuit cameras.
  - "Clean" rooms to ensure optimal running conditions for computer and network hardware.
  - Empty pipe fire suppression of some sort.
  - Relay racks, cabinets or cages to mount servers into.
- Power:
  - Connected to two or more different power stations/grids.
  - Inline power backup using a system of UPS batteries (often with a diesel standby generator).
  - Possibility to connect two different grids of power distribution to one server.
- Connections:
  - Because of the high concentration of servers inside a colocation centre most carriers will be interested in bringing direct connections to such buildings.
  - In most cases there will be a larger Internet-Exchange hosted inside a colocation centre, on which customers can connect for peering.

3.2 Potential Obstacles

This section discusses a number of potential obstacles including annual fees and the public utility permitting process.

3.2.1 Fees

> *Since there is no statute that requires CalTrans to charge these fees, nor any clear scale to on which to base the amount of the fees, this policy seems obstructionist to economic development and technological advancement. Given the tax revenue that would be generated from economic expansion in the region once the redundant line is in place, it is also counterproductive and, I would think, counter to our current Governor's vision for the state.*
>
> *Bob Morse, Talking Tech Blog*

Recurring fees that have a significant impact on the operations of this fiber. The proposed aerial build uses existing PG&E poles and as such PG&E charges annual pole attachment fees, which are not significant. The proposed direct burial build utilizes State Highway 299 and thus is subject to Caltrans right of way fees. These fees certainly have a significant impact on the operational costs for the direct burial build. Full cost impact is discussed in Section 6 of this report.

While we have not received definitive costs from PG&E, we believe their recurring fees of will amount to $27K annually based on the figures in Appendix F. The estimates were validated with other California-based utility companies. PG&E is working on an estimate that will be provided directly to Humboldt and should be incorporated in the business plan. They are interested in utilizing the fiber once built.

Caltrans, the California Department of Transportation, considers proposals to install communication lines in controlled-access right of way (freeways, expressways and bridges.) The route chosen, State Highway 299, is varied between controlled access and conventional roadway. Controlled access roadway is subject to right of way fees based on geographical location, length of placement, and the number of conduits installed. Current estimates for the direct buried fiber build indicate that approximately 40 miles (211,200 feet) of the installation will be in controlled-access right of way. Current Caltrans charges are $1.00 per foot per year for rural areas statewide which will result in a $211,200 annual fee for the direct burial build option.

3.2.2 Public Utility and Permitting Process

There are two things to consider when dealing with the installation of the new fiber: California Public Utility Commission (CPUC) licensing and California Environmental Quality Act (CEQA) compliance. Both have an impact on the time to build and the cost associated with the build.

The CPUC manages a process for communications companies to obtain a Certificate of Public Convenience and Necessity (CPCN) to become a Competitive Local Carrier (CLC)[4]. Based on conversations with the CPUC, the new fiber company would be considered to be a public utility since it will be selling/leasing services to companies that are public utilities (e.g. phone companies.) It is recommended that the during the business plan process this be further investigated with the CPUC, since the plan proposed herein falls into a grey area within the

[4] The communications trade commonly refers to CLCs as CLECs (pronounced see-leck), Competitive Local Exchange Carriers. However, the CPUC utilizes the term CLC in its official processes, rather than CLEC.

CPUC. Generally, the CPUC almost never fails to grant authority to become a CLC but the process will take about 3 months and should be done in advance of construction. The business planners should send a written description of the final plan to the CPUC and get a ruling regarding its need for CLC status. In addition, we suggest that the business planners consult with the prospective customers to understand specific requirements for interconnection to the new fiber. It may be easier for them to interconnect to a company with CLC status. Links for contacts and detailed information are included in Appendix H.

If the new fiber company becomes a CLC, the CPUC will also manage the California Environmental Quality Act (CEQA) compliance for the fiber build. CEQA is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. This process can take years depending upon how quickly everyone signs off.

The CEQA process will take the longest and cost the most for the direct burial fiber build. A conservative minimum estimate for processing time and cost is 11 months and $300,000. If everything goes well and the initial application is perfect, which rarely happens, it is possible to get an 11 month turnaround. The process takes a long time due to bureaucracy. The CPUC is obligated to hire an outside consultant to do a review which means a public bid process taking 3-4 months. There are also mandated public review periods -- 45 days for public review of the consultant’s report and then another possible 30 days for a commission proposed decision comment period.

The aerial fiber build utilizing the PG&E transmission poles would be easier. The concern of CEQA is primarily ground-oriented environmental impact which would be minimal in this case. Estimates are that this study would be inexpensive and take about a month for processing. Currently, the CPUC is trying to make communications cable installation on existing poles CEQA exempt. This would eliminate the CEQA requirement entirely for the aerial build.

Other local permitting may be required and we recommend that the business planner further investigate these and other unidentified legal requirements and costs.

4. Potential Anchor Tenants and High Volume Users

With only one fiber route into and out of Humboldt County, we are only a backhoe, tree fall, or landslide away from being cut off. The SBC microwave system that used to serve as our only link to the outside world is not adequate for the volume of traffic the fiber now carries - both voice and data. A redundant fiber route could be a "failover" in case of damage to the current fiber.

Tina Nerat, Times Standard, October 10, 2005

This section discusses anchor tenants who are the expected major purchasers of middle mile services. Additionally, high volume users are discussed including communications users who have a high need to purchase connectivity outside of the Humboldt County area.

4.1 Anchor Tenants

In the proposed middle mile structure, the anchor tenants are comprised of communication companies and companies that need large amounts of network resources for internal management purposes. Communications companies are also commonly called *carriers* in the industry. They buy conditioned circuits or dark fiber or something in between, depending on their requirements. They will generally interconnect via the AT&T or Level 3 intersecting fibers to traverse additional networks to their chosen point of termination. Figure 1 below shows how the interconnections help form rings that provide redundancy into and out of Humboldt County.

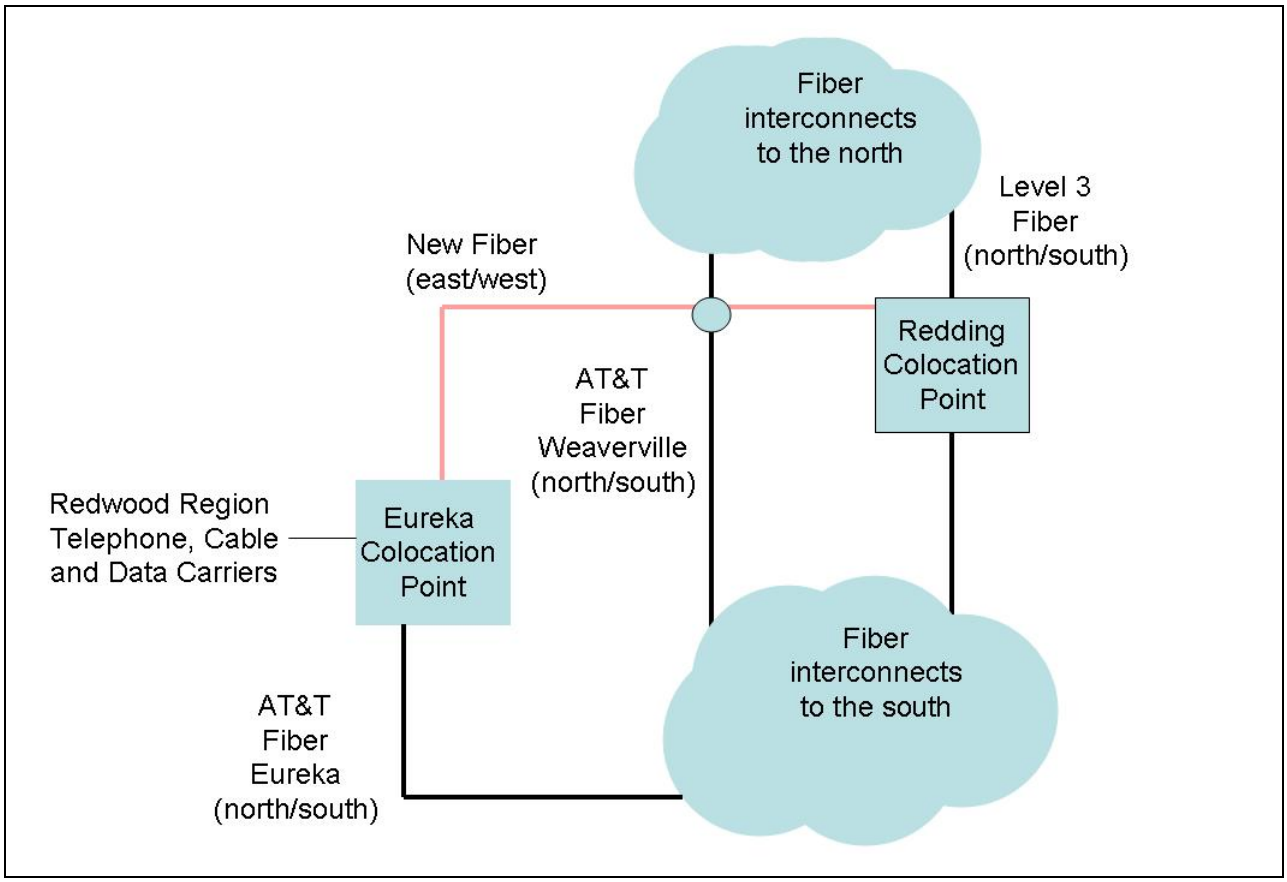


Figure 1. Carriers in the Redwood Region will connect to the Eureka colocation point to utilize the new fiber. They can then interconnect to a variety of north/south options for traversing to the rest of the nation's fiber networks.

