UTAH BROADBAND CENTER
CONNECTING UTAH

WALLSBURG VALLEY
LOCAL BROADBAND PLAN

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EXECUTIVE SUMMARY

The Town of Wallsburg is a rural community situated in an undeveloped valley in the Wasatch Mountains. The community strives to maintain its charm while providing those amenities that have become necessary in the digital world in which we live. Access to reliable and affordable internet services is not currently available to all. Town of Wallsburg residents wish to reduce the digital divide found in many aspects of life including education, health care, remote work opportunities, entertainment, and social connections.

VISION	Our vision is to give all residents in Wallsburg Valley the choice to utilize reliable, high-speed internet services in their homes and community.

KEY BARRIERS	**Availability**	**Rural Setting**	**Lack of ISP Participation**
	Reliable high-speed internet is not available in all Wallsburg Valley locations, only to those with direct line of sight to wireless provider towers	Rural setting with low population has not been a priority market for ISPs	ISP providers are not responsive to invitations to bid on broadband service delivery to Wallsburg Valley

COVERED POPULATIONS	Aging population over age 60	Disabled individuals	Veterans	Individuals who are not white or Hispanic

GOALS	**Connectivity:** Ensure fiber internet connectivity is available to all residences in the community	**Affordability:** Provide tiered options with flexible price plans	**Inform:** Inform community about broadband options to foster digital inclusion

KEY STRATEGIES	Conduct research to understand the needs of the community	Identify any existing assets and potential ISP carriers	Perform analysis to understand cost of broadband expansion	Secure funding for broadband expansion

1 OVERVIEW OF THE LOCAL BROADBAND PLAN

1.1 VISION

The Utah Broadband Center (UBC) envisions a Utah where all can fully participate in a modern society by having access to high-speed internet, useful devices, and tools to achieve digital independence. The Wallsburg Valley community shares in the State's vision to close the digital divide by increasing the broadband infrastructure so that it is accessible, modern, and scalable throughout the Wallsburg Valley. To achieve this vision, community leaders, internet service providers (ISPs), public, and private stakeholders will collaborate on a comprehensive set of goals and objectives to promote social connectivity and accomplish this transformative vision.

1.2 GOALS AND OBJECTIVES

Wallsburg Valley's broadband plan goals include:

Infrastructure Buildout

- Provide broadband access to all residents of Wallsburg Valley, regardless of their location or economic status. This includes those residences located outside the formal city boundaries in unincorporated land and should encompass all residences located in zip code 84082.
- Reduce dependence upon unreliable wireless and satellite options by creating a robust broadband infrastructure that can support higher speeds and greater capacities. The strong preference is for a fiber network.
- Select ISP partners that are practical and feasible and who are willing to undertake the challenges of bringing broadband to Wallsburg Valley.

Education

- Foster digital inclusion that will lead to improved educational and health care outcomes, along with improved job opportunities and increased social connections.
- Provide better connection and internet speeds for students of all ages, ranging from elementary school to college level.

Communication

- Improve town website to include relevant and up to date content, including online bill payment information.

- Establish email collection mechanism so that town clerk or other trusted individuals can easily distribute important information quickly.
- Communicate when new content, training classes or links etc. are available.

2 BACKGROUND

On November 15, 2021, the Infrastructure Investment and Jobs Act (IIJA) was signed into law. This Act included a $65 billion investment in high-speed broadband internet infrastructure and efforts to close the digital divide to ensure that all Americans have access to reliable and affordable high-speed internet.

Included in the IIJA was the Broadband Equity, Access, and Deployment (BEAD) Program. The BEAD Program provides $42.45 billion to expand high-speed internet access by funding planning, infrastructure deployment, and adoption programs throughout the United States.

Through this funding, the Utah Broadband Center (UBC) launched a grant program that will consist of two phases, with funding in each phase. The first phase is planning and the second is implementation. The State of Utah was awarded $5 million to support both the creation of a statewide Digital Connectivity Plan and provide funding for local communities to create local broadband plans.

The UBC awarded the Town of Wallsburg $30,000 to create a plan for broadband infrastructure deployment in the region. Wallsburg Valley's broadband plan will be used to inform the statewide Digital Connectivity Plan that will determine Utah's broadband priorities over the coming years.

The local planning grant from the UBC was awarded on April 3, 2023, and the project kick-off meeting with the consultant team, Horrocks, began on April 11, 2023.The initial draft of this plan will be submitted on June 1, 2023, to the UBC, and the final plan to be incorporated in the statewide planning efforts will be submitted on August 1, 2023.

2.1 SCOPE OF BROADBAND PLAN

The Town of Wallsburg is a rural community situated in a pristine valley in the Wasatch Mountains. Wallsburg Valley is surrounded by the Uintah National Forest in Wasatch County. The nearest towns are Heber City to the North and Provo/Orem to the West.

Wallsburg Valley is a peaceful community that wants to maintain its rural setting, agricultural atmosphere, and natural beauty. However, Wallsburg Valley does recognizes the digital disparity it currently faces. Wallsburg Valley aims to prosper in the present interconnected world and adequately equip itself for the future so that it remains a desirable place to live.

The resident population of Wallsburg Valley comprises families, students, elderly individuals, remote workers, and widows/widowers. 95% of the population are full-time residents, with only a

small percentage of the homes being second or rental homes. High-speed internet connectivity is an amenity that has become necessary for educational, work, health, and social interactions.

While the majority of residents live in Wallsburg Valley full time, only 35.9% of residents have internet connectivity that is considered served with a download speed that is greater than 100 Mbps and an upload speed greater than 20 Mbps. 64.1% do not have access to a high-speed internet connection and are considered unserved or underserved with a connection that is less than 100 Mbps download and 20 Mbps upload.

Wallsburg Valley has attempted to resolve this digital divide in the past by inviting ISPs to bid on fiber connectivity. Due to the rural location and low population, the request for proposal (RFP) process has been challenging.

Table 1 shows demographic information.

