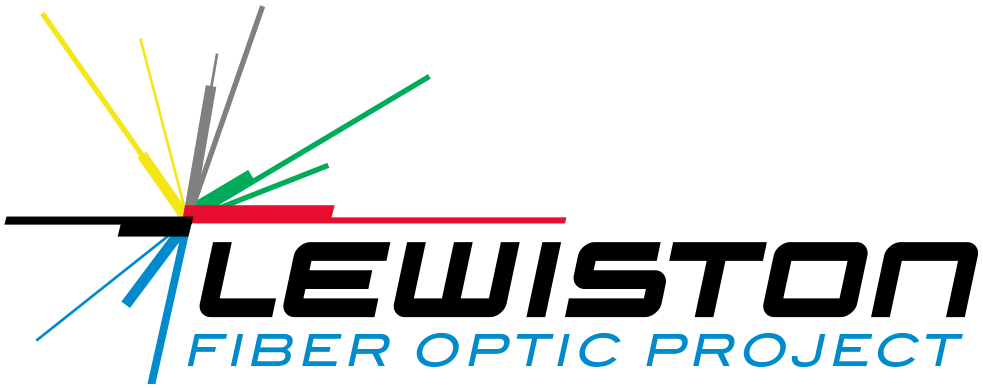

Lewiston Fiber Optic Project Feasibility Study

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LEWISTON
FIBER OPTIC PROJECT

Table of contents

Submitted to:

Port of Lewiston
Idaho - USA

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I. Executive Summary

The Port of Lewiston is embarking on a program to facilitate state-of-the-art communications services to citizens and businesses in the local area while simultaneously enhancing the status of Idaho as a technology and business leader in the US and the world. This report represents an evaluation of the feasibility of construction and operation of a fiber optic network within the port district boundaries.

Competitor areas both nationally and abroad are increasingly adopting fiber projects as the essential communication medium. This is not driven by the need for larger email attachments, more television channels or less of a wait browsing the internet. On the contrary, as communications, software, and businesses expand their reliance on high-bandwidth services, these possibilities facilitate other goals such as innovation, job growth, economic development, education, health services and community development.

The reasoning behind The Port of Lewiston expanding the local area fiber network is based on the belief that, like roadways, waterways, sewer systems, etc., government is best at developing infrastructure to be used by private and public businesses as well as individuals to expand economic development. Private-sector networks are not meeting this growing demand for bandwidth speed in an affordable manner[1]. Though there are private-sector fiber deployments underway in some areas of Idaho, they focus almost exclusively in high-density population centers or in direct business-to-business categories with limited access. In this context of private sector disinterest, The Port of Lewiston is creating an infrastructure asset with a network that is upgradeable and capable of supporting a large number of private or public sector communication initiatives. This fiber advancement in Idaho will:

- Promote private sector competition by allowing competing, differentiated broadband services and access quickly and inexpensively due to the availability of the infrastructure.
- Facilitate economic development by enabling small business creation and growth as well as the enhanced economic activity that accompanies it.
- Enhance the abilities for businesses, communities, students, health care providers, etc. that would not have access to the services and technology.
- Facilitate a free market system that allows access to an open, standards base internet platform.
- Promotion of initiatives like rural economic development, revitalization zones and health care access and advancement.

Without adequate fiber services, rural areas like Lewiston will become less attractive to not only businesses that increasingly rely on broadband services, but also to individuals that

choose to live in these communities. It is in Idaho and The Port of Lewiston's best interest to utilize the expansion of this network in order to provide additional access to advancing private and public businesses as well as a backbone for future enhancements such as Fiber to the Home (FTTH).

This initial study will expand on the information areas above as well as provide a rough installation path recommendation, fiber lighting & maintenance, and some initial costs and numbers which should be expanded through a more in-depth economic impact study.

2. Washington State Telecommunications as it relates to the Port of Lewiston

2.1 History of Telecommunications Development by PORTS & PUD's in Washington State

RCWs 53.08.005, 53.08.370, and 53.08.3801 *(http://apps.leg.wa.gov/RCW/default.aspx?cite=53.08&full=true#53.08.370)* allow ports and PUDs to build telecommunication infrastructure and offer it wholesale to service providers. Under these provisions, Ports have worked to develop a telecommunications plan and infrastructure to facilitate enhanced telecommunications services in their districts. Like the Ports in Washington State, The Port of Lewiston should collaborate with local independent telephone companies, when invited and where feasible, to create infrastructure that helps local providers enhance telecommunications services offered to rural communities.

Developing this feasibility study examines the viability of constructing infrastructure to meet the needs of the interested private investors and public sector. The Port of Lewiston should expand on this feasibility study to do a more in-depth evaluation of the construction cost of the proposed project, network equipment and installation costs, operational and maintenance costs, and a market analysis and economic impact study prior to developing its network.

2.2 Support of Public Policy

The Port of Lewiston, along with the state of Idaho, could develop a policy system that mirrors that of Washington State in order to advance economic development through infrastructure projects. In Washington State, fiber projects like the one proposed in Lewiston are supported through public policy at several levels. First, as previously stated, through RCWs 53.08.005, 53.08.370, and 53.08.380, port and public utility districts are empowered to build telecommunication infrastructure and offer it wholesale to service providers. The importance of telecommunications infrastructure is long

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established and confirms the importance of telecommunication infrastructure:

"WHEREAS telecommunications is vital to the security and welfare of this Nation and to the conduct of its foreign affairs" Although this statement was made in the context of the economic and values of the 1950's, not much has changed. In the Telecommunications Act of 1996, Congress directed the Federal Communications Commission (FCC) and state regulatory commissions to: "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans." *(2 Source: http://www.lib.umich.edu/govdocs/jfkeo/eo/10995.htm)*