We estimate that 10 fibers can be initially sold to carriers as backup or new links. Carrier's needs for the type of fiber configuration and the hardware needed to provide the configure may vary and needs to be included when looking at operational expenses and sales income. Depending on price and performance, we expect that reasonable growth in the 5-10% range will occur on an annual basis. The list of carriers in the area who are likely users includes:

- AT&T
- CENIC
- Frontier Communications
- Level 3
- PG&E
- Sudden Link
- Verizon

4.2 High Volume Users

As part of the study, we talked to regional users of communications services to determine their future needs as well as to figure out the buying patterns both within and outside of the county. Except for the communications carriers as discussed earlier, it is likely that high volume users will be purchasing their connectivity directly from the carriers as opposed to directly from Neworg. The carriers serving the high volume users will purchase fiber access from Neworg to meet their customers' needs.

4.2.1 Vertical Markets in Humboldt

We have broken out the vertical markets (those that are oriented to one particular specialty) in Humboldt County into seven different areas. These areas were determined after interviews as well as researching general Humboldt business data. In particular, we noted segments that seem to have a great need to communicate outside the Humboldt area. The vertical markets and their core buyers include:

- Communications Companies
  - Sudden Link, Frontier, Verizon (Northwest, California, Cellular), Almega, US Cellular, Edge, Sprint
- Education
  - Humboldt State University, College of the Redwoods, County Office of Education
- Healthcare
  - St. Joseph's Hospital, Open Door Clinics, Telehealth Center, Mad River Community Hospital, United Indian Health Services, Southern Humboldt Community Healthcare District, Redwood Rural Health Center
- County and City Governments
  - Eureka, Fortuna, Ferndale, Arcata, Fortuna, Blue Lake, Trinidad, Rio Dell
- State Government
  - State Parks, Department of Fish & Game, CDF, CHP, Caltrans

- Federal Government
  - National Park Service, National Weather Service, Coast Guard, National Forest, Postal Service, Port, Homeland Security, Army Corps of Engineers, BLM, Fish & Wildlife Service
- Industry
  - Manufacturing (e.g. Humboldt Creamery)
  - Services (e.g. Humboldt Merchant Services, Security National, ISPs)
  - Tourism, Media (e.g. Newspapers, TV and Radio)

Figure 2. Humboldt Creamery is one example of an industry that needs data communications to communicate with its statewide facilities.

4.2.2 How Buyers Buy

Humboldt County and the surrounding areas are comprised of a unique set of users who are likely to purchase their services under bulk contacts.

Generally, federal, state and local government offices are mandated or eligible to purchase communications services via a large contract. For example, the state government *must* buy communications services via the CALNET contract. Municipalities and schools are not mandated to purchase via this same contract but are eligible for its reduced pricing. This means that many of the inbound and outbound circuits in Humboldt County are using AT&T services, the awardee of the current CALNET contract with the State of California.

The State of California is currently undergoing a rebid of the CALNET contract. According to Ron Kaplan, research manager of IDC's IP VPN Research, "This RFP is important because it represents an enormous five-year, $1.5 billion contract for telecommunications services and because it contains significant requirements for transitioning state telecommunications services to converged IP delivery and to broadband wireless access facilities." The award of the CALNET II contracts for telecommunications and network services is targeted for October 2006. Instead of

bidding on a single bundled contract, CALNET II has been split into four separate modules. The modules are:

- Core services (local voice and statewide data)
- Long distance voice
- Internet Protocol services
- Broadband fixed wireless access

CALNET II, at a value of up to $2.1 billion if all extensions are exercised, stands to be one of the largest contracts in the state's history and is meant to serve the state's telecommunications needs through 2012.

Contract purchasing also holds true for federal agencies and other regional/national organizations. Generally, an agency will purchase from a bulk contract under a central budget authority, which mandates a particular carrier for services.

Public educational institutions in Humboldt County purchase their middle mile services from CENIC, a non-profit focused on developing, deploying and operating leading-edge network-based services for the research and education community. The California State University System and the California Community College System direct their wide area network needs and budgets to CENIC for the provisioning of communications infrastructure. The K-12 High Speed Network (K12HSN) is a state program which provides network connectivity, Internet services, teaching and learning application coordination, and videoconferencing coordination and support for California’s K-12 community. K12HSN provides for K-12’s participation in CENIC’s network, generally connecting the local County Office of Education (i.e. Humboldt County Office of Education.)

Industry may have different buying patterns, but in many cases, will have a preferred provider for out-of-county services generally chosen through a competitive bidding process. Until recently, these included Sprint, MCI and AT&T. With the recent merger of AT&T with SBC and MCI with Verizon, buying will be consolidated.

There is another consideration for buyers of broadband services. A number of groups in Humboldt County are eligible for special funds that subsidize a portion of their connectivity. Healthcare, education and library groups are eligible for both federal and state subsidy programs through the Universal Service Fund and the California Teleconnect Fund. Their communications provider is responsible for filing for the subsidies and rebating these users and must be certified by the federal and state government.

5. Ownership Model

In the 21st century, connectivity is our basic infrastructure. The more you have -- the more speed, the more access across all sorts of boundaries -- the greater your access to the world. And the greater your access to the world -- the more connectivity you have -- the more wealth you can create and accumulate.

Let me summarize this in a way you might understand:

Guns defined the 17th century, colonization.
Ships defined the 18th century, trade.
Canals and railroads defined the 19th century, industrialization.
Roads defined the 20th century, mass production.
Connectivity will define the 21st century, information.

Dana Blankenhorn, www.danablankenhorn.com

To make it simple to understand, we have entitled the ownership structure "Neworg", short for *new organization*. We are recommending that the ownership of Neworg be a privately-held, for-profit C corporation with a focus on selling fiber services to communications companies (*carriers*) in the region including telephone companies, cable companies, wireless companies, Internet companies and cellular companies.

5.1 Recommended Model

The ownership model we are recommending is based on a number of criteria that came to light during the study. While talking with residents of Humboldt County and with potential purchasers of service on this new fiber, it became clear that Neworg needed to encompass the following characteristics to be successful:

- Solid financial status
- Technical and operational credentials in the communications technology area
- Deep, long-term commitment to the economic vitality of the region
- Clear understanding of the communication needs of the region
- Entrepreneurial creativity backed with solid business skills
- Avoidance of decision-by-committee structures
- No government ownership or operation

In the end, we are recommending a new privately-held, C corporation be formed to run Neworg. Neworg will become a carrier's carrier – that is, focus on selling services to the companies who want to provide the local communications connectivity in the Humboldt County area and the surrounding regions. With the focus on selling to the communications companies in the area (see Section 4 for more details), Neworg can operate with a lean organization and stay focused on helping carriers who want to provide data and broadband services in the region build their local market.

In some aspects, Neworg needs to take on the ideals of a non-profit – to serve the region's public good by identifying underserved communities and by catalyzing local demand for broadband services. In turn, this will grow the service providers' markets and ultimately create new demand for middle mile fiber connectivity. At the same time, it must retain the nimbleness and flexibility afforded to it by the for-profit C corporate structure to attract investors with a long-range economic interest in the region.

Neworg, as a visible technology company in the area, can assist the county in becoming recognized as a technology center – a critical step for relocation of businesses into the area. As such, Neworg should retain local staff and work closely with the local colleges and high schools to provide internship opportunities.

In this model, the fiber and other assets of Neworg are owned by the shareholders of the C corporation. It is critical to find investors who have a long-range economic interest in the region and are not investing to make a quick buck. The financing of Neworg is discussed in detail in Section 6.4 of this report, but bears a mention in this section. It is unlikely that Neworg will have any profit for at least 5 years, due to the large upfront investment required by the fiber build. This means that it will be difficult for the organization to obtain traditional commercial financing or meet today's return on investment expectations.

5.2 Process

The ownership model was selected based on:

- governance models that have previously succeeded in the Humboldt County area
- governance models that have succeeded in other jurisdictions for similar assets
- solutions that may be unique to the culture of Humboldt County

During the course of the study, we spoke to a variety of different organizations and individuals from the Humboldt area to gain more insight into what works and what doesn't work in the area. In addition, we spoke to a variety of potential customers of Neworg and listened to their opinions as well. These conversations were particularly valuable in that they really provided a laser-focus to the ownership model proposed. The potential customers had solid ideas about how an organization needed to be structured to allow them to most easily purchase services. The Humboldt organizations and individuals had very definitive ideas about what works and what doesn't in the county. In addition, we looked at other structures of fiber holding companies and found that some are transitioning from traditional non-profits to for profit or LLC companies to make it easier to function. The net result was the recommended model.

6. Financial Model

This section discusses the estimated expenses for the aerial and fiber build as well as their minimum revenue requirements and breakeven points. It also covers financing.

6.1 Expenses

We have included capital expenditure installation expenses and annual operation expenditures for two different options: an aerial fiber build utilizing the PG&E poles and a buried fiber build utilizing State Route 299. Many of the costs are similar between the two options, but some costs are unique to the technique.

In general, the aerial build option appears to be the most cost effective over time and, as such, creates a good opportunity to provide a realistic ROI for investors. Over ten years, the aerial cost of building and operating the fiber is approximately $11M. The same cost for the buried fiber build and operations is approximately $24M. Detailed expenses are shown in the next two sections for each type of build.