Table 1: Demographic Information

WALLSBURG VALLEY	
Total Population	743
Median Household Income	$137,222
Total Employer Establishments	18
Bachelor's Degree or Higher	16.3%
Employment Rate	70.8%
Poverty	.6%
Median Age	43.4
Land in Square Miles	107.13
RACE AND ETHNICITY	
White	99%
All Others	1%

Figure 1 shows the location boundaries for the study area of this broadband plan. The large circle represents the approximate boundaries of Wallsburg Valley. The boundary for Wallsburg Town is shown as well.

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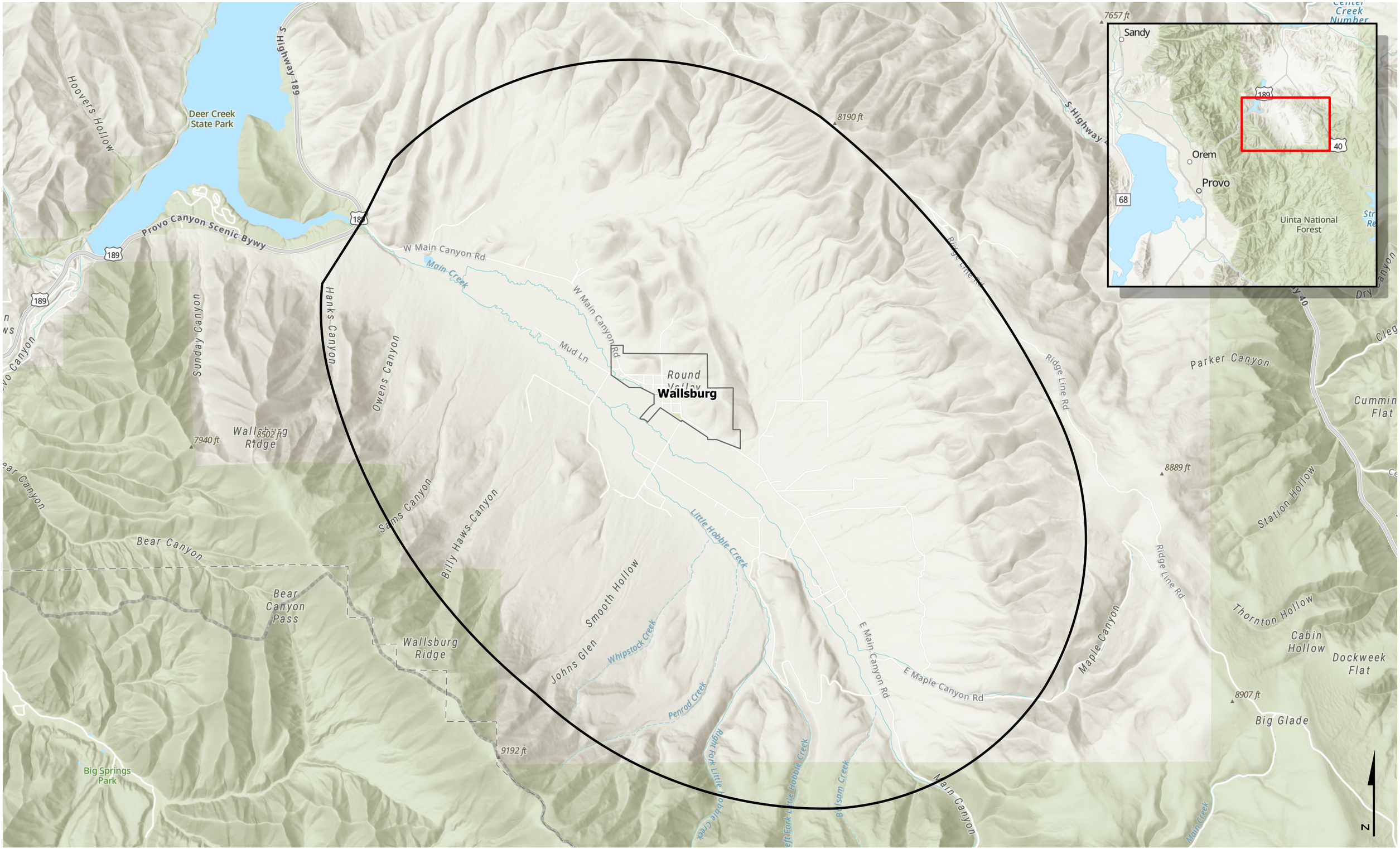

Figure 1: Boundaries of Wallsburg Valley

0 0.25 0.5 1 1.5 Miles

2.2 WHAT IS BROADBAND?

Broadband is a dedicated connection to high-speed internet. The threshold for what speed is defined as high-speed internet changes according to the standards presented by the Federal Communication Commission (FCC). Currently, broadband is defined as any speeds above 25 megabits per second (Mbps) download speed and 3 Mbps upload speed (25/3 Mbps).[1]

The BEAD Program defines households with less than 25/3 Mbps as unserved locations and those with less than 100/20 Mbps as underserved locations.[2] Community anchor institutions with less than 1/1 gigabits per second (Gbps) speeds are also considered underserved, as defined by Section 60102 of the IIJA, which also sets forth the BEAD program[3].

2.2.1 Broadband Network Distribution

The infrastructure that data travels along is called a network. Similar to other public utilities such as roads or water pipes, the network infrastructure is carefully planned and then built according to how many people need to be served in both the present and the future. Within the network, data is carried across fiber, wires, or radio signals in the air (wireless). These various means of carrying data have different capacities and speeds. The part of the network used to transport data between cities or across cities is known as middle mile infrastructure. The middle mile network connects to hubs built throughout a city. The part of the network that connects from a hub to the end-user is called final mile or last mile infrastructure. End-users can be businesses, residential homes, or individuals connecting to cell service. In Figure 2, the blue lines connecting the city to the hubs represent middle mile infrastructure, and the orange lines connecting the hubs to the residential houses represent final mile (or last mile) infrastructure.