This requirement translates into fiber optic networks and access to high-speed broadband internet access. The Federal Communications Commission defines "high-speed" broadband as data transmission rates in excess of 200 kilobits per second in either direction. In today's market of bundled services, cable, internet, phone, and software, all are carried over high-speed networks. These services are essential for Lewiston to remain competitive well into the future. Most recently, President Obama validated and invested in the compelling need for broadband services through the ARRA. Funds from this ARRA will be distributed by the U.S. Department of Agriculture (USDA) Rural Utilities Services (RUS) and the U.S. Department of Commerce (Commerce) National Telecommunications and Information Administration (NTIA). The Port of Lewiston may be able to partner with recipients of these funds (if there are any still available) through the State of Idaho. The awarded project that runs through Whitman County will offer a great springboard for The Port of Lewiston to work off. (*3 Source: Washington State E2SSB 6438: http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bill%20Reports/Senate/6438-S2.SBR.pdf*)

3. Regional Broadband

3.1 Incumbent Local Exchange Carrier (ILEC):

An ILEC is a local telephone company that was in existence at the time of the break up of AT&T into the Regional Bell Operating Companies, also known as "Baby Bells." The ILEC is the former Bell System or Independent Telephone Company responsible for providing local telephone exchange services in a specified geographic area. When referring to the technical communities ILEC is often used just to mean a telephone provider[2]. The definition of ILEC's includes duties to offer at wholesale rates any telecommunications service that the carrier provides at retail to subscribers who are not telecommunications carriers as well as not to prohibit or impose unreasonable or discriminatory conditions or limitations on the resale of such services[3]. ILEC's are positioning themselves as long-term ILEC holders or putting their efforts into non-regulated broadband divisions focusing on broadband and wireless companies.

The issues associated with relying on an ILEC to build infrastructure and communication advancement is three-fold:

1) Building the network: ILEC's currently have the infrastructure in place to provide services to the entire community. (The problem with utilizing this network is limited access to the ILEC's network.) The extent to which a service competition exists, a market is distorted if the infrastructure provider can manipulate the quality of competing services over the connections the provider controls to the end customer. In a context in which network owners have been permitted by the FCC and the courts to "close" their networks to competition[4], competitors can reach customers only by building their own facilities at what is generally seen as a prohibitive cost. This discriminates against the emergence of multiple competitors.

2) Size of the "pipe": While there may be significant competition in provision of services such as telephone, email, and video - this is not significant competition in provision of "pipe" - the infrastructure over which all of these services operate. The networks operated by telephone companies cannot offer the kinds of speeds and capacity possible with a fiber optic network. As commercially available software and services are advanced, it will become increasingly difficult for phone companies to provide the bandwidth required and will likely fall behind even coaxial network providers like Comcast.

3) Cost: The cost associated with delivering broadband services across a phone line is not in-line with the amount of bandwidth they deliver compared to other competitive services. Current DSL rates are less then 1Mbps at a average cost of $80/mo. while typical cable service speed is 1 to 3 Mbps at a cost of $100/mo when purchasing a bundled service of voice, internet and television. Fiber to the home rates where available are comparable to cable in price but offer 3 to 10Mbps at a cost of $100/mo. in a bundled service.

3.2 Cable Television and Broadband Services (CATV):

Cable Television in the United States is a common form of television delivery, generally by subscription. Cable first became available in the United States in 1948 and as technology has advanced, as well as the invention of the World Wide Web, cable companies also provide a variety of other services to include internet access and voice over internet protocol (VOIP).

Cable companies offer broadband internet access at speeds defined by the FCC as "high speed[5]." Cable companies operate quality, reliable systems that compete well against other offerings in today's marketplace. Currently, cable companies are using their excess large capacity bandwidth to bring internet and phone services to non-traditional customers, competing with CLEC/ILEC providers offering business solutions and competitively selling solutions on E-rate to

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schools and government entities. Because of the large buying power of combining residential and business broadband needs, their pricing is very competitive - lowering the costs and taking a large market share. As IPTV (TV over the internet) becomes the market place norm in the next five years, these companies should hold a very competitive advantage owning a fiber coax network holding a future infrastructure monopoly. Developing infrastructure for these companies to supply services will benefit the Port of Lewiston.

The issues of waiting for infrastructure development on the part of these companies, like with an ILEC, are very much the same. They include:

1) Access: While a cable network is fairly broad in Lewiston and access to that network through subscription services is open there are the some important distinctions between and ILEC and a cable provider regarding access. Data by SNL Kagan shows that as of 2006 about 58.4% of all American homes subscribe to basic television services. Most cable subscribers in the US are in the suburbs and tend to be middle class - cable subscriptions are less common in low income, inner city and rural areas[6]. Like ILEC's, cable providers are also able to limit access or "close" their network to competition.

2) Size of the "pipe": Even with the advantage cable networks have over a phone line, this distinction is failing when looking at the larger picture - even with advanced electronics and software, these systems cannot keep pace with the potential speeds of fully-fiber networks such as the ones proposed in this study. Cable systems are limited by the inherent shortcomings of the coaxial cable that runs from their nodes into the home as well as the fact that bandwidth in an area is shared rather than dedicated. Even advertised speeds may be illusory or inconsistent. The New York Times recently noted, "customers do not get the maximum promised speed, or anywhere near it, from their cable and digital subscriber line connections. Instead the phrase "up to" refers to speeds attainable under ideal conditions, like when a DSL user is near the phone company's central switching office[7]."

3) Cost: Business plans in the CATV market usually cap bandwidth, which makes data speeds dependent on the number of users while fiber networks are scaled for the bandwidth needs of the client. Cost comparisons between the "up to" statements of the cable networks and fiber networks are deceiving. Still, even with these comparison standards, advertised cable broadband is roughly 1 to 3 mbps while projected fiber to the home can offer 3 to 40Mbps which is needed for IP television.