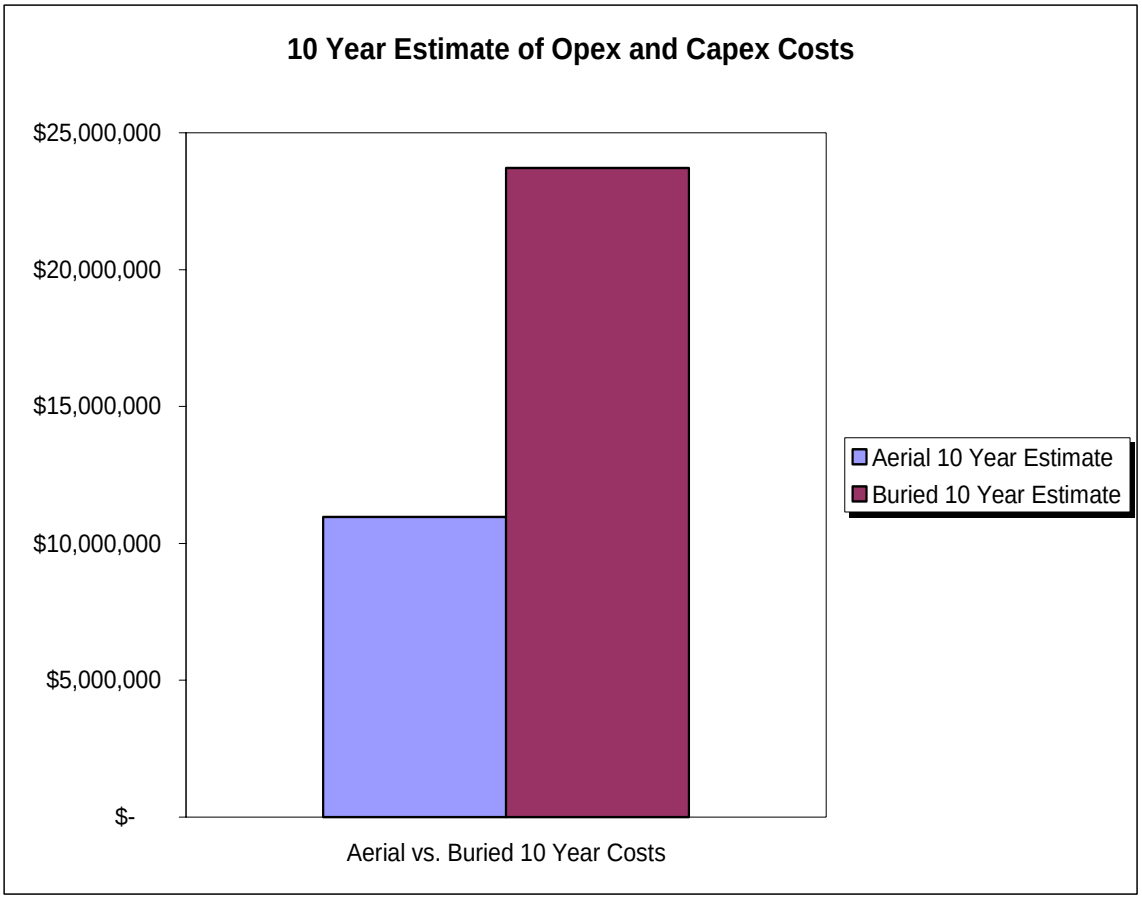


Figure 3. The aerial fiber build is about half the cost of the buried build when looking at total costs over 10 years, making it an attractive option for Humboldt County.

6.1.1 Aerial Build

In Figures 4 and 5, we have detailed the expected expenses of an aerial fiber build. We utilized the following assumptions in these calculations:

- Approximately 147 miles of fiber needed (776,160 feet) where 30% utilizes existing burial routes (typical in city centers)
- 44 miles of buried fiber (232,848 feet of buried fiber)
- 103 miles of aerial fiber (543,312 feet of aerial fiber)
- 17.6 poles per mile for the aerial run
- Installation of a 144 strand single mode fiber

We have also defined both one time installation costs and recurring costs for planning purposes. The Project Item column shows the different items that need to be considered for a fiber build including project management and a contingency fee. The average costs were obtained from industry sources and from specific pricing information provided by right of way holders (see Appendice for detailed information.) The Cost Basis and the Based On columns provide information as to how the calculations were based. The Capex includes the capital expenditures needed for the initial installation and the Opex includes the ongoing annual expenses.

The estimated total cost of installation is $8.8M. The ongoing maintenance and operations cost for this option is $220K annually.

Aerial Capital Expenditure (Capex)					
Project Item	***Cost***		***Cost Basis***	***Based on***	***Initial Capex***
Survey, route design, mapping	$	0.49	foot	total mileage	$ 380,318
Develop scope of work	$	0.05	foot	total mileage	$ 38,808
Submittal of utility ROW agreements	$	0.35	foot	total mileage	$ 271,656
Environmental Impact Study	$	0.25	foot	total mileage	$ 194,040
Aerial construction permits	$	0.17	foot	aerial mileage	$ 92,363
Agency permit fees	$	0.03	foot	total mileage	$ 23,285
Traffic plans	$	0.39	foot	total mileage	$ 302,702
Pole engineering, wind loading	$	540.00	pole	pole count	$ 977,962
Installation of utility pole attachments	$	0.55	foot	aerial mileage	$ 298,822
Pole anchors, bonding, grounding	$	0.25	foot	aerial mileage	$ 135,828
Aerial cable placement	$	0.79	foot	aerial mileage	$ 429,216
Underground cable placement	$	0.89	foot	buried mileage	$ 207,235
Fiber	$	1.25	foot	total mileage	$ 2,328,480
Weatherproof enclosures with electronics	$	100,000	site	#	$ 100,000
Full time inspector	$	750.00	day	250 build days	$ 187,500
Asbuilt drawings	$	0.50	foot	total mileage	$ 388,080
Subtotal Installation					*$ 6,356,295*
Project Management/Administration		15%	Installation Subtotal		$ 953,444
Subtotal Installation and Management					*$ 7,309,739*
Contingency		20%	Installation & Maintenance Subtotal		$ 1,461,948
Grand Total					***$ 8,771,687***

Figure 4. This spreadsheet shows the initial aerial build costs.

Aerial Annual Operations Expenditure (Opex)					
Project Item	***Cost***	***Cost Basis***	***Based on***	***Annual Opex***	
PG&E Pole Attachment	$ 17.35	pole/year	pole count	$	31,422
AT&T Conduit Lease	$ 0.55	foot/year	buried mileage	$	128,066
Subtotal Installation				*$*	*159,488*
Project Management/Administration	15%	Installation Subtotal		$	23,923
Subtotal Installation and Management				*$*	*183,411*
Contingency	20%	Installation & Maintenance Subtotal		$	36,682
Grand Total				***$***	***220,093***

Figure 5. This spreadsheet estimates the annual operating cost of the fiber.

6.1.2 Buried Build

In Figures 6 and 7, we have detailed the expected expenses of an buried fiber build. We utilized the following assumptions in these calculations:

- Approximately 147 miles of fiber needed (776,160 feet)
- 40 miles of controlled roadway subject to Caltrans fees
- Installation of a 144 strand single mode fiber

We have also defined both one time installation costs and recurring costs for planning purposes. The Project Item column shows the different items that need to be considered for a fiber build including project management and a contingency fee. The average costs were obtained from industry sources and from specific pricing information provided by right of way holders such as Caltrans (see Appendix E for detailed information.) The Cost Basis and the Based On columns provide information as to how the calculations were based. The Capex includes the capital expenditures needed for the initial installation and the Opex includes the ongoing annual expenses.

The total estimated cost of installation is $19M. The ongoing maintenance and operations cost for this option is $468K annually.

Buried Capital Expenditure (Capex)				
Project Item	***Cost***	***Cost Basis***	***Based on***	***Initial Capex***
Survey, route design, mapping	$ 0.49	foot	total mileage	$ 380,318
Develop scope of work	$ 0.05	foot	total mileage	$ 38,808
Submittal of utility ROW agreements	$ 0.35	foot	total mileage	$ 271,656
Environmental Impact Study	$ 0.25	foot	total mileage	$ 194,040
Trenching permits w/CADD dwgs.	$ 2.95	foot	buried mileage	$ 2,289,672
Agency permit fees	$ 0.03	foot	total mileage	$ 23,285
Traffic plans	$ 0.39	foot	total mileage	$ 302,702
Underground cable placement	$ 0.89	foot	buried mileage	$ 690,782
Plow/rockwheel trenching	$ 4.50	foot	80% of buried mileage	$ 2,794,176
Trench/bore	$ 24.50	foot	20% of buried mileage	$ 3,803,184
Fiber	$ 1.25	foot	total mileage	$ 2,328,480
Weatherproof enclosures with electronics	$100,000	site	#	$ 100,000
Full time inspector	$ 750.00	day	250 build days	$ 187,500
Asbuilt drawings	$ 0.50	foot	total mileage	$ 388,080
Subtotal Installation				*$ 13,792,684*
Project Management/Administration	15%	I Subtotal		$ 2,068,903
Subtotal Installation and Management				*$ 15,861,587*
Contingency	20%	I&M Subtotal		$ 3,172,317
Grand Total				***$ 19,033,904***

Figure 6. This spreadsheet shows the initial buried fiber build costs.

Buried Annual Operations Expenditure (Opex)				
Project Item	***Cost***	***Cost Basis***	***Based on***	***Annual Opex***
AT&T Conduit Lease	$ 0.55	foot/year	buried mileage	$ 128,066
Caltrans ROW	$ 1.00	foot/year	40 miles	$ 211,200
Subtotal Installation				*$ 339,266*
Project Management/Administration	15%	I Subtotal		$ 50,890
Subtotal Installation and Management				*$ 390,156*
Contingency	20%	I&M Subtotal		$ 78,031
Grand Total				***$ 468,188***

Figure 7. This spreadsheet shows the annual buried fiber build operating costs.

6.3 Revenue

In order to determine the minimum revenue streams needed for the project to provide either a 5 year or 10 year ROI, we looked at expected expenses balanced against annual sales. The following assumptions were used:

- 10 fibers leased to communications carriers
- Annual expenses were based on operating expenses plus sales and marketing and general and administrative costs.
- Wholesale price was based on breaking even for the anticipated model and should not be considered a final sales price. The final sales price may vary considerably depending on the specific customer configuration.

Detailed spreadsheets showing the calculations are included in Appendix I.