[1] FCC. (2015). Broadband Progress Report. https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2015-broadband-progress-report

[2] NTIA. Notice of Funding Opportunity - Broadband Equity, Access, and Deployment (BEAD) Program. Section I. Program Definitions, C. Definitions. Pages 16-17. https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf

[3] United States Congress. (2021). H.R. 3684- Infrastructure Investment and Jobs Act. 60401(e)(3)(C). https://www.congress.gov/bill/117th-congress/house-bill/3684/text

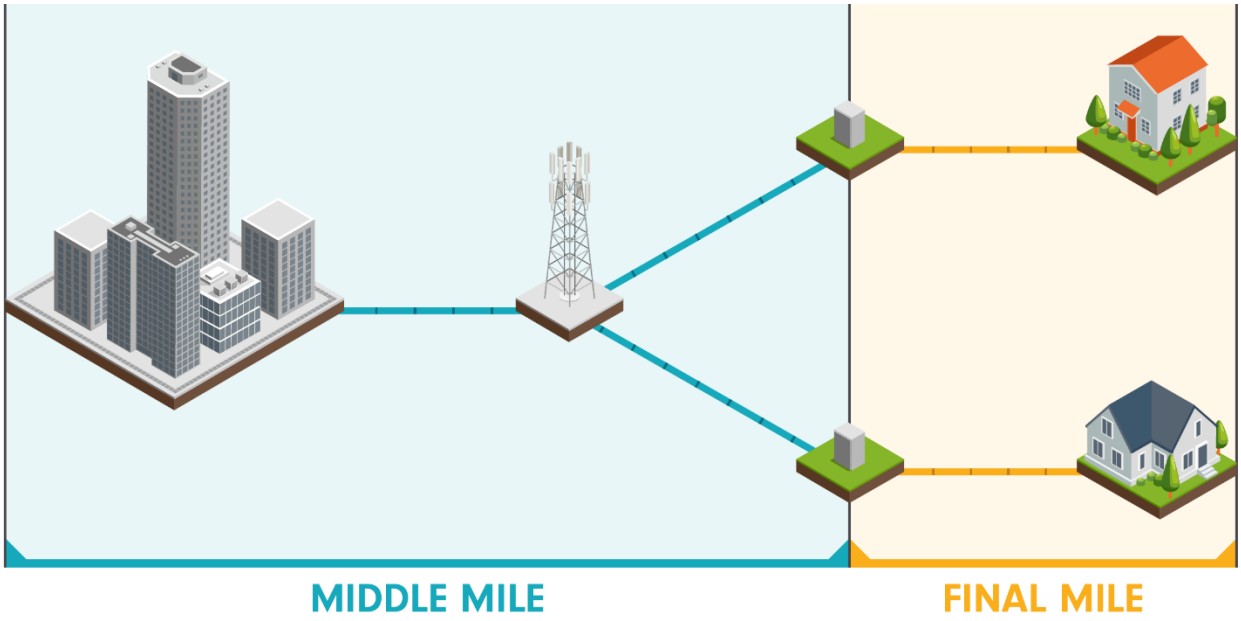

Figure 2. Middle Mile and Final Mile Infrastructure.

2.2.2 Types of Broadband

There are various technologies that high-speed broadband internet can be served through, such as fiber optic, digital subscriber line (DSL), cable modem (Coax), and wireless technologies. Each form of technology has pros and cons.

2.2.2.1 Fiber Optic

Fiber optic technology sends data-carrying digital signals as light through cables made of glass fibers. It provides the fastest, most reliable networks. Because fiber is a newer technology, many areas do not have fiber networks developed, and this type of network can require building new infrastructure. Fiber optic cables can be placed on existing power poles, or they can be placed inside conduit buried in the ground. If the network is designed and installed correctly, symmetrical speeds can be up to 400 Gbps; however, 400 Gbps speeds are typically only designed for and installed in the backbone/distribution cables of the network. **Fiber optic is the gold standard for high-speed broadband internet as it provides the fastest speeds and can support emerging digital technologies into the future.**

2.2.2.2 DSL

DSL uses existing copper telephone cables to transmit data. Speeds vary widely based on local providers, the condition of cables, the distance between homes, and the equipment at the primary connection point. Because of this, DSL speeds can be less than 1 Mbps or up to 100 Mbps. With maximum DSL speeds at 100 Mbps, DSL does not meet the ever-growing needs of future technologies, so it is not a preferred option when building modern broadband infrastructure.

2.2.2.3 Cable Modem (Coax)

Cable modem delivers increased speeds over DSL and transmits broadband data over the same coaxial cables that are used for cable televisions. Like DSL, it is not a preferred option when building new broadband infrastructure, but it can be used where existing infrastructure is in place. Cable modems use a protocol called Data Over Cable Service Interface Specification (DOCSIS). There are six versions of DOCSIS (1.0, 1.1, 2.0, 3.0, 3.1, and 4.0). The speeds range between 40 Mbps download and 10 Mbps for upload for version 1.0 to 10 Gbps download and 6 Gbps upload for version 4.0.

2.2.2.4 Wireless

Wireless broadband includes several technologies, including satellite broadband, Wireless Local Area Networks (WLANs), Wi-Fi, and cellular 4G, 5G, and LTE. These technologies use radio spectrum to transmit broadband data. Please note that BEAD funding can only be used to build wireless broadband technology when it is connected to a terrestrial Middle Mile network and cannot be used on satellite broadband technologies.

Satellite Broadband – Satellite internet involves satellites that orbit the earth while transmitting long-range signals to individual subscriber locations anywhere on earth with a clear view of the sky. It is primarily a middle mile wireless solution, but many people use satellite internet directly to their homes as well. Satellite connection speeds vary based on location, and weather and tree foliage can affect the signal. Typical connection speeds are 12-100 Mbps. However, satellite internet has a higher latency (a delay of transmission also known as lag), making video calls extremely “glitchy” on this type of internet. An acceptable range of latency is between 50-100 ms. Satellite connection latency typically falls within 594-624 ms.[4] For the BEAD program, the NTIA currently does not recognize satellite broadband technologies as a reliable wireless technology.

WLANs – WLANs are the Last Mile networks used at homes or businesses to distribute internet to phones, computers, and other devices through radio signals. Wi-Fi and hotspots are both examples of a WLAN. Connection speeds are dependent on the service provided at the access point.