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4. Expansion of Rural Broadband

The benefits of expanding broadband access into rural areas are tremendous to both public and private businesses and individuals. People and businesses that work with large computer files could more easily send and receive large documents, including critical software updates and cloud computing. Streaming video could be utilized by businesses to curtail travel expenses. Hospitals and medical centers would be able to better serve their communities by offering telemedicine, document sharing and consulting. These are just a few benefits of rural broadband development. FCC Commissioner, Michael Copps stated, "Broadband can be the great enabler that restores America's economic well-being and opens doors of opportunity for all Americans to pass through, no matter who they are, where they live, or the particular circumstances of their individual lives[8]."

The consequences of not expanding a broadband service - specifically fiber networks - in rural areas will be devastating. Large population centers, with their existing and expanding broadband fiber networks are the drivers of technology advances and largely determine the requirements of business. Software and services are currently being developed that require a large broadband "pipe" in order to meet these needs. As these requirements trickle down into everyday life, the lack of broadband will limit the availability of necessary services.

Many businesses locate in rural areas for quality of life issues and many municipalities rely on the economic development that these businesses bring. If rural areas do not advance their broadband offerings, businesses will not be able to locate in rural areas, hospitals will not be able to offer the latest information and procedures, and individuals will not have access to a myriad of services. Rural communities will not be able to attract the economic drivers and will eventually be forgotten.

If rural communities do not have ILEC/CATV companies building infrastructure and offering services, then this role will need to be filled by private-public partnerships. Without the long-term, low return on capital investment these companies will not have a platform to compete in offering services. Studying urban trends and business plans and facilitating ways to include companies in rural areas can help acquire these services.

5. Fiber to the Home (FTTH)

Fiber to the Home (FTTH), also called Fiber to the Premises (FTTP) or Fiber to the Building (FTTB) brings fiber optics directly to homes/buildings. In the past, consumer telecom networks had a high-speed backbone with lower speed cables running to users' homes and offices. The high-speed backbones were able to carry the combined capacity of all the users, but the infrastructure running to the users severely limited the speed and bandwidth available to consumers.

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FTTH allows for much larger bandwidth and much faster delivery speeds, which are essential for modern “triple-play” deliveries in which access providers offer video, data and phone services.

Very large, multi-national companies are focusing on high-speed, fiber optic networks because they know this is the direction the technology is moving. Consumers are increasingly streaming and downloading large files, like hi-definition movies, and engaging in video-chatting. Both AT&T and Verizon offer “high-speed” connections of speeds up to 10 Mbps - but with the demand that users are putting on the networks, this bandwidth will be used up quickly. The telecom giants jumping on the FTTH bandwagon signal that fiber optics is set to go mainstream, and demand for fiber optics infrastructure will grow.

6. Feasibility Study

6.1 PROJECT OVERVIEW:

Based on the layout of the region and the need to identify anchor tenants, the fiber network will be available to small and large Communications Licensed Exchange Carriers (CLEC) along the network path as well as to institutions of higher learning and hospitals / health centers. The Feasibility Study is divided into 6 parts: 1) Construction Feasibility, 2) Installation path, 3) Monitoring Regional Growth, 4) Fiber to the Home (FTTH), 5) Fiber Lighting, Access and Network Maintenance, 6) Cost Estimates.

This feasibility study for the Port of Lewiston is based on connecting into the Port of Whitman fiber extension. In the map Figure 1: Proposed Phase I Build, the project route was surveyed by driving to the proposed anchor tenants and, based on the existing pole runs, a route was determined that would connect them. This route is portrayed in blue showing aerial construction, red denoting underground construction and green where existing fiber is in place. Based on the existing infrastructure and the cost of aerial versus underground construction, aerial was utilized wherever possible.

The map, Figure 2: Proposed Phase II Build, there are designations for both aerial and underground construction with the phase I area designated by a grey line.

6.2 RIGHT OF WAY

Based on the intended path in Figure 1: Proposed Phase I Build, our initial search yielded no concern over perfecting the right-of-way for the purposes of the Project. A full engineering and planning study will have to be performed and is not covered in this feasibility study.

6.3 CONSTRUCTION FEASIBILITY:

Traveling and examining the intended installation path was the first step conducted regarding the construction and fiber installation task of Phase I and Phase II. The path was examined for suitability of aerial or buried fiber. Land