The most interesting outcome of this revenue model is that it seems reasonable to assume a 5 year ROI for the aerial fiber build. We found that an annual lease fee of $197,500 can be charged (considered affordable by the carriers.) In the 10 year breakeven example, the annual lease fee could be even less. This is shown clearly in Figure 8 below. Figure 8 also shows that the buried fiber build requires a much higher annual lease fee per fiber. There may be carriers who feel that the buried sales price is worth the expense, even though it is higher. Determining these preferences will be a key element of the detailed business plan.

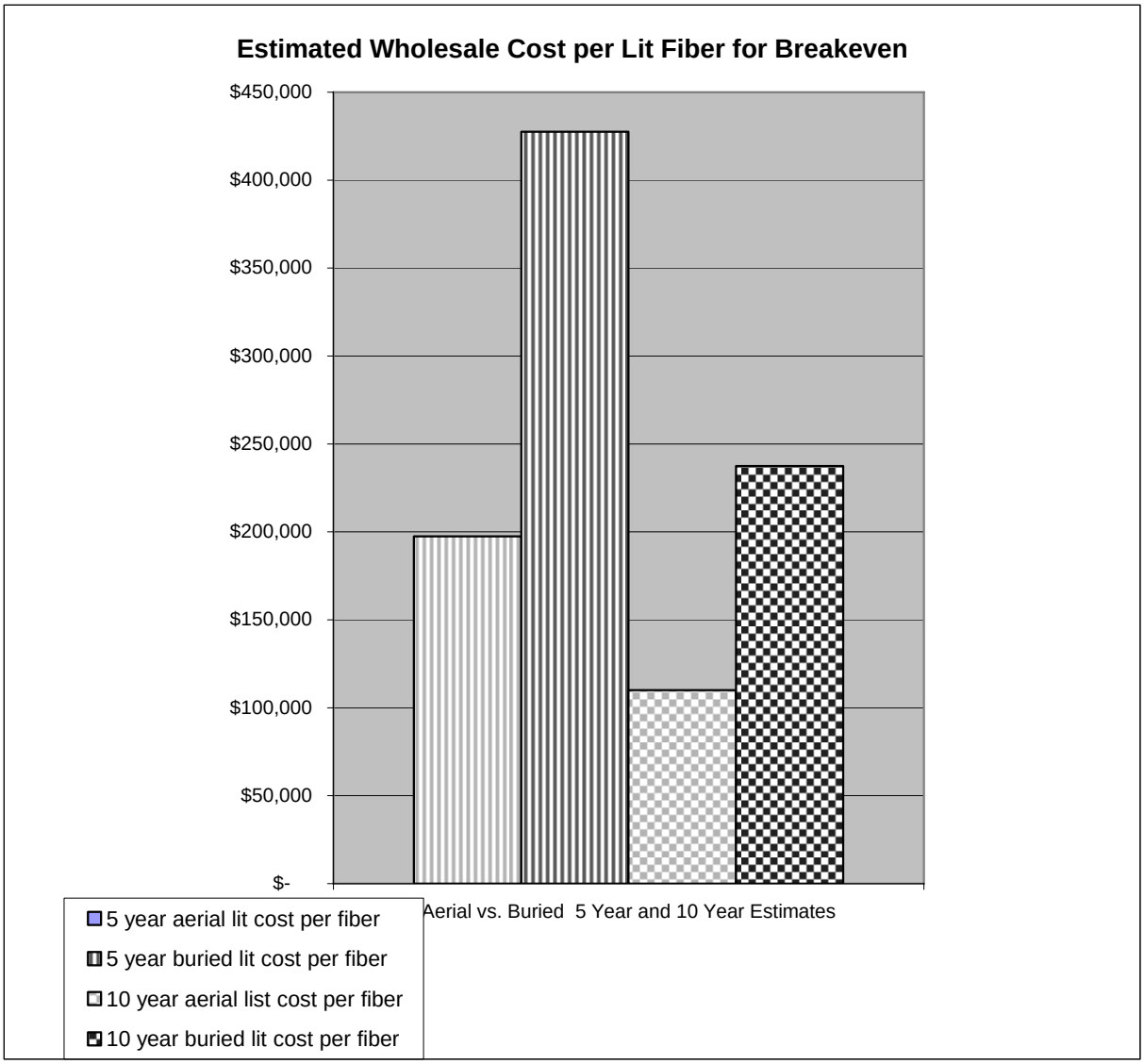


Figure 8. The aerial fiber build nets out a very affordable sales price for single fibers.

6.4 Financing

Neworg has a difficult task in ensuring that the investment and revenue model instills confidence with the potential buyers of services. Nothing will turn off customers faster than inadequate or uncertain funding particularly the conservative, service-driven customer that Neworg will be pursuing.

Because we are recommending a privately-held, for-profit company, we recommend that investment capital be raised to cover the initial build of the fiber. This will build confidence with carrier companies who will be purchasing fiber services. In the startup period, the monthly income generated by selling access to the fiber should be set such that ongoing expenses are covered and a repair and replacement reserve is funded.

To further complicate the financing strategy, traditional investors in private companies expect a return on investment (ROI) rather quickly – months to a small number of years is typical. As such, the Neworg will have to find investors who are interesting in growing the region economically, not just the ROI on their Neworg investment. A number of the study participants mentioned individuals, banks, foundations and companies that might have a vested interest in protecting their long-range investments in the area and, as such, would be potential investors with a long-term vision and willing to accept a long-range ROI. Once a business plan is finalized, we recommend that these sources of funds be further investigated for possible investment in the new venture.

Because the company will be new, it will be difficult for it to secure institutional loans. But, there may be organizations within the county that might be in the position to fund Neworg through loans because of the fiber's overall economic benefit to both Humboldt County and Redwood Region institutions.

Alternative Model	*Advantages*	*Disadvantages*
Government Financing	Low interest loans	-Tedious process -No obvious agency -New company
Commercial Loan	-Less upfront investment needed -Community bank or other lending institution could loan for the 'good of the community'	-New company will have a difficult time getting commercial financing
Grant	Unfettered funds	-Grant opportunities are limited by the location of fiber. -No obvious source to cover the millions needed for the initial build
Venture Capital	Investments generally available with solid business plan	18 month to 3 year exit strategy must be solid and provides risk for company and possible hesitancy from carriers to use fiber.

Figure 9. Summary chart of the advantages and disadvantages of alternative fund sources.

7. Service Provisioning Models

This section discusses the recommendation of initial service provisioning as well as ongoing operations. Initially, service provisioning involves the fiber build itself and then involves the operations and maintenance of the fiber as well as operational requirements of new interconnections.

7.1 Recommended Model

For the initial fiber build, we recommend that Neworg outsource the installation to a qualified contractor. It is essential that the build be done by a contractor who is well versed in laying fiber as well as the permitting process. This will ensure that a high quality installation is done and the fiber will perform as required.

At the same time, it will be important to have a detailed engineering study done prior to the installation, particularly if you choose to install using direct buried fiber. This study will also be utilized for the CEQA process. Using an RFP would be good, but you might want to talk to local resources and knowledgeable folks to help determine who is the right fit.

Neworg will also need to locate and outfit the colocation point in Eureka. This could be done in conjunction with one of the local providers such as AT&T or Sudden Link or be built by the fiber contractor.

Operations and maintenance includes the following items:

- Operations and monitoring of the fiber and associated hardware
- Ongoing maintenance of the fiber and associated hardware
- Emergency maintenance of the fiber and associated hardware
- Operations of the collocation point
- Installation and management of the interconnections with carriers

A number of potential customers of the fiber are also interested in providing on one or more of these functions. During the business planning process, we recommend that a list of potential bidders be compiled for an eventual RFP or contract.

7.2 Process

One option for long term fiber maintenance is Level 3's professional services. We recommend that once a final determination of the fiber build is determined, a quote be obtained from Level 3 for inclusion in the plan. See Appendix K for more information.

8. Implementation Project Plan

One of the first steps for this project is to choose which build type will work best for the area and then develop a detailed business plan. The business plan should include a detailed marketing and sales strategy, potential customer commitments and definitive costs and revenues. The business plan is a critical element in finding and convincing investors to fund the enterprise and a solid story for working with potential customers. Appendix C has a sample table of contents for a business plan.

During the study process, we identified construction and planning resources that may assist in the business planning process or the actual construction. These are listed in Appendix D. Additional resources should be collected and be incorporated in the business planning process.

Also, during the business plan process, it will be important to obtain written commitment from both potential funders and potential customers and to make a firm determination and forecast of sales. A very important step is to set a firm timeline for installation and operations to ensure that potential customers have adequate time for budgeting and engineering plans. We want to make it easy for them to connect to the new fiber.

The community and Neworg should work with Humboldt State University (HSU) to determine the feasibility of implementing a local peering point as part of the fiber install and make appropriate plans to fund the peering point and encourage use of the peering point. HSU currently has the largest communications path into its campus from outside the county. As such, it has the most leverage in encouraging providers to participate in building and connecting to a local peering point.

Neworg should also work with the community to build widespread community support for broadband which will net larger broadband demand -- exactly what the carriers want and what Neworg needs to ensure its viability.

9. Acknowledgements

There have been many people who have been generous with their time and knowledge that helped with this report.

First, Tina Nerat deserves thanks for her tireless efforts in helping identify and set up interviewees, keeping us straight about the region and her sage advice as we completed this report. She has been an invaluable silent partner in this endeavor. Connie Stewart also worked extensively during the interview process.

Skip Dye graciously advised us on the technical details of the fiber world and was priceless in his assistance in navigating the financial understanding of the project. He also shared trusted contacts to benefit the community.

Thanks to all the R groups who supplied advice when it was needed and continue to keep the community educated about the wonderful benefits of broadband.

And, thanks to the wonderful communities that comprise Humboldt County. Your broadband enthusiasm and spirit keeps you unique in this nation – a community who 'gets it'. Humboldt is the perfect example of a true First Mile community. Titus Moetsabi said it perfectly when he first described the attitude of a first mile of community, "Connect yourself to the rest of the world and all it has to offer."