Cellular 4G, 5G, and LTE – Cellular 4G, 5G, and LTE involve antennas mounted on cell towers transmitting radio signals, which are then received through the modems in cell phones, mobile routers, cellular antennas, or various signal boosters. Mobile carriers now offer residential fixed wireless broadband plans supported by their mobile towers. A middle mile fiber network connected to a tower will increase the network capabilities and provide a better final connection to the cellular user. The download speeds can often reach 600 Mbps if specialized equipment is used to boost the signal. This is usually the fastest high-speed broadband internet available for

[4] Cooke, K. (2023). Is Satellite Internet a Good Option? Pros and Cons of Satellite Internet Service. SatelliteInternet.com.
https://www.satelliteinternet.com/resources/satellite-internet-pros-and-cons

users who do not have access to fiber optic technology. This technology supports broadband speeds for mobile devices as well as fixed wireless broadband service to residences.

2.2.3 Benefits of Broadband

High-speed broadband internet has become an integral part of society. It is critical for work, education, telehealth, and the completion of everyday tasks.

High-speed broadband internet has transformed the way the world does business. There are few businesses that can operate today without the internet, and while some can get by with a low-speed connection, high-speed internet is becoming increasingly necessary. A Pew Research Center survey[5] conducted in April 2021 found that 90% of adults surveyed considered internet "essential or important for them personally during the [COVID-19] pandemic."[6] High-speed broadband internet has allowed for remote work possibilities, which opens the possibility of highly skilled workers relocating to smaller communities and benefiting the economies of those communities. Readily available access to the internet has allowed businesses to widen their customer base to a global market. Wallsburg Valley is primarily a residential and agricultural community, and high-speed broadband internet would allow its residents to participate in remote work options and run successful home-based businesses. There are at least 20 Wallsburg residents that would work from home if they had better internet speeds according to Wallsburg officials.

While high-speed broadband internet is benefitting many regions across the globe, it is important to ensure that Wallsburg Valley does not get left behind. There is a growing digital divide where those that do not have access to the internet do not learn the digital skills necessary for high-paying jobs, pushing them further into poverty. Conversely, increasing high-speed broadband internet access increases economic opportunities for low-income families.

Developing digital skills at an early age has become increasingly important, as high-speed broadband internet is an integral tool in modern education and preparation for the future workforce. Access to online classes, homework submissions, and research opportunities can be lost if a reliable high-speed broadband internet connection is not secured. Wasatch School District is also utilizing online learning on snow days and other times when it is not possible for students to gather at the school. Online classes can be made available for specialized subjects like foreign language or technological courses that do not have a local teacher available. Children without access to a broadband internet connection may be left out in these scenarios. According to a data specialist with the Wasatch School District, there are 178 K-12 students enrolled for the 2023-2024 school year that reside within Wallsburg Valley. Wallsburg officials estimate that an additional 40 children are homeschooled and another 20 attend private school.

Other online resources are also becoming more important for communities. For example, telehealth is a tool that allows users to connect to doctors and medical providers online. Some

[5] https://www.pewresearch.org/internet/2021/09/01/the-internet-and-the-pandemic/
[6] https://www.pewresearch.org/internet/2021/09/01/the-internet-and-the-pandemic/

of the benefits of telehealth include decreased health care costs, access to specialists not available locally, travel time reductions, and reducing the risk of exposing others to viral infections. High-speed broadband internet is necessary when completing a video call with a health professional.

High-speed broadband internet has become increasingly essential for daily tasks. High-speed internet is used when paying bills, accessing banks and retirement accounts, and applying and interviewing for jobs. High-speed broadband internet is also vital when enjoying modern-day entertainment, such as video streaming, watching live sports, or playing live video games. It is used when communicating with family and friends, especially when making a video call. Even using a smartphone with 4G or 5G service involves broadband technology.

3 CURRENT STATE OF BROADBAND AND DIGITAL ACCESS

3.1 METHODS TO DETERMINE THE CURRENT STATE OF BROADBAND

The planning team took several steps to determine the current state of high-speed broadband internet in Wallsburg Valley. This planning team included the following individuals and/or organizations:

- **Wallsburg**
    - Scott Larsen – Councilman
    - Celeni Richins – Mayor
    - Alisha O'Driscoll – Town Clerk
- **Horrocks**
    - Eleise Lowe – Project Manager
    - Rachel DeRooy – Technical Analysis
    - Katie Williams – Public Involvement

The activities performed included:

- **Public Outreach:** Wallsburg Valley conducted targeted public outreach to gather feedback from residents starting in April 2023 through July 2023. The purpose of this outreach was to learn and understand regional broadband needs and to identify gaps in broadband availability, accessibility, and affordability for residents. Public outreach was

conducted for both the Utah Internet Speed Test and the Wallsburg Valley broadband survey with the use of a shareable outreach package that included the following:

- Survey and Speed Test overview flyer (See Appendix E:)
- Posting on the Wallsburg Valley Facebook page (See Appendix E:)
- Online survey specific to Wallsburg Valley

- **Public Surveys:** Wallsburg Valley created and distributed the Wallsburg survey to gather more quantitative data from the public about their experience with internet connectivity. Questions in this survey covered topics such as residents' current internet connections, device accessibility, affordability options, connectivity for businesses, community internet needs, and voluntary disclosure of demographics. A toll-free hotline number was provided for residents taking the survey who did not have access to the internet. Physical copies of the survey were made available at the Post Office and Town Hall, and two residents filled out the physical copy of the survey.

  As of July 5, 2023, 42 surveys were completed for Wallsburg Valley's broadband planning efforts. There were 21 surveys completed specifically in Wallsburg Valley in conjunction with the statewide efforts from the UBC.

  Specific survey findings and analysis can be found in Sections 3.4 and 3.5.

- **Internet Speed Tests:** Stakeholders' participation in the Utah Internet Speed Test, sponsored by the UBC, helped the team gather real-time internet upload and download speeds in the Wallsburg Valley area. The outreach team advertised the Utah Internet Speed Test through flyers hung throughout the town and door-to-door efforts to notify the general public of Wallsburg Valley's planning effort.

  As of July 5, 2023, there were 58 speed tests completed in Wallsburg Valley. See Section 3.5.1 Broadband Availability for more detailed Speed Test results and information.

- **Stakeholder Meetings and Workshops:** The UBC, as part of the statewide planning effort, conducted stakeholder workshops in each of the 29 counties in Utah. Participants of these workshops included community advocates, educators, public and elected officials, and industry leaders. During these meetings, participants engaged in in-depth discussion relating to broadband. Topics included education, economic impact, affordability, availability, barriers, and opportunities to expand access to high-speed internet.