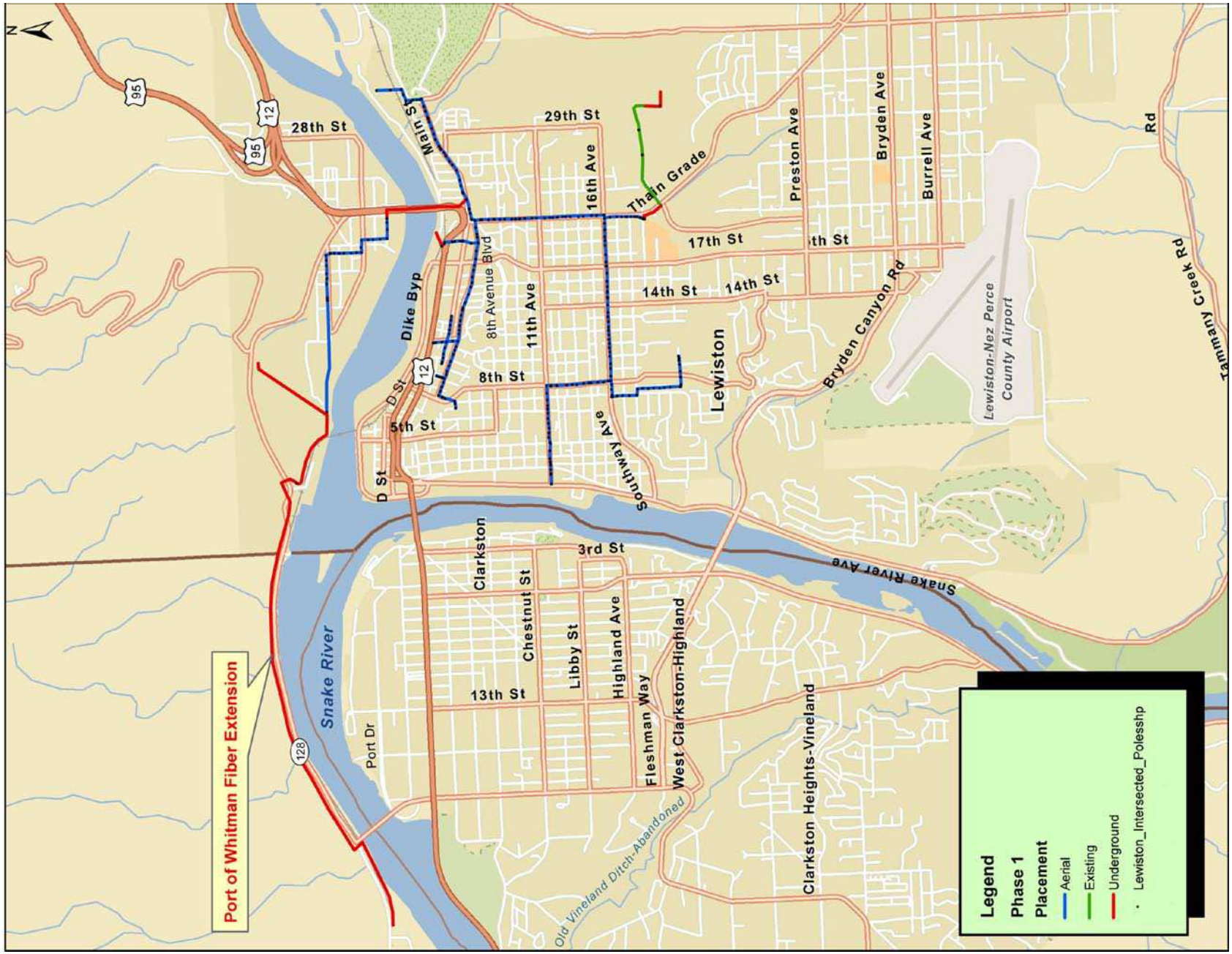

FIGURE 1: PROPOSED PHASE I BUILD

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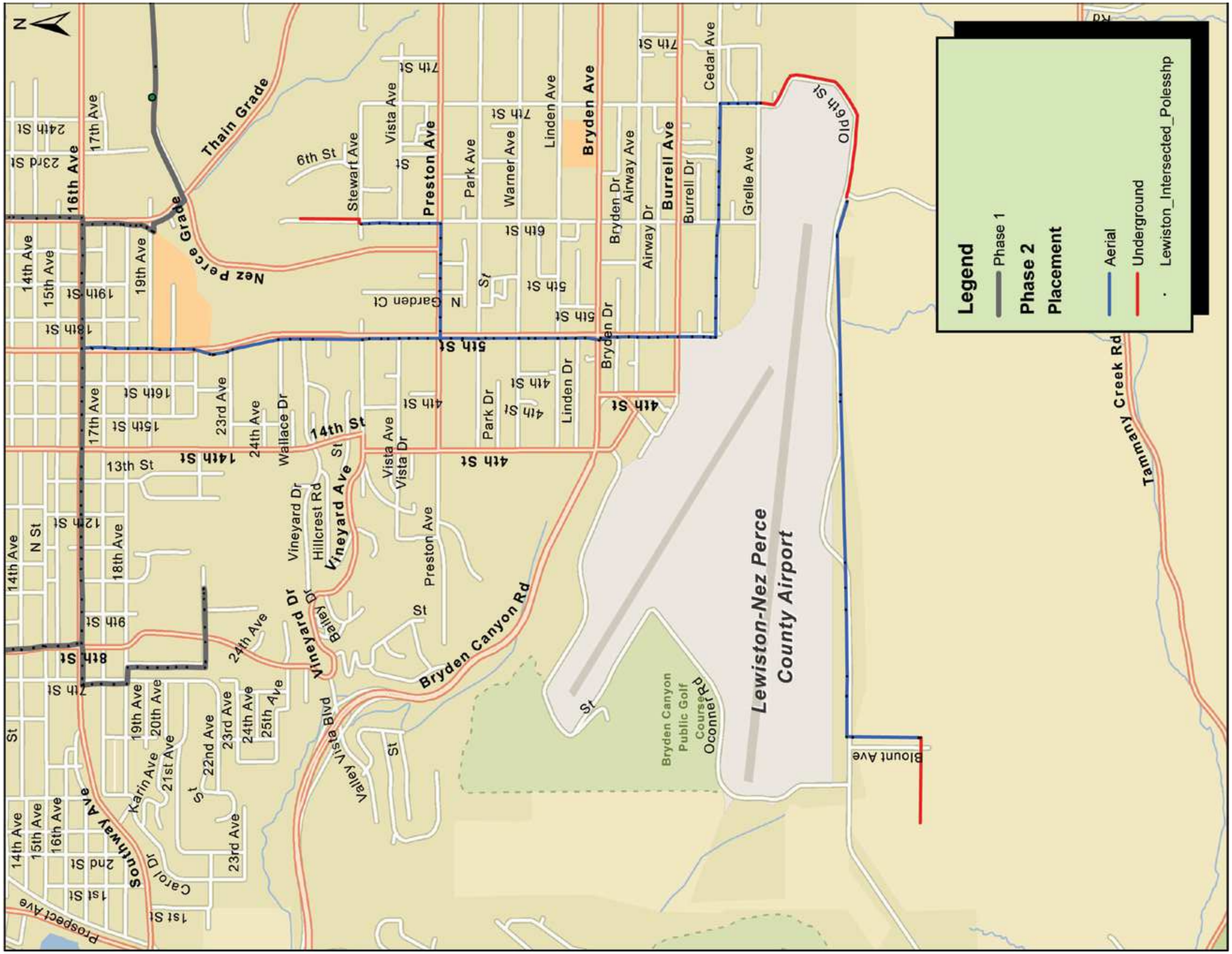