Appendices

Appendix A. Study Participants

Assembly Member Patty Berg's Office
- Connie Stewart

AT&T (formerly SBC)
- Rhunette Alums
- Gary Mandella

California State Parks
- Ilijana Asara
- Liz Burko
- Phil Esry
- Alan Friedman
- Chris Ortiz

College of the Redwoods
- John McBrearty

City of Arcata
- Dan Hauser
- Paul Pitino

City of Blue Lake
- Wiley Buck

City of Eureka
- Dave Tyson

City of Ferndale
- Michael Powers

City of Fortuna
- Duane Rigge

City of Rio Dell
- Jay Parrish

Cox/Cebridge
- Mark Geiger

County of Humboldt
- Jacqueline Debets
- Kim Kerr
- Dan Larkin
- Loretta Nickolas
- John Woolley

Corporation for Education Network Initiatives in California (CENIC)
- Jim Dolgonas

Edge Wireless
- Roy Willy

Eureka Chamber of Commerce
- Chris Crawford

Frontier
- Donna Dilts

Hoopa Tribe
- Jim Allen
- Gene Genoar
- Lyle Marshall

Humboldt Area Foundation
- Kathy Moxon

Humboldt Artworks
- Angie Schwab

Humboldt County Office of Education
- Garry Eagles
- Joe Sapper

Humboldt County Office of Economic Development
- Jacqueline Debets

Humboldt Creamery
- Lisa Carnahan
- Rich Ghilarducci

Humboldt Merchant Services
- Ann Condon

Humboldt State University
- Ann Burroughs
- Brad Finney
- Denice Helwig
- David Mashall
- Rollin Richmond
- Rick Vrem

Independent
- John Hauser

Last Mile Digital
- Andy Johannesen

Level 3
- Erik Huntsinger

National Weather Service
- Nancy Dean

Redwood Coast Rural Action (RCRA)
- Various

Redwood Region Economic Development Commission (RREDC)
- Gregg Foster and board

Redwood Technology Consortium (RTC)
- Bob Morse
- Tina Nerat

St. Joseph's Hospital System
- Larry Raizen

Security National Service
- Mark Hodgson

Small Business Development Center (SBDC)
- Kristin Johnson

Sprint
- Phil Butler
- Steve Easley

State of California Business, Transportation and Housing Agency
- Jeff Newman

Verizon
- Kurt Rasmussen

US Cellular

Yurok Tribe
- John Corbett
- Howard McConnell

Appendix B. Introduction to Muni Peering Points

Muni Peering Points (MPP) are the building blocks of new networks. They create community connectivity, essentially catalyzing companies to provide good first mile broadband solutions. They bring communities to the network and offer access to the currency of the 21st century: information.

Just how critical are MPPs? As Dana Blankenhorn writes,

> *In the 21st century, connectivity is our basic infrastructure. The more you have -- the more speed, the more access across all sorts of boundaries -- the greater your access to the world. And the greater your access to the world -- the more connectivity you have -- the more wealth you can create and accumulate.*
> *Let me summarize this in a way you might understand:*
> - *Guns defined the 17th century, colonization.*
> - *Ships defined the 18th century, trade.*
> - *Canals and railroads defined the 19th century, industrialization.*
> - *Roads defined the 20th century, mass production.*
> - *Connectivity will define the 21st century, information.*

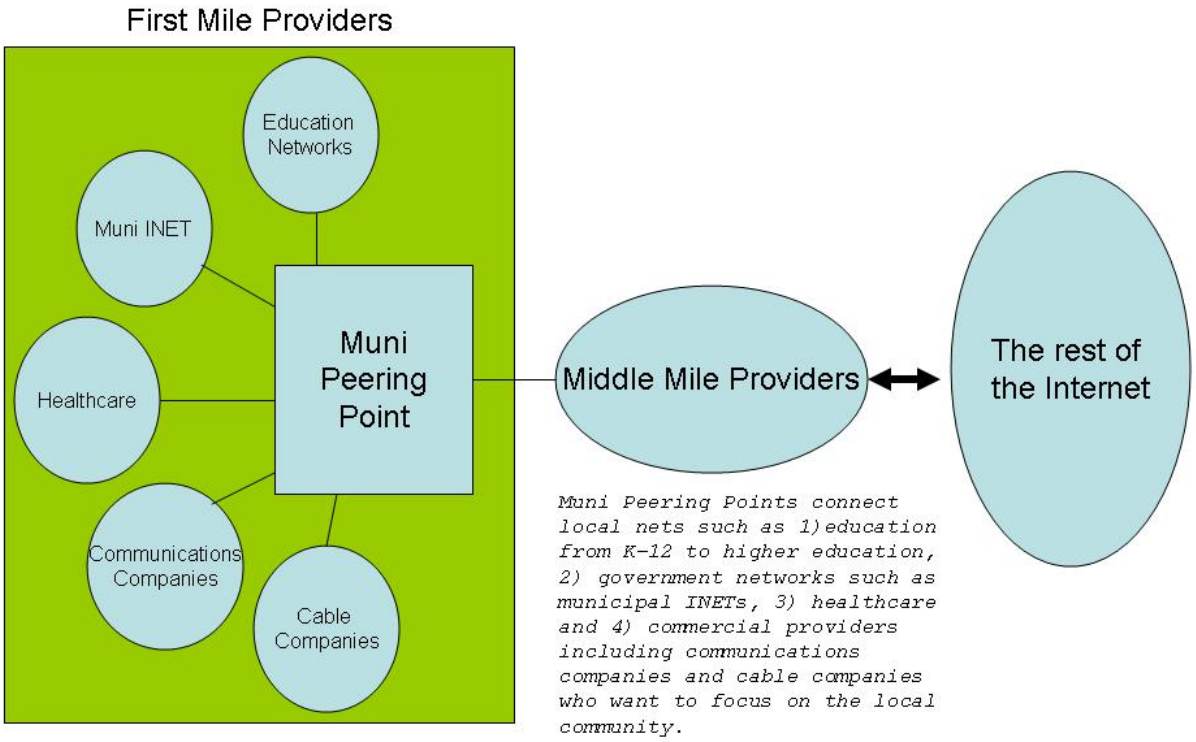
One can think of the muni peering point as the new central office for communications—in essence, a communications commons. Peering among local networks, which can be thought of as the equivalent to free local calling, occurs within exchanges. The local community networks peer with each other at the MPP, exchanging traffic without leaving the area (see Figure 1). MPPs act as regional hubs that:

- Keep local traffic as regional as possible
- Allow remote community ISPs (and maybe end users) to choose providers at MPP, rather than having to use only the ones who can get to the community
- Allows municipalities to provide a cost-effective interconnect method while staying out of the competitive service business

MPPs allow communities to provide FACILITIES without providing SERVICES by connecting community networks consisting of providers plus fiber and/or wireless facilities. Transit providers connect this community facility network to the outside world. A MPP allows the local community to easily and economically support many transit links. Supplier networks interconnect MPPs.

MPPs give communities what is needed for scalable networks – building local interconnections to what people want: education, healthcare, and entertainment as well as for communicating with colleagues, friends, and family. They offer a multitude of features, such as:

- Solid off-the-shelf technology
- Innovative connections at layer 1, 2 or 3
- Scope and choice for consumers
- Simple, fast and cheap to build and maintain



Moreover, community MPPs can:

- Encourage competition, driving down prices
- Provide communities with a technology center
- Serve as a hub to attract technology-oriented business
- Drive down transit costs
  - Transit costs in Canada decreased by 30%, while capacity quadrupled
- Allow a connectivity platform for application services
  - Voice – like telephone calls
  - TV and other video
  - Healthcare –diagnosis and monitoring
  - Situational Awareness – public health, environment, weather
  - New ways of communication with friends and family

Appendix C. Sample Business Plan Table of Contents

Taken from http://www.bizplanit.com/vplan/toc/samples.html

Company Description
ÊÊ Legal Description
ÊÊ Business History & Description
ÊÊ Current Status
ÊÊ Future Plans
ÊÊ Key Management

Mission & Vision
ÊÊ Mission Statement
ÊÊ Company Vision
ÊÊ Corporate Values & Approach

Product & Service Description
ÊÊ Overview of Products & Services
ÊÊ Product & Service Advantages
ÊÊ Proprietary Features
ÊÊ Product Development Activities
ÊÊ Product Liability

Industry Analysis
ÊÊ Industry Overview
ÊÊ Industry Participants
ÊÊ Industry Trends & Growth

Target Market
ÊÊ Market Demographics
ÊÊ Market Trends & Growth Patterns
ÊÊ Market Size and Potential

Marketing Plan
ÊÊ Marketing Strategies
ÊÊ Marketing Tactics
ÊÊ Positioning
ÊÊ Public Relations

Sales Plan
ÊÊ Sales Strategies
ÊÊ Sales Process
ÊÊ Sales Team
ÊÊ Distribution Channels

Competitive Analysis
ÊÊ Competitive Overview
ÊÊ Market Share Analysis
ÊÊ Direct Competitors
ÊÊ Indirect Competitors
ÊÊ Competitive Advantages
ÊÊ Barriers to Entry

Operations Plan
ÊÊ Location
ÊÊ Property Ownership/Lease Terms
ÊÊ Equipment
ÊÊ Purchasing Policies
ÊÊ Quality Control Measures
ÊÊ Administrative Procedures
ÊÊ Staffing and Training
ÊÊ Labor Considerations
ÊÊ Management Control Systems
ÊÊ Organizational Chart

Regulatory Requirements
State
Federal

Management Team
ÊÊ Key Management
ÊÊ Board of Advisors
ÊÊ Board of Directors
ÊÊ Professional Service Providers

Financial Plan
ÊÊ Financial Summary
ÊÊ Current Ownership Summary
ÊÊ Funding Request / Terms of Investment
ÊÊ Sources and Uses of Funds
ÊÊ Exit Strategy
ÊÊ Projected Financial Statements
ÊÊ Financial Assumptions
ÊÊ Historical Financials
ÊÊ Break-Even Analysis
ÊÊ Financial Ratios

Appendices
ÊÊ Product Samples/Pictures
ÊÊ Management Resumes
ÊÊ Business Location Site Information
ÊÊ Legal Documents
ÊÊ Other Critical Data

Appendix D. Implementation Resources

D. 1 Environmental Consultants

Premiere
Environmental Consultants
Monica M. Oscarson MPH,CH
5532 Woodruff Ave.
Department 330
Lakewood, Ca. 90713
562-804-1145

D.2 Contractors

Oasis Telecom Companies
Bill Purcell
717-732-2387

NcI
Network Cabling, Inc.
Jason Plasse
760-743-1900

Underground Construction Co.,Inc
Jim Curry
707-746-8800

Skip Dye
Datalog, A, C7
7710 Balboa Ave., #223C
San Diego, CA 92111
858 569 4812 office
858 569 4273 fax
760 497 9286 cell
skipdye@flash.net

Appendix E. Caltrans Telecommunications Information

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
1120 N STREET
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-2346
FAX (916) 653-8762
TTY (916) 653-4086

Flex your power!
Be energy efficient!