  The workshop for Wasatch County was held on January 30, 2023. The workshop included one representative from Wallsburg Valley. During the workshop, the Wallsburg Valley representative provided insight surrounding the following topics:

- Wasatch School District ran a fiber line in during COVID to help with student population; Utah Broadband was reselling and pushing for free to students, and it was a joint venture with the school district.
- Utah Broadband is overbuilding their coverage with fiber (all through Strawberry and Charleston).
- Only option is Starlink for most people.

- **Meeting With Internet Service Providers (ISP):** Meetings were scheduled and conducted with identified internet service providers (ISPs) and town officials to create a partnership and discuss ISP expansion plans in Wallsburg Valley and assess their readiness to apply for federal BEAD deployment grant funding for City. Focus areas included service requirements and ISPs' capacity to deliver reliable broadband connectivity. The approach involved comprehensive measures such as analyzing data from the FCC and the Utah Broadband Maps as well as conducting surveys and meetings with local officials. ISPs' active involvement in the Affordable Connectivity Program (ACP) was confirmed, verifying their commitment to expanding broadband access in unserved and underserved regions. The unique geography and characteristics of the Wallsburg Valley were considered when evaluating infrastructure needs and associated costs to establish realistic project timelines and budgets. In addition to providing valuable insights into ISP capabilities and commitment to expanding broadband access, meeting with the respective ISPs provided crucial information for formulating effective plans to deliver internet connectivity to unserved and underserved communities.

- **Existing Assets Assessment:** Using data collected from state GIS mapping efforts, the FCC, the Utah Residential Broadband Map[7], surveys, meetings with stakeholders, and internet speed tests, the technical team created an asset inventory of all existing broadband assets within Wallsburg Valley. The integration of GIS data into the assessment provided valuable insights into the existing broadband landscape, aiding in the development of targeted strategies for enhancing connectivity.

- **Disparity Analysis:** Analysis was conducted to identify and map areas within Wallsburg Valley that are unserved and underserved. To further understand potential disparities in broadband access, socioeconomic and demographic variables were considered that could contribute to inequalities in broadband access between members of one group versus another. Examples of groups considered include Age 60+, Disabled Individuals, Veterans, Incarcerated Individuals, Non-White, and Rural Areas. This data was gathered from both public outreach efforts and the U.S. Census and analyzed. GIS mapping

[7] UGRC. Utah Residential Broadband Map. https://broadband.ugrc.utah.gov/

technology allows visualization of those areas that may require targeted intervention for digital inclusion efforts.

- **Research:** The team collected research from various sources and agencies regarding broadband infrastructure and deployment best practices, federal funding opportunity qualifications, all resources produced by the NTIA, and broadband outreach best practices.

  Additional research was conducted by utilizing the latest U.S. Census data to provide insights into an area's population and household data, geographic distribution, demographic information, socioeconomic information, internet adoption and usage, and commuting patterns. These factors contribute to the formation of a comprehensive plan that is based upon data.

- **Geographic Information System (GIS) Mapping:** To visualize and analyze broadband coverage, gaps, and infrastructure locations in Wallsburg Valley, Geographic Information Systems (GIS) mapping technology was utilized. This mapping approach provided valuable insights into the current state of broadband connectivity, identifying areas of need, and assessing the planning of future expansion.

3.2 EXISTING RESOURCES

Existing programs include all the programs and activities that Wallsburg Valley currently performs or has performed in the past. See Table 2 and Table 3 for information on current activities and funding.

Table 2. Current Broadband-Related Activities

ACTIVITY NAME	DESCRIPTION	INTENDED OUTCOME(S)
Installed fiber backbone for town	The school district installed a 6-mile fiber line from Hwy 189 to the Town of Wallsburg in 2020.	The primary intended outcome was to provide broadband service for the students living within Wallsburg Valley. As of 2023 there are approximately 240 K-12 students in Wallsburg Valley.
Local Broadband Plan	This project is to inform the state-wide Digital Connectivity Plan that will determine Utah's broadband priorities over the coming years.	Aid Wallsburg Valley to identify needs and gaps in Local Broadband Infrastructure, then strategize implementation

Table 3. Broadband Funding

SOURCE	PURPOSE	TOTAL	EXPENDED	AVAILABLE
Utah Broadband Center	Wallsburg Valley broadband infrastructure planning	$30,000	$27,500	$2,500

3.3 PARTNERSHIPS

This section identifies existing and potential partners and community anchor institutions that Wallsburg Valley may engage for the development and implementation of the Local Broadband Plan. Such partners include organizations that are already engaged in issues related to broadband deployment and digital inclusion, such as local governments, college and university systems, school systems, faith-based organizations, foundations, chambers of commerce, and local ISPs.

Table 4. Local Community Partners and Community Anchor Institutions

COMMUNITY PARTNER / ANCHOR INSTITUTION	DESCRIPTION OF CURRENT OR PLANNED ROLE IN BROADBAND DEPLOYMENT AND ADOPTION
Wasatch County School District	Wasatch County School District worked with Utah Broadband to hang Fiber from the mouth of the canyon to the Town Hall in 2018 when school children could not submit assignments due to lack of internet connectivity.
Town Hall	Anchor Institution located at 70 W Main Canyon Rd in the Town of Wallsburg
Fire Station	Anchor Institution located at 130 East 300 South in the Town of Wallsburg
LDS Church	Anchor Institution located at 494 W Main Canyon Rd in Town of Wallsburg
Wallsburg Rodeo Arena	This arena is located by the Wallsburg Park. This is the primary source of recreation among the children in Wallsburg. Public Wi-Fi is provided as the children often do their homework here.
H.E.A.T. Program	Assists low-income households with energy and water costs[8].
Heber Senior Citizen's Center	Provides classes and resources for seniors in Wallsburg Valley. Located at 465 E 1200 S, Heber City, UT.