FIGURE 2: PROPOSED PHASE II BUILD

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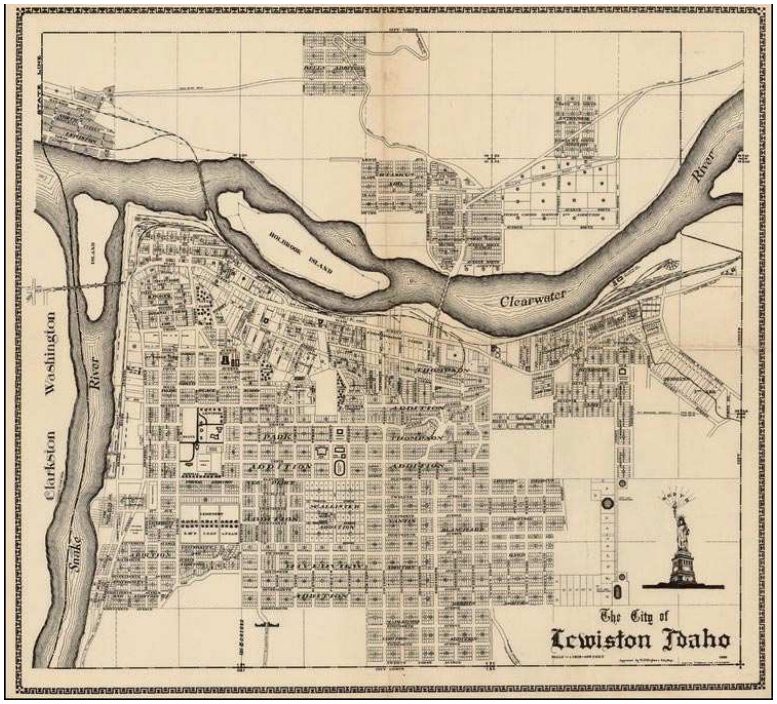

conditions, or attributes, not suitable for installation were avoided. The attributes included rock outcroppings, culverts, bridges, and public and private crossings. A general overview was conducted with the design requirement that make ready for attachment to poles would not be more than 30% of aerial construction costs. [Make ready is a termed used by the Power Utility or whomever owns the poles with the designation referring to the cost of making the pole useable for another attachment. The last one to attach to a pole pays for all existing users to make ready, or make room for another attachment.] Figures 3&4 in the Appendix labeled Make Ready show the areas of the proposed build where different types of make ready may occur. This is an estimate. Engineered plans must be submitted to Avista and other owners of poles who will determine costs associated with make ready. This preliminary budget is adequate for planning purposes and feedback from pole owners will determine the finalized cost and scope of work.

With an emphasis on aerial routes, underground construction was used only in areas where all utilities are located underground or at entrances to facilities. A major reduction in the construction budget is the ability to use existing conduit the Port of Lewiston installed while constructing the Industrial Park where SEL is located. Direction drilling to replace the existing conduit was budgeted at over $500K. This Port land will be the home of future growth in the region. The various installation methods are briefly described below.

Aerial Construction: The majority of the urban area construction will be aerial. The most cost-effective type of construction when the existing pole runs are in place. Make ready or moving other utility company's lines on the existing poles can be a financial obstacle to aerial construction. Cost per mile without make ready construction will average $34,000 per mile due to rural utility standard and prevailing wage. The pull pole costs are based on the equivalent costs in the Port of Whitman fiber build. Keep in mind the added cost of 30% make-ready and about $9,000 for engineering and a rough total cost for aerial construction is about $54K per mile.

Plowing: Plowing can rank as the least expensive of the

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various standard construction methods for installing fiber depending on the soil conditions and right of way. Making use of large plows, such as Caterpillar, to dig up the earth and replace it after fiber installation is very cost effective. Plowing is a construction method that can only be carried out in open, rural, sparsely populated areas that allow the use of such heavy equipment. Plowing generally costs $6 - $8 per linear foot and will be used when available for this project.

Trenching: Trenching, which contractors can carry out either by hand or machine, uses machinery such as a backhoe or excavator. Unlike plowing, trenching can be conducted in smaller, denser, more contained areas. Trenches may be as big as several feet wide and deep. Trenching generally costs $8 - $12 per linear foot.

Boring: A third standard construction installation method is known as directional drilling or boring. Unlike plowing and trenching, directional boring is a method that is less intrusive. So, unlike those methods, it doesn't create site disruption and can be used to bore underneath public and private crossings to avoid the need to resurface after installation. The estimated cost of directional drilling is $36 to $84 per linear foot.

Sawing: Sawing represents yet another conventional construction method that will be employed for larger public paved crossings. This technique is often employed to install cabling beneath paved surfaces, in dense surface terrains, or underneath concrete surfaces such as city streets, sidewalks, and parking. This process can cost $30 - $50 per linear foot.

6.4 INSTALLATION PATH:

6.4.1 Anchor Institutions: The anchor institutions that could utilize the proposed infrastructure are fairly scattered around Lewiston and, based on the existing aerial pole runs, we do not envision many changes. Conversations and negotiations will determine if the additional runs to connect economic development tenants will be performed by the Port of Lewiston.

6.4.2 Economic Development Tenants: Economic development tenants are public and private businesses that would likely be interested in connecting to the fiber network. These businesses are ones which have large bandwidth needs such as banks, ISP's, Public Works Department, Medical Centers, etc. and the cost of connection would be offset by additional services provided to them.

6.4.3 Installation Path: As of the writing of this document the route for entry and exit through Lewiston has not been engineered. We have used the Port of Whitman NOC as a distribution point based on the ability to use an existing structure for housing the electronics.

6.4.4 Future Goals & Planning: The initial build recommended in this study needs to be combined with a plan for future development to incorporate network redundancy and cus-

tomer connections. As technology advances, more and more businesses/individuals will require access to the network in order to utilize the services they need. Communication with this group of future customers is the most important aspect of moving forward so they will be knowledgeable about what is currently available and when they can expect to connect. The plan forward should include:

1) Three year operation and development plan.
2) Communication with all possible users, providers and the community at large.
3) Assemble stakeholders meetings of high-bandwidth users, technology companies, economic development agencies, government and service providers.
4) Build a scenario where this group meets in a public forum to address the needs and wants of the community regarding growth, technology and economic development utilizing the Ports assets.
5) Weigh carefully community wants with economic constraints and market conditions to provide policy input to Port elected officials.