ANNUAL COMPENSATION RATES FOR TELECOMMUNICATION PLACEMENTS IN CONTROLLED-ACCESS RIGHTS-OF-WAY

Pricing shall be based on the linear number of feet multiplied by the appropriate rate taken from the following list for each individual 1 inch to 1 ½ inch conduit or innerduct (approximate). Rates are payable in advance for the initial installation (the first annual payment shall be a prorated payment if applicable) and thereafter will be due annually by June 30th:

$1.00 for rural areas statewide (rural areas – any area within the State not urbanized as defined below)

$2.00 for smaller urban areas (urban areas – any urban area within the State that does not fall into other geographical pricing categories)

$2.50 for urbanized Southern California (Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties)

$4.75 for the urbanized San Francisco Bay Area (Alameda, Contra Costa, Marin, San Francisco, San Mateo and Santa Clara Counties)

*$8.00 for Toll Bridges

*Bridges (other) – add $1.00 to above rates for all areas

Reevaluation of Rates: The compensation rates shall be reevaluated and adjusted every five (5) years to reflect fair market value. The next adjustment shall be effective June 30, 2010.

The Permit shall have "rider" provisions specifying the annual compensation due and, if applicable, any other "in lieu" conditions (i.e. fiber, equipment, etc. dedicated for public use.)

*Bridge placements continue to be subject to the Longitudinal Exception Process.

Definition of Geographical Areas:

"Urbanized" – includes all areas defined as "Urbanized" in 23 U.S.C. 101 ["...an area with population of 50,000 or more designated by the Bureau of the Census, within boundaries to be fixed by responsible State and local officials in cooperation with each other, subject to the approval by the Secretary..."]. For reference purposes, currently designated urbanized areas are shown in yellow on the official California State Highway Map as issued by the Department of Transportation (2003 edition).

Appendix F. Pacific Gas and Electric Fee Schedule

Year of Attachment	Annual Rental Rate [Note 4]	
	Pole Attachment $/Pole Contact [Notes 1, 2 & 3]	Conduit Attachment $/Linear ft. [Notes 1 & 2]
2004	$16.04	$1.93
2005	$16.68	$2.01
2006	$17.35	$2.09
2007	$18.04	$2.17
2008	$18.76	$2.26
2009	$19.51	$2.35

1. All rental rates are for a period of one year from January 1 through December 31, billable and payable in advance in January of each year.

2. Rates for 2005 to year 2009 are forecasted based on historical costs, using a 4% escalation per year.

3. Pole attachment rate is for One (1) foot of space per attachment. Multiple pole contact rate will apply for attachments requiring more than One (1) foot of space or having multiple attachments on the same pole.

4. PG&E reserves the right to modify these attachment rates if any rules, regulations or orders of the CPUC, or a court of law, allow PG&E to charge a fee greater than the restraints imposed by Rule VI and the definition of "annual cost of ownership" in Rule II, Section I of CPUC Decision 98-10-058, dated October 22, 1998 ("fee restraints"). Modification of these attachment rates pursuant to this paragraph shall be effective beginning with the most recent annual period preceding the date when PG&E is allowed to charge attachment rates greater than the fee restraints.

0x01 graphic

EXHIBIT B

POLE AND CONDUIT ATTACHMENT RATE

Page 1 of 1 Rev. 01

01/2004

5.

Process Fees (Based on Poles/Application Package)

Year	2004	2005	2006	2007	2008
1 - 49 Poles	$176	$183	$190	$198	$206
50 - 99 Poles	$228	$237	$247	$256	$267
100 - 199 Poles	$456	$474	$493	$513	$533
>200 Poles	$543	$565	$587	$611	$635

Map Fees

Year	2004	2005	2006	2007	2008
Map Per Copy	$1.25	$1.30	$1.35	$1.40	$1.45
Mapping Hourly Rate	$67	$69	$72	$75	$78

Mapping hourly rate shall be charged by half hour increments with a minimum of a half hour charge per office visit. Number of maps copied per hour is approximately 10-20 maps (varies by scope of request).

Engineering Fees

Year	2004	2005	2006	2007	2008
Engineering Hourly Rate	$95	$99	$103	$107	$111
Pole loading Calc/Pole	$119	$124	$129	$134	$139
Pole Replacement Estimating/Pole	$380	$395	$411	$427	$445

Construction Facility Rearrangements Cost $/Crew day

Year	2004	2005	2006	2007	2008
*Service Connection Fee	$123	$128	$133	$138	$144
4 man Construction Crew	$2,843	$2,957	$3,075	$3,198	$3,326

Construction figures do not include engineering.

Figures are based on 8-hour work day

Construction Pole Replacement $/pole

Year	2004	2005	2006	2007	2008
City and County of San Francisco (Area 1)	$11,600	$12,064	$12,547	$13,048	$13,570
Bay Area/Peninsula (San Mateo and Santa Clara Counties) (Areas 1, 3)	$8,767	$9,118	$9,482	$9,862	$10,256

Bay Area/East Bay (Alameda, Contra Costa and Marin Counties) (Areas 2, 7)	$8,523	$8,864	$9,218	$9,587	$9,971
Outside Bay Area (Area 3 South; Areas 4, 5, 7)	$5,356	$5,570	$5,793	$6,025	$6,266
Transmission Poles (All Areas)	$11,451	$11,909	$12,385	$12,881	$13,396

Rates are based on PG&E's actual system average pole replacement cost.

Consent To Assignment (CTA) $/Assignment

Year	2004	2005	2006	2007	2008
Process A Request For CTA	$297	$309	$321	$334	$347

All dollar figures are based on PG&E's actual standard labor cost.

2004 - 2008 rate is forecasted to include 4% escalation rate.

0x01 graphic

EXHIBIT C

OVERHEAD FACILITIES

ESTIMATED STANDARD UNIT COST

MAKE READY & REARRANGEMENT WORK

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12/2003

Appendix G. Humboldt County Statistics

Humboldt County

Population

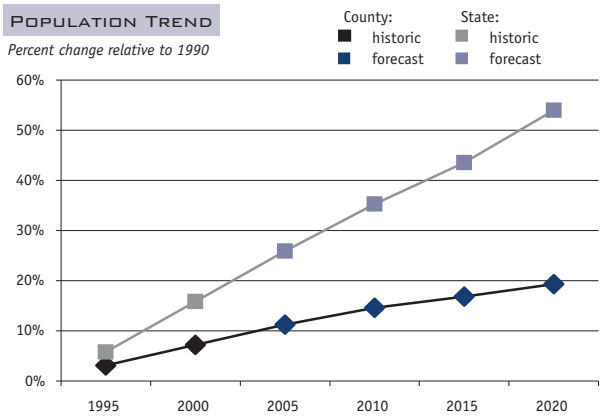
Population Trend:

1990 Population	119,118
Portion of pop. living in unincorporated area	52.2%
2000 Population	127,700
Portion of pop. living in unincorporated area	52.9%
Population change, 1990 to 2000	7.2%
Projected population change, 2000 to 2010	6.9%

Population by Age, 2003:

	under 18	18-34	35-49	50-64	65+	Average Age
County	23.2%	24.3%	22.9%	17.9%	11.8%	37.5
State	28.4%	23.1%	23.2%	15.2%	10.2%	36.7

Population Trend



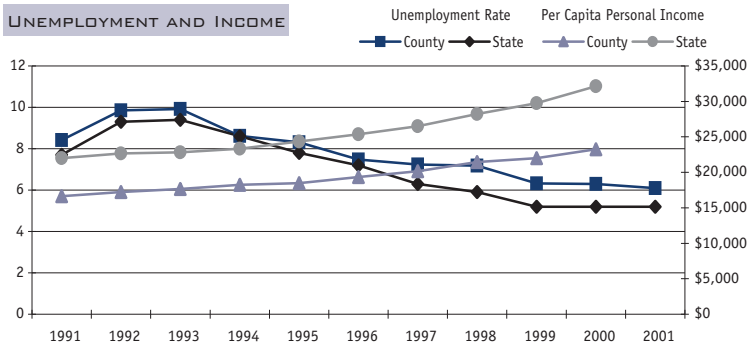
Economy

Workforce Characteristics:

	County	State
Total workforce (2001)	59,100	17,362,300
High school graduates (2001)	1,377	316,124
High school dropout rate (2000-01)	2.3%	2.8%
% of grad's qualified for UC/CSU (2001)	33.5%	35.6%
Average SAT score (2001)	1,058	1,006
Average wage per job (2000)	$ 24,932	$ 40,367
Housing demand* (2001)	-2.20	1.82
Home ownership rate (2000)	57.6%	56.9%
% of pop. below poverty (1999)	19.5%	14.2%
Average cost of care, infant age 0-2 (2001)	$ 6,473	$ 9,404
Average cost of care, child age 2-5 (2001)	$ 5,127	$ 6,394