Table 5. Statewide Partners

NAME	CONTACT INFORMATION	ROLE IN BROADBAND DEPLOYMENT AND ADOPTION
Rebecca Dilg	rdilg@utah.gov (801) 538-8681	Utah Broadband Center Director *Governor's Office of Economic Opportunity*
Claire Warnick	cwarnick@utah.gov (801) 450-6682	Utah Broadband Center Program Manager *Governor's Office of Economic Opportunity*
Teri Mumm	tmumm@utah.gov	Utah Broadband Center Digital Access Program Manager *Governor's Office of Economic Opportunity*

[8] https://mountainland.org/heat/

Lynne Yocom	yocom@utah.gov (801) 514-4565	Fiber Optics Manager *Utah Department of Transportation*
Liz Gabbitas	lgabbitas@utah.gov	Digital Access and Education Program Manager *Utah State Library*
Vikram Ravi	vravi@ntia.gov	Federal Program Officer for Utah *National Telecommunications and Information Administration*

3.4 ASSET INVENTORY

Broadband assets include hard assets (e.g., towers, buildings, and utility poles) and soft assets (e.g., programs, activities, strategies, skills, and people) that can be leveraged to close the digital divide. Hard assets in Wallsburg Valley are described below in Section 3.4.1. Wallsburg Valley's soft assets are described in Sections 3.4.2 and 3.4.3.

3.4.1 Broadband Availability

General Service Areas

Figure 3 and **Figure 4** below depict the wireline and fixed wireless broadband currently available in Wallsburg Valley, Utah. ISPs are required to submit their corresponding service areas twice a year through FCC Form 477. ISPs are now required to submit service areas through the FCC webpage[9]. The accuracy of the service locations can be influenced by the optimism and interests of ISPs. These maps, part of the Utah Residential Broadband Map[10], provide specific upload and download speed information as well as fixed and mobile wireless data. Figure 3 shows service areas considered "served" which have at least 100/20 Mbps speeds. Figure 4 shows service areas considered "underserved" which have at least 25/3 Mbps speeds. Underserved and unserved will be further discussed in the needs and gaps analysis in Section 3.5. Residents in Wallsburg Valley are not seeing the speeds reflected in Figure 3 which will be shown in the survey results throughout the report.

[9] Federal Communications Commission. December 2022. Information for Filers. https://www.fcc.gov/BroadbandData/filers

[10] UGRC. Utah Residential Broadband Map. https://broadband.ugrc.utah.gov/

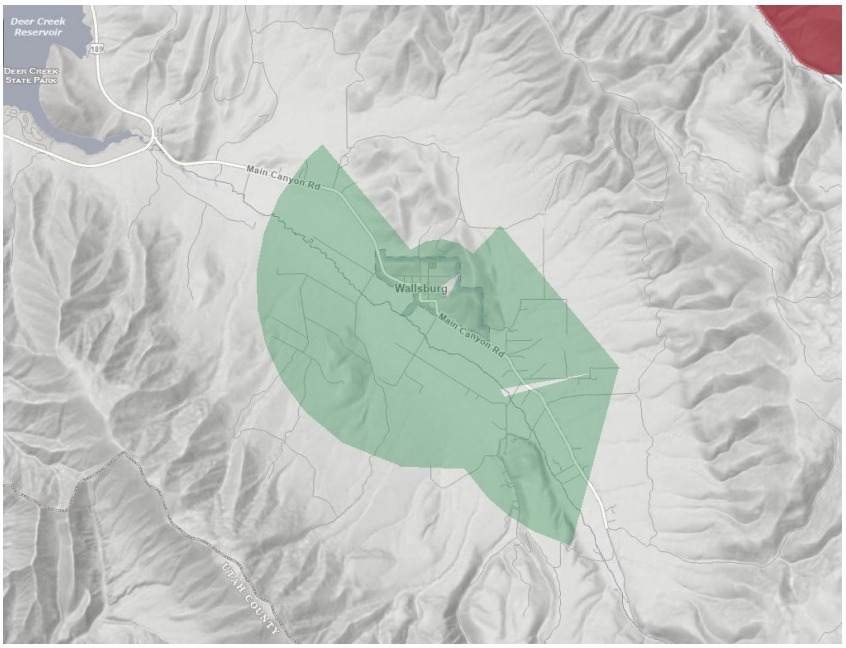

Figure 3. Broadband Coverage Area in Wallsburg Valley with 100/20 Mbps Minimum Speeds (Red Areas are Wired Service, Green Areas are Fixed Wireless Service)

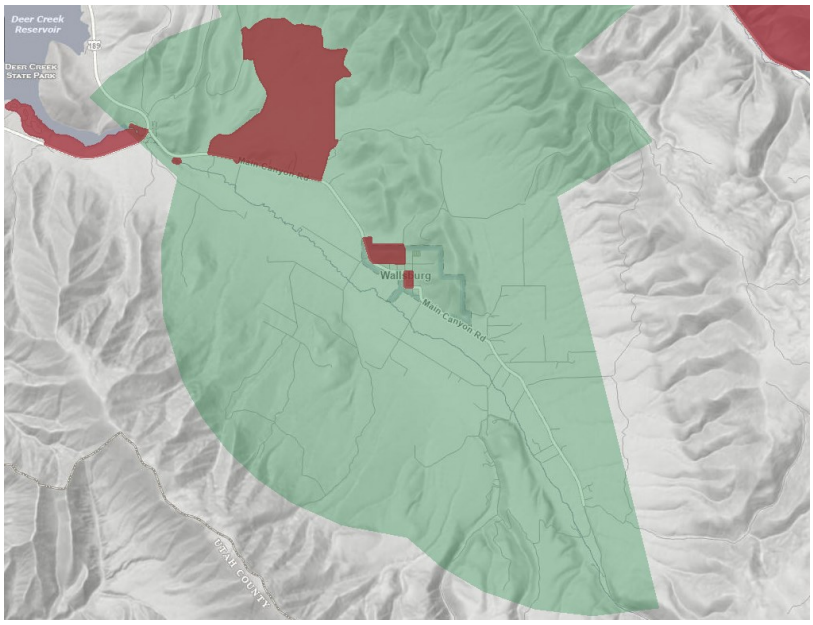

Figure 4. Broadband Coverage Area in Wallsburg Valley with 25/3 Mbps Minimum Speeds (Red Areas are Wired Service, Green Areas are Fixed Wireless Service)

Table 6 summarizes the availability of different internet technologies for the population of Wallsburg, including fiber, cable/DSL, licensed wireless, and unlicensed wireless for all available speeds. These numbers were obtained from GIS data as reported from FCC Form 477.[11]

Table 6. Technology Available to Region's Population

TOWN	FIBER	CABLE/DSL	LICENSED WIRELESS	UNLICENSED WIRELESS
Wallsburg	0%	80.7%	0%	100%

Internet Service Providers (ISPs)

Private ISP companies provide internet service to residents and businesses and typically own the networks that distribute the broadband to their customers. Twice a year, ISPs report their service areas through FCC Form 477. In Utah, these coverage areas are mapped onto Utah Residential Broadband Map[12], a state GIS map from the Governor's Office of Economic Opportunity. In Wallsburg Valley, a range of ISPs cater to the diverse needs of residents and businesses.