6.5 MONITORING REGIONAL GROWTH:

There are many projects that are currently in the works that will provide a large amount of information for moving forward regardless of the path taken. As similar regional projects move forward, open communication between stakeholders will provide information regarding build out, service models, local trends, teaming opportunities, future expansion and possible funding opportunities to name a few. The larger the information pool, the better it will be for the Port of Lewiston to make informed decisions regarding not only the current proposed plan, but future build out opportunities. These projects include the Pend Oreille BTOP2 grant design, The Port of Whitman dark fiber model and the Grant County PUD LIT services model. Communication with these districts and PUD's will be invaluable.

The plan forward should include:

1) Follow the development of Pend Oreille FTTH BTOP2 grant design, Port of Whitman County dark fiber model, Grant County PUD LIT services model.
2) Work with local ISP and CLEC providers to utilize IP television companies that are developing on national networks.
3) Communicate with NoaNet and other carriers on regional business plans that are developing IP television services.
4) Draw conclusions on an annual basis and report results to community stakeholder group. Formulate policy recommendations to the Port of Lewiston commissioners.

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6.6 FIBER TO THE HOME FOR THE PORT OF LEWISTON:

Based on available data and trends in both government and private funding it is safe to say that the expansion and development of FTTH is going to expand dramatically in the next five years. FTTH networks now exceed 18% of homes (6 million total) and these numbers are expected to expand dramatically. The FCC has proposed and additional $25 Billion in additional federal spending to subsidize national broadband access[9]. Barring any unforeseen technology development that does not currently exist, FTTH is the model on which infrastructure will be developed and information will be transmitted. The Port of Lewiston needs to keep this in mind and decide their role in the upcoming infrastructure and financial expansion. While not financially feasible to set up the FTTH infrastructure in Lewiston based on current projected revenue data at this time, positioning the Port of Lewiston as the future provider in one form or another would certainly be advantageous. The plan forward should include:

1) Using the stakeholder group from above, develop a model where the community considers FTTH. Provide cost output comparisons of other national urban area communities, FTTH models and cost structures.
2) Determine the cost per home model. Urban models can be used as a rough estimate but since home density is less in rural areas, they will be more expensive.
3) Provide the stakeholder with this information and research by PUD and CATV/ILEC companies in the region. Work towards consensus because the community needs to not only be connected but competitive.

6.7 FIBER LIGHTING, ACCESS, & NETWORK MAINTENANCE:

The plan developed for the Port of Lewiston is to provide infrastructure based on a dark fiber model. This scenario is the simplest with the Port of Lewiston providing infrastructure that will be lit by service providers such as local ISP, CLEC, ILEC entities. The Port of Lewiston would build out the infrastructure to the identified anchor and economic development institutions and lease dark fiber. Service providers would lease fiber at $0.02 per foot per strand with a one-mile minimum. This is modeled after the Port of Whitman County fiber build currently being developed.

This plan designates the Port of Lewiston controlling network maintenance and emergency repair through an outsourced provider of these services – see Emergency Response and Restoration section in the Appendix.

6.8 COST ESTIMATES:

See attached file “LFS_SpreadSheet.xlsx” for a complete budget spreadsheet.

Construction Cost Estimate: The spreadsheet attached in the Appendix shows current unit pricing for Port of Whitman work during the last two years. These unit costs are for labor and materials. Due to the use of Federal money on these projects, Federal Davis Bacon wages were paid. This wage is at least 20% higher than Washington State prevailing wage. Look for similar to greater cost savings on Idaho wage rates.

Operational Cost: Pole attachment costs must be considered when building yearly expense budgets. Current yearly cost per pole is $18.00 per pole, per year. Insurance is required with utilities and pole owners and will be determined at time of installation.

Build Assumptions: The design of the network is predicated on tying into the existing Port of Whitman and NoaNet fiber optic networks currently being constructed in the valley. This will offer the Port of Lewiston the most flexibility for its customers. The Port of Whitman has located a telecommunications hut in Clarkston, WA adjacent to the AT&T and Zayo telecommunications facilities. “Meet Me” or tie in vaults are located on the premise allowing all telecommunications vendors to cross connect or buy services from each other. NoaNet is located in the Port of Whitman County facilities and utilizing this layout would allow Port of Lewiston customers all available choices of lit or dark services.

6.9 REVENUE MODEL ASSUMPTIONS:

The basis for this feasibility study and the costs / revenue associated with the build-out are based on existing fiber systems like the Port of Whitman fiber build, NoaNet fiber build, and other rural area builds where fiber plant layouts have similar features. Using a central spot of Memorial Bridge and E. Main Street as the center point for service area zones, each customer inside a zone will be assessed a zone fee per strand. This was calculated using .02 cents per foot per strand with a one-mile minimum per zone. This is modeled after the Port of Whitman County fiber build currently being developed and works well in the business area. Based on this information, a zone based model where the base price of construction is spread over a network and designed around the metropolitan areas of the city where there is the greatest chance of dark fiber leasing leads to the costs and revenue assumptions. This study lists the following sites in the model as potential customers:

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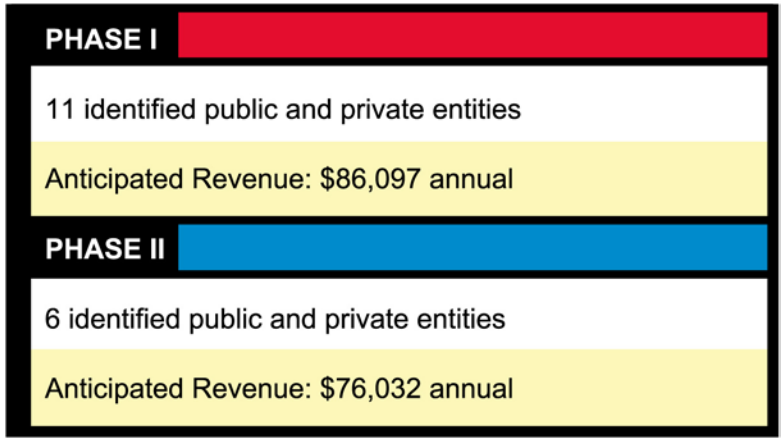

TOTAL PHASE I ANNUAL REVENUE: $86,097.00

Public and private entities have become customers of Ports and PUD's where dark fiber or competitive lit services are available. In designing this model, a 45% customer rate is used to demonstrate a return on investment. That means 55% of the identified potential customers are not included in the model. This is a very conservative approach to the business model, an approach that has been used and refined for public networks where the risk of public capital is not an acceptable solution. With the limited number of users currently defined, the cost projections provide a payback in approximately 8 years. As networks are built and more users are identified, we have traditionally seen this move to a more realistic 3-4 year payback with in-fill.

Phase II, while not included in this financial model, has many opportunities for networking branch sites of existing potential clients in the Phase I financial model. There are many ways to approach the further extension of this build by partnering or developing long-term fiber lease contracts for networks. As a comprehensive client list is developed in collaboration with the Port of Lewiston, the revenue model can be expanded to include new sources. Based on a conservative number of identified clients, Phase II may demonstrate a pay-back of approximately 3-4 years. We have seen longer builds with few high use customers in the area look unfeasible with traditional modeling in past studies. The Port should consider working with other Federal, State, County, City municipalities and even School Districts that may need to network multiple facilities together in order to lower the build costs. A model that works well in this area is to have these community partners pay for NRE (Non Reoccurring Engineering) as a one-time payment to help with the build out of the network. In return the partners receive a pre-determined amount of fiber strands for their upfront monetary help in the build and, usually, a smaller maintenance fee paid on an annual basis. Taking on these partners greatly reduces the time to return on investment. While Phase II is beyond the scope of this study, layout and cost assumptions for a large part of the construction and engineering have been performed and are in the cost analysis.

7. Conclusion:

Based on investigations of the technology, the position large companies are taking and developing, and the understanding of how Washington State Port Districts (specifically the Port of Whitman) are developing their infrastructure, it is easy to understand that fiber networks are going to be the future of communications infrastructure. It is also easy to understand that without the development of broadband networks in rural communities, they will surely lose out on future economic development associated with both public and private business.

The beginning steps of this planning are outlined at the end of section 6.4.4 and are expanded on in section 6.5 and section 6.6.

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(2) Wikipedia, “Incumbent local exchange carriers,” en.wikipedia.org/wiki/Incumbent_local_exchange_carrier

(3) “47CFR69.601”. U.S. Government Printing Office.

(4) Under recent rulings, the owners of DSL and cable broadband have been permitted to close their networks to competitors - a deviation from the common carrier rules under which numerous competitive Internet Service Providers (ISP) offered service over dial-up. As a result, many ISPs have ceased to offer Internet service because they cannot access the distribution networks at any price.

(5) Subscribers in the Lewiston area may be able to get cable speeds of “up to” three to six Mbps and under ideal circumstances (none of one’s neighbors using cable service at the same time), a couple of Mbps upstream. Fractions of those speeds would not be unusual at peak hours.

(6) www.marketingcharts.com

(7) New York Times, “Not Always Full Speed Ahead”, Matt Richtel and Ken Belson, November 18, 2006

(8) FCC COmmissioner Michael Copps, April 8, 2009 www.wireless.fcc.gov/outreach/index.htm?job=broadband_home

(9) FCC proposing additional national broadband subsidies targeting fiber-to-the-home

http://itknowledgeexchange.techtarget.com/telecom/fcc-proposing-additional-national-broadband-subsidies-targeting-ftth/

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9. Appendices:

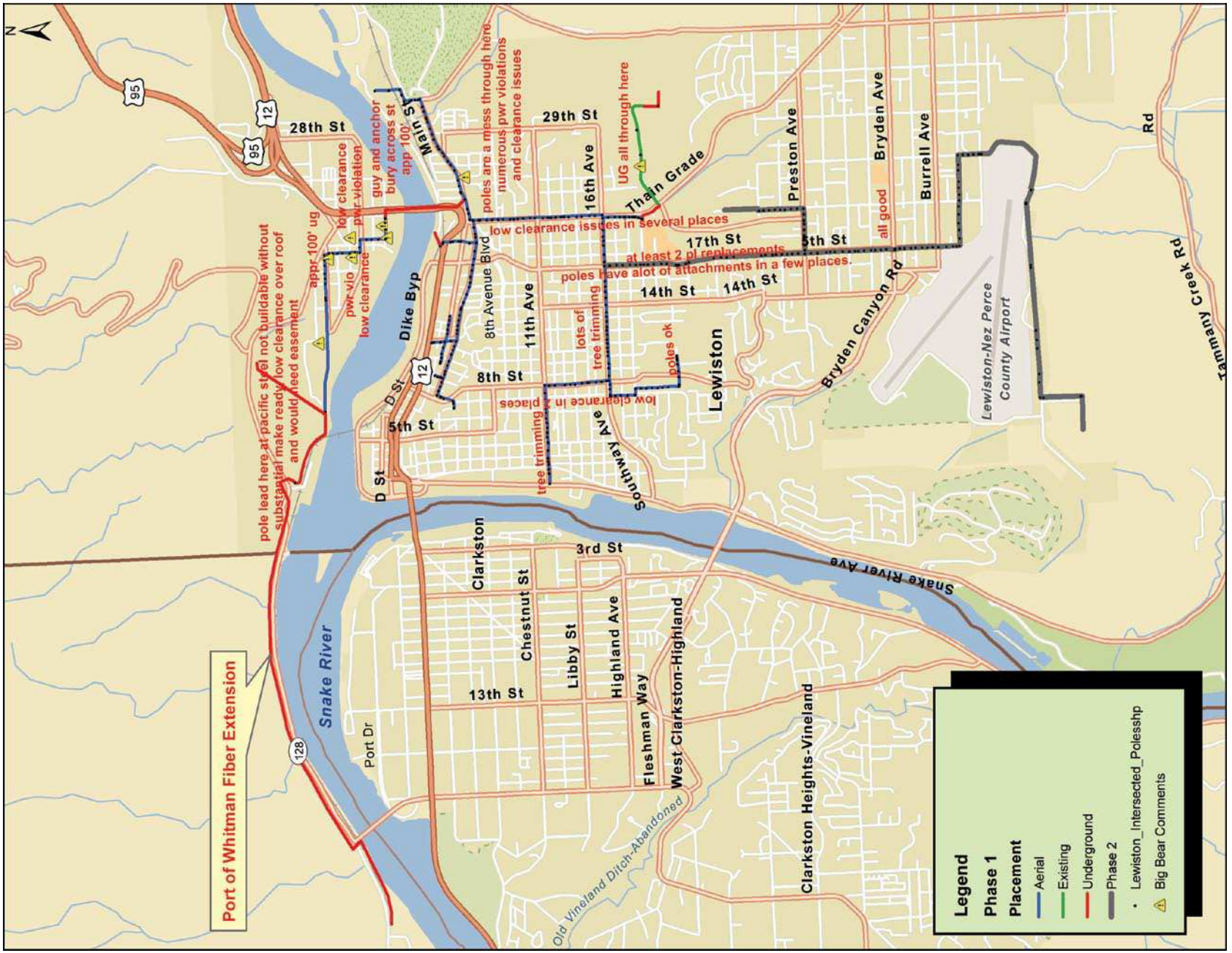

FIGURE 3: PROPOSED PHASE I MAKE READY

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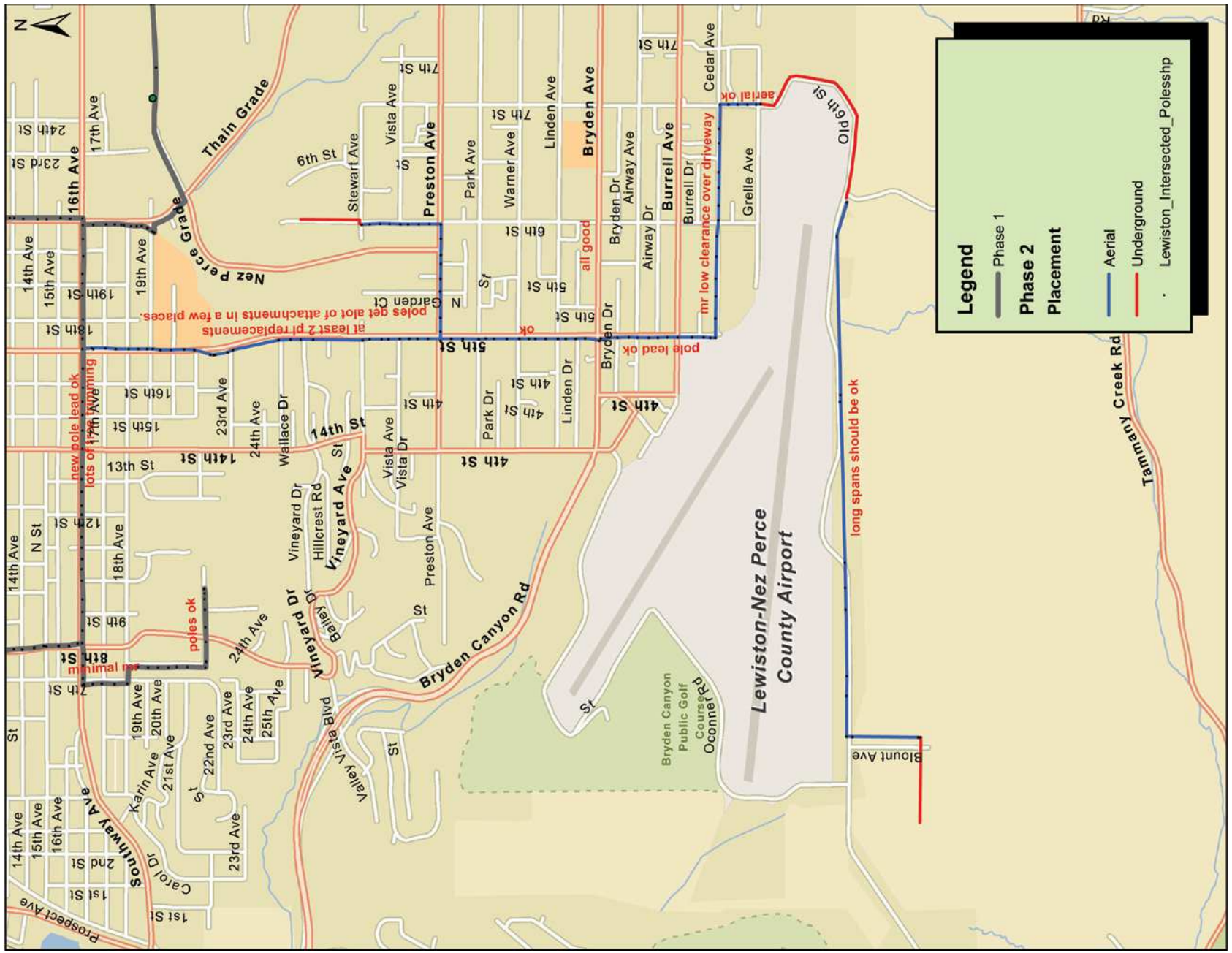

FIGURE 4: PROPOSED PHASE II MAKE READY

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