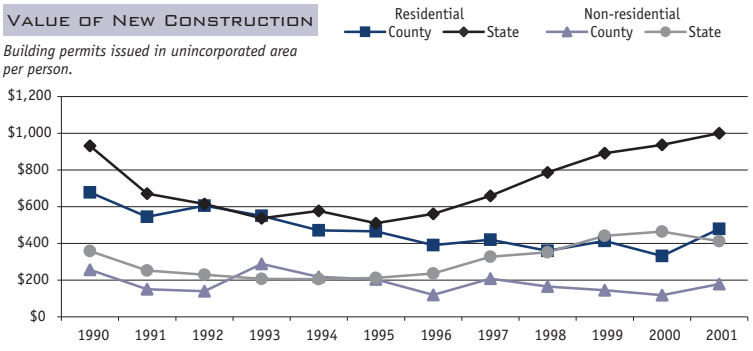
**ratio of change in workforce to new units of housing (based on building permits issued)*

Unemployment and Income



Value of New Construction

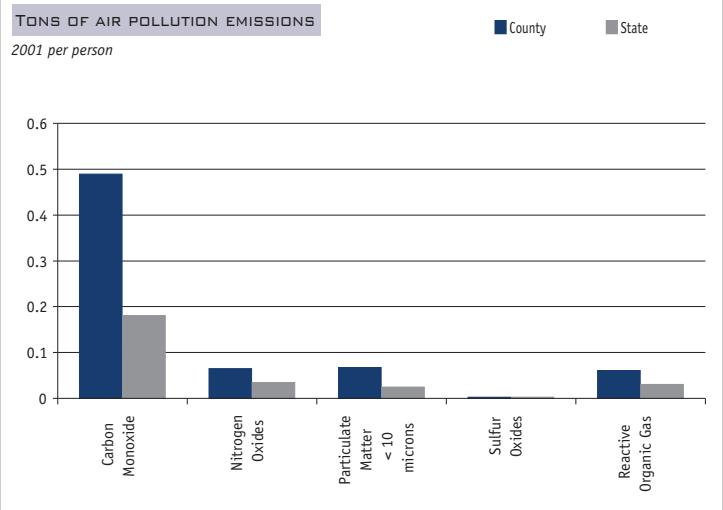
Building permits issued in unincorporated area per person.



Environment

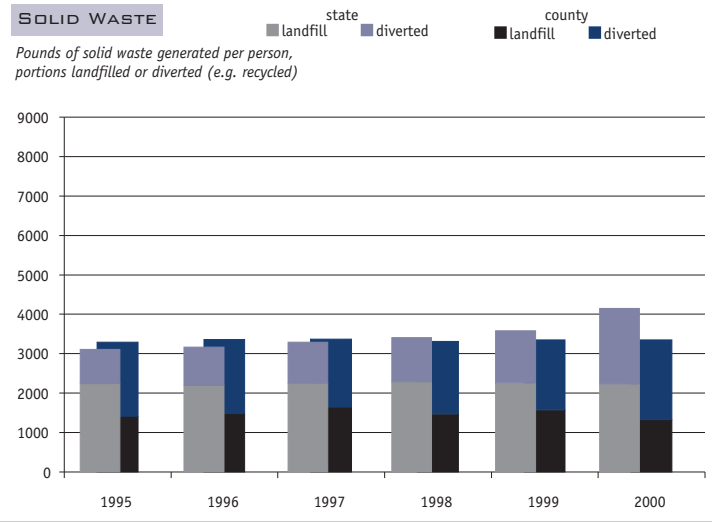
Tons of air pollution emissions

2001 per person



Solid Waste

Pounds of solid waste generated per person, portions landfilled or diverted (e.g. recycled)



Public Finance

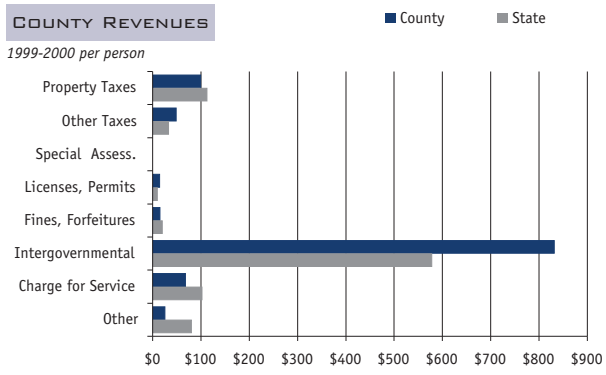
Fiscal Year 1999-00:

County Revenues:	Total	– Per Capita – County	State Avg.	Rank
Property Taxes	$ 12,788,137	$ 99.58	$ 112.61	38
Other Taxes	$ 6,246,538	$ 48.64	$ 33.12	27
Special Assess.	$ 0	$ 0.00	$ 0.50	15
Licenses, Permits	$ 1,889,861	$ 14.72	$ 9.67	37
Fines, Forfeitures	$ 1,936,438	$ 15.08	$ 19.97	46
Intergovernmental	$ 106,747,147	$ 831.24	$ 578.00	13
Charge for Service	$ 8,710,957	$ 67.83	$ 102.37	47
Other	$ 3,274,079	$ 25.50	$ 80.16	57
Total	$ 141,593,157	$ 1,103	$ 1,066	24

County Expenditures:				
General	$ 12,483,492	$ 97.21	$ 88.39	39
Public Protection	$ 35,129,093	$ 273.55	$ 266.56	36
Pub. Ways & Fac.	$ 12,010,893	$ 93.53	$ 30.07	20
Health	$ 26,686,600	$ 207.81	$ 153.49	14
Sanitation	$ 0	$ 0.00	$ 0.50	14
Public Assistance	$ 49,899,334	$ 388.57	$ 305.29	17
Education	$ 1,934,467	$ 15.06	$ 8.31	18
Rec. & Cultural Srv.	$ 415,985	$ 3.24	$ 8.02	36
Debt Service	$ 1,881,198	$ 14.65	$ 29.06	37
Total	$ 140,441,062	$ 1,094	$ 890	21

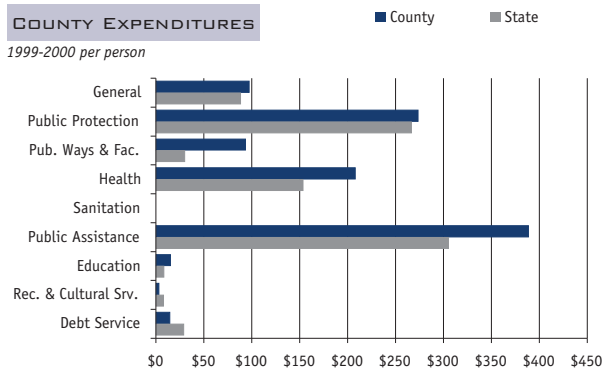
County Revenues

1999-2000 per person



County Expenditures

1999-2000 per person



Social Services

Hospital admissions for drug or alcohol treatment, 2000

County total	906
per 1,000 people	7.06
State average per 1,000 people	4.74

Mental health programs clients served, fiscal year 1999-00

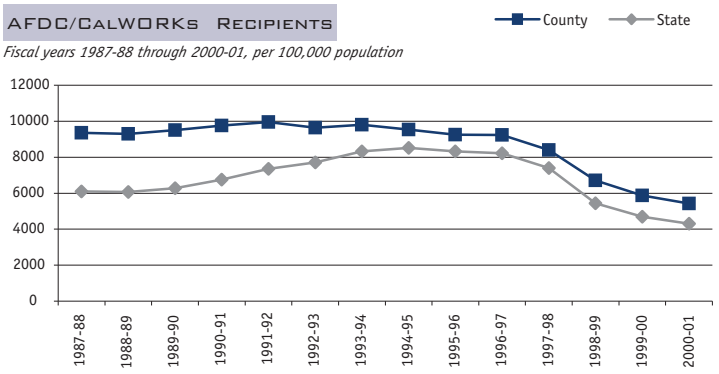
County total	3,304
per 1,000 people	25.73
State average per 1,000 people	14.36

Live births with late (3rd trimester) or no prenatal care, 2001

County percent	4.1%
State average	2.9%

AFDC/CalWORKs Recipients

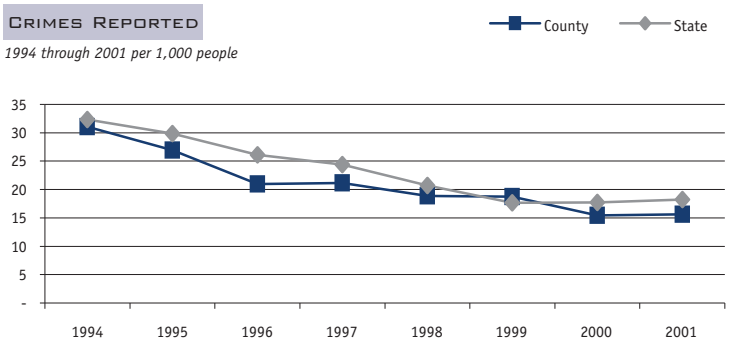
Fiscal years 1987-88 through 2000-01, per 100,000 population



Public Safety

Crimes Reported

1994 through 2001 per 1,000 people



2001 data, except where otherwise specified:

	County	State
Violent crimes per 1,000 people	4.20	5.97
Property crimes per 1,000 people	11.45	12.23
Arrests per 1,000 people	56.80	39.19
% of trials resulting in conviction (2000)	83%	84%
Adult Probation cases per 1,000 people	11.76	9.32
Law enforcement expenditures per person (fiscal year 1999-2000)	$ 131	$ 240

Civic Participation

	County	State
Percent of registered voters who voted in the 2002 General Election	54.4	49.6
Percent of residents eligible to vote who voted in the 2002 General Election	43.5	35.4
Percent of 2001 income tax returns with voluntary contributions	1.5	0.9

Source information for the data in this county profile is available on page 138.