ISPs currently serving Wallsburg Valley are:

- CenturyLink
- Rise Broadband
- Utah Broadband

Figure 5 through Figure 7 show the current coverage areas of each of the available ISPs in Wallsburg Valley. Areas in red are wired service while areas in green are fixed wireless service. These coverage areas show any coverage available by the ISP, regardless of whether it is a high or low speed.

[11] Federal Communications Commission. Fixed Broadband Deployment Data from FCC Form 477. https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477

[12] UGRC. Utah Residential Broadband Map. https://broadband.ugrc.utah.gov/

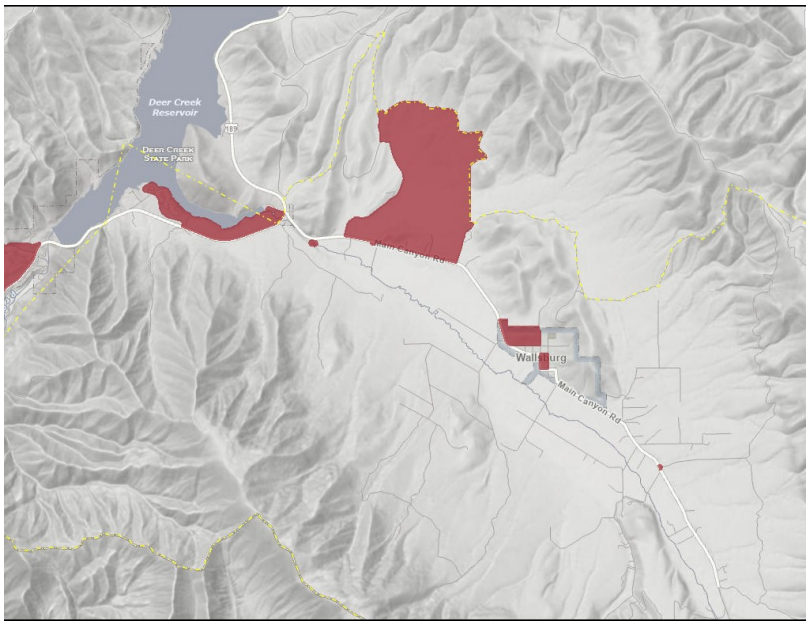

Figure 5. CenturyLink Coverage Area in Wallsburg Valley with Any Speed (Red Areas are Wired Service, Green Areas are Fixed Wireless Service)

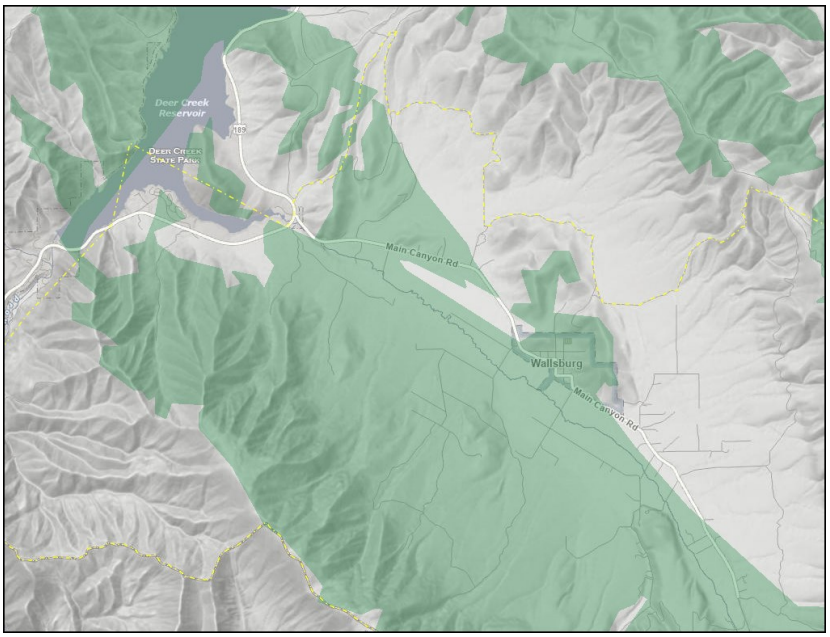

Figure 6. Rise Broadband Coverage Area in Wallsburg Valley with Any Speed (Red Areas are Wired service, Green Areas are Fixed Wireless Service)