Appendix H. CPUC and CEQA Information and Links

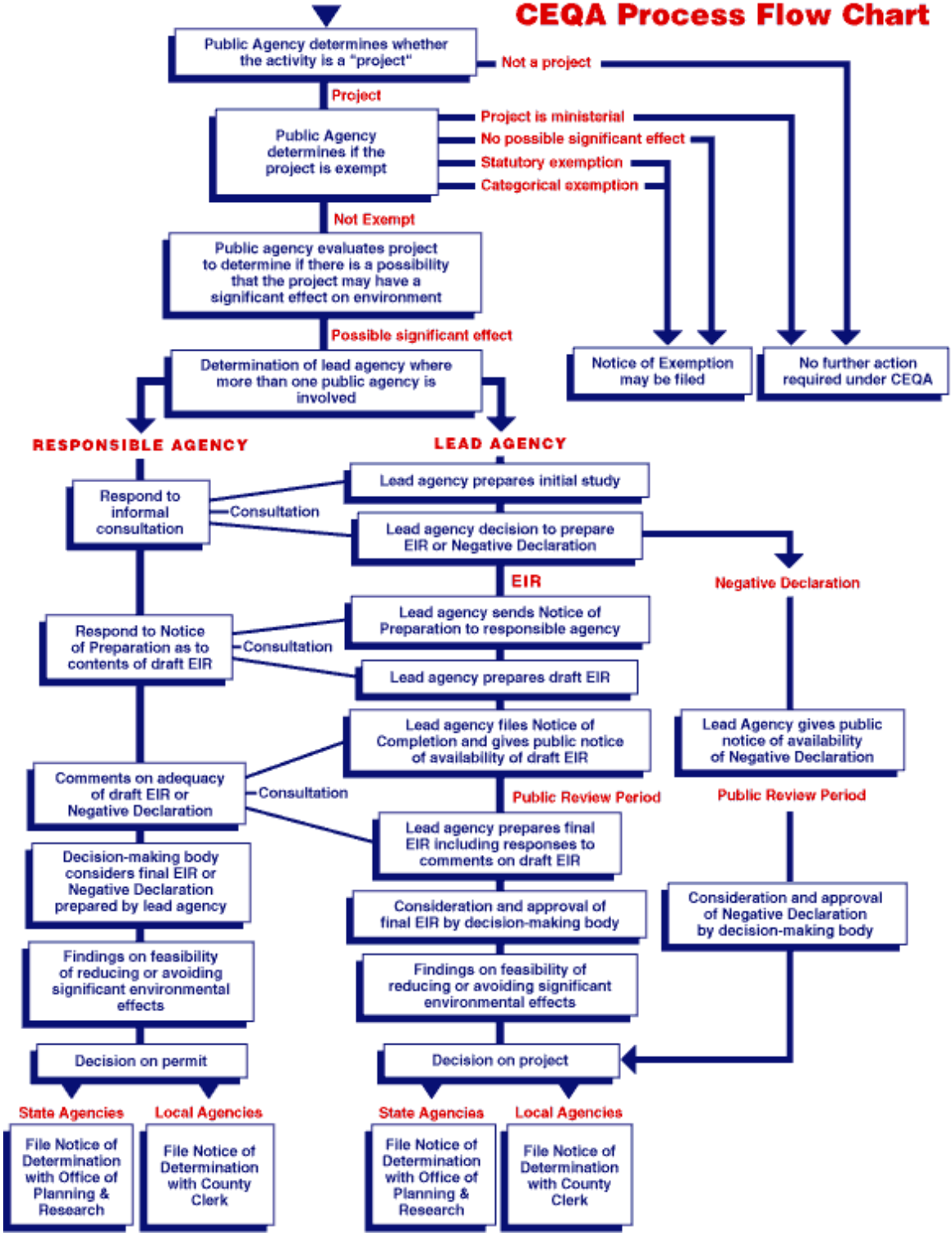
Competitive Local Carrier information at the CPUC can be found at
http://www.cpuc.ca.gov/static/telco/information+for+providing+service/clc+application/

Contact within the CPUC's Telecommunications Division for information about CLC and necessity for CEQA study:

Jack Leutza, Director
Telecommunications Division
505 Van Ness
San Francisco, CA 94102
(415) 703-1060

Contact within the CPUC's CEQA Division for details about CEQA study:

John Boccio
CEQA Telecommunications Projects Manager
Energy Division
505 Van Ness Ave
San Francisco, CA 94102
(415) 703-2641



Appendix I. RFP Resources from CompuMentor

The following resources are available for free from CompuMentor and could be helpful in the RFP process for the fiber installation.

The RFP Process: An Overview
If you plan to use an outside vendor, an RFP (request for proposal) can be a valuable tool. Here, NPower provides some basic considerations and tips for each phase of the bidding process. It also includes a link to a sample RFP.
http://ga0.org/ct/wpqByD61oRQ5/

Sample RFP Timeline
This sample timeline and checklist can serve as your rough guide to keeping the RFP process on track -- from developing and writing an RFP, to distributing it to vendors, to making a final selection.
http://ga0.org/ct/w7qByD61oRQv/

Appendix J. Breakeven Financial Charts

5 Year Breakeven for Capital and Operating Costs

Aerial			
Annual Expenses			
Aerial Operating Expense	$	220,093	
Sales and Marketing	$	44,019	20% of Opex
G&A	$	79,234	30% of Opex + S&M
Total Annual Expenses	$	343,346	
Annual Sales			
Annual lit fiber wholesale price	$	197,500	
Quantity of fibers sold	$	10	
Total Annual Sales	$	1,975,000	
Annual Profit/Loss	$	1,631,654	
Five Year Cost	$	9,872,154	Estimated Cost
Five Year Breakeven	$	9,875,000	Revenue Estimate

Buried			
Annual Expenses			
Buried Operating Cost	$	468,188	
Sales and Marketing	$	93,638	20% of Opex
G&A	$	168,548	30% of Opex + S&M
Total Annual Expenses	$	730,373	
Annual Sales			
Annual lit fiber wholesale price	$	427,500	
Quantity of fibers sold	$	10	
Total Annual Sales	$	4,275,000	
Annual Profit/Loss	$	3,544,627	
Five Year Costs	$	21,374,842	Estimated Cost
Five Year Breakeven	$	21,375,000	Revenue Estimate

10 Year Breakeven for Capital and Operating Costs

Aerial			
Annual Expenses			
Aerial Operating Cost	$	220,093	
Sales and Marketing	$	44,019	20% of Opex
G&A	$	79,234	30% of Opex + S&M
Total Annual Expenses	$	343,346	
Annual Sales			
Annual lit fiber wholesale price	$	110,000	
Quantity of fibers sold	$	10	
Total Annual Sales	$	1,100,000	
Annual Profit/Loss	$	756,654	
Ten Year Costs	$	10,972,621	Estimated Cost
Ten Year Breakeven	$	11,000,000	Revenue Estimate

Buried			
Annual Expenses			
Buried Operating Cost	$	468,188	
Sales and Marketing	$	93,638	20% of Opex
G&A	$	168,548	30% of Opex + S&M
Total Annual Expenses	$	730,373	
Annual Sales			
Annual lit fiber wholesale price	$	237,500	
Quantity of fibers sold	$	10	
Total Annual Sales	$	2,375,000	
Annual Profit/Loss	$	1,644,627	
Ten Year Costs	$	23,715,780	Estimated Cost
Ten Year Breakeven	$	23,750,000	Revenue Estimate

Appendix K. Level 3 Services Brochures

Level 3® Professional Services

Customized Solutions for Critical Network Projects

Today's evolving business climate presents both challenges and numerous opportunities. Your network can be a key factor in your ability to navigate change effectively.

The Level 3® Professional Services offering provides custom solutions that your business needs to address every stage of network growth. We will help you plan, deploy, optimize, manage and run your network infrastructure – regardless of its complexity or your organization's size. Our expertise and business-centric approach will help you reduce costs, manage complexity and boost your competitive edge.

Level 3's comprehensive Professional Services include:

- Network Audit and Optimization Services – We resolve issues affecting the performance and health of your network, prepare for changes in your business, or better manage the costs associated with your communications needs. We perform a variety of assessments from network performance to cost analysis to asset utilization.
- Network Design and Engineering Services – We develop end-to-end network design plans across all major technologies and vendors to meet your specific network objectives and constraints. We deliver a baseline network design recommendation and documentation to fully support the network design.
- Network Implementation and Migration Services – We perform simple cutovers to major network migrations, as well as conversions and implementations. We can plan and execute an entire deployment strategy from start to finish: identify the goals, define the migration process, develop schedules and checklists, and manage the implementation.
- Custom Network Monitoring & Management – We provide 24 x 7 proactive monitoring and management of customer networks via our Customer Network Control Center. Our shared environment ensures the most cost-effective services possible.
- Tech Services – We deliver responsive, on-going network support, including "smart hands" maintenance support, parts logistics support, and other value added services to support life-cycle engineering for management and maintenance of customer network assets.

Relying on our experience

Our team of professionals includes the same engineers who planned, built and maintain our 23,000 mile fiber-optic network. Our first-hand experience combines with a depth of networking expertise to provide best-in-class network solutions for your business, whether that solution includes wide area and metro IP, VoIP, Switched Data, or Optical networks.

Leveraging shared resources for cost efficiencies

You gain the cost advantages of our shared resources such as lab services, maintenance and monitoring resources, third-party vendor relationships and our own expert networking specialists.

Managing expenses and gaining productivity

Alleviate the need for internal network resources and focus on your core business. We will empower you to better manage operating expenses by uncovering methods for simplified network management, increased operating efficiencies and increased network productivity.

To learn more about the Level 3 Professional Services, call 1-877-2LEVEL3 or visit: www.Level3.com.

www.Level3.com
1-877-2LEVEL3