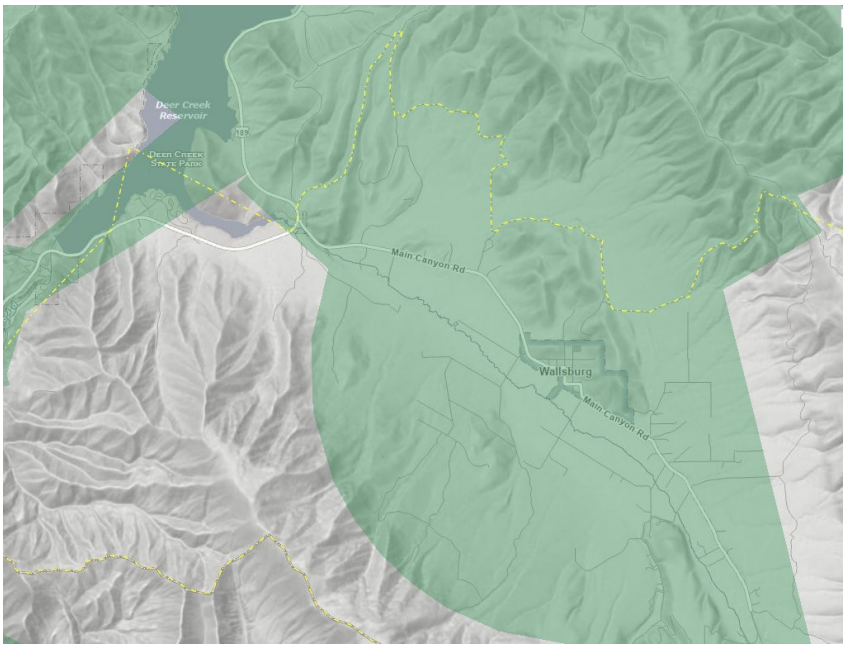

Figure 7. Utah Broadband Coverage Area in Wallsburg Valley with Any Speed (Red Areas are Wired Service, Green Areas are Fixed Wireless Service)

Wireless Towers

Point-to-point wireless towers, also known as microwave towers or wireless backhaul towers, are structures used in telecommunications to establish wireless communication links between two specific points. These towers facilitate the transmission of data, voice, or other forms of communication over long distances without the need for physical cables or fiber optic lines.

The primary purpose of point-to-point wireless towers is to establish a direct and dedicated connection between two locations. These towers are typically equipped with directional antennas, which transmit and receive signals in a focused beam, allowing for high-speed and reliable data transmission.

Municipal Fiber Network

Wasatch School District undertook an initiative in 2018 to install approximately 3 miles of aerial fiber from US-89 at the mouth of Wallsburg Valley to Wallsburg Town Hall only. The purpose of this installation was to aid students with submission of schoolwork from the Town Hall. Wallsburg Valley is utilizing this fiber network that is owned by the Wasatch School District at the one location it serves, which is the Town Hall.

Utah Department of Transportation (UDOT)

UDOT has been actively deploying fiber optic infrastructure along the state highway system for many years. This infrastructure includes conduit, fiber optic cabling, access points, distribution hubs, and communications equipment. This infrastructure is a publicly owned asset that UDOT

uses to monitor traffic and other transportation-related activities and facilitate broadband deployment across state highways. Whenever UDOT builds or expands a roadway, their practice is to install fiber optic conduits as an incremental cost to the project. UDOT exchanges sections of their empty conduit to private ISPs to allow them to install their own cabling. In exchange, private ISPs provide their own empty conduit for UDOT to use in different locations. Often, an ISP that provides shared communications infrastructure, such as Crown Castle or Syringa, will own and manage the fiber in the conduit leased from UDOT. This network creates the primary middle mile fiber network throughout the region. The ISPs that provide final mile internet service to the end user can often start their build out from the nearest state road.

One of the advantages of using the UDOT fiber network for broadband is that it can reduce the cost and complexity of deploying new infrastructure. Rather than building new fiber optic cables, ISPs can lease or use existing UDOT fiber to provide broadband services to customers. This can make it more feasible for ISPs to offer high-speed internet service in rural areas where the population density may be lower and the cost of deploying new infrastructure is higher.

Figure 8. shows UDOT fiber network infrastructure in the region of Wallsburg Valley along with FCC unserved and underserved locations. The significance of these unserved locations will be discussed in Section 3.5.1 Broadband Availability. In Wallsburg Valley, there is only UDOT fiber running along Hwy 189. UDOT has a 72-count fiber optic cable, and All West has a 288-count fiber optic cable within the UDOT conduit that passes by, but does not enter, the entrance to the Wallsburg Valley area.

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FCC Locations

- Underserved (25-100 M Down)
- Unserved (<25 M Down)

Structures

- Buildings
- Hub
- Hub-Mini
- Existing Fiber

Wallsburg

West Jordan
Sandy
Orem
Provo
Uinta National Forest
40

S Highway 189
Provo Canyon Scenic Pkwy
W Main Canyon Rd
Main Creek
Mud Ln
Hanks Canyon
Owens Canyon
Sunday Canyon
Ridge Line Rd
Parker Canyon
Wallsburg Ridge
7940 ft
8502 ft
8190 ft
7657 ft
8889 ft
Bear Canyon
Sams Canyon
Billy Haws Canyon
Bear Canyon Pass
Smooth Hollow
Johns Glen
Whipstock Creek
Penrod Creek
Little Hobble Creek
Right Fork Little Hobble Creek
Left Fork Little Hobble Creek
Balsam Creek
Maple Canyon
E Maple Canyon Rd
Main Canyon
Station Hollow
Thornton Hollow
Cabin Hollow
Dockweek Flat
Big Glade
8907 ft
9192 ft
Big Springs Park
Cummin Flat
Dry Canyon
Center Creek Number

N

0 0.25 0.5 1 1.5 Miles

Horrocks.

Figure 8: UDOT Fiber Network in Wallsburg Valley

3.4.2 Digital Access

Digital access refers to the ability of individuals to use and benefit from digital technologies, including high-speed internet. In addition to the availability of broadband infrastructure, digital access also depends on factors such as knowledge, skills, and personal hardware. As digital technologies continue to play an increasingly important role in our daily lives, the need for equitable access to high-speed internet becomes more pressing. Digital equity is an important aspect of this issue, as it refers to the fair and just distribution of digital resources and opportunities, particularly for covered populations (unserved, underserved, and underrepresented communities). In Wallsburg Valley, ensuring digital access and digital equity for all residents is a critical part of building a thriving and inclusive community.

Public Wi-Fi Networks

Wallsburg has two locations with public Wi-Fi. Wi-Fi is provided at the Town Hall and at the Town Park / Arena.

Utah Communities Connect (UCC) developed an interactive map detailing public Wi-Fi locations in Utah as a response to the access needs brought on by the COVID-19 pandemic. This map documents Wi-Fi access points throughout Utah (see Figure 9)[13]. None of the Wallsburg's public Wi-Fi locations are listed on the UCC map.

[13] Utah Communities Connect. Public Wi-Fi Access Points. https://utah.maps.arcgis.com/apps/webappviewer/index.html?id=e463ba10af034b6e90a8d01b5c13ec55 (accessed May 9, 2023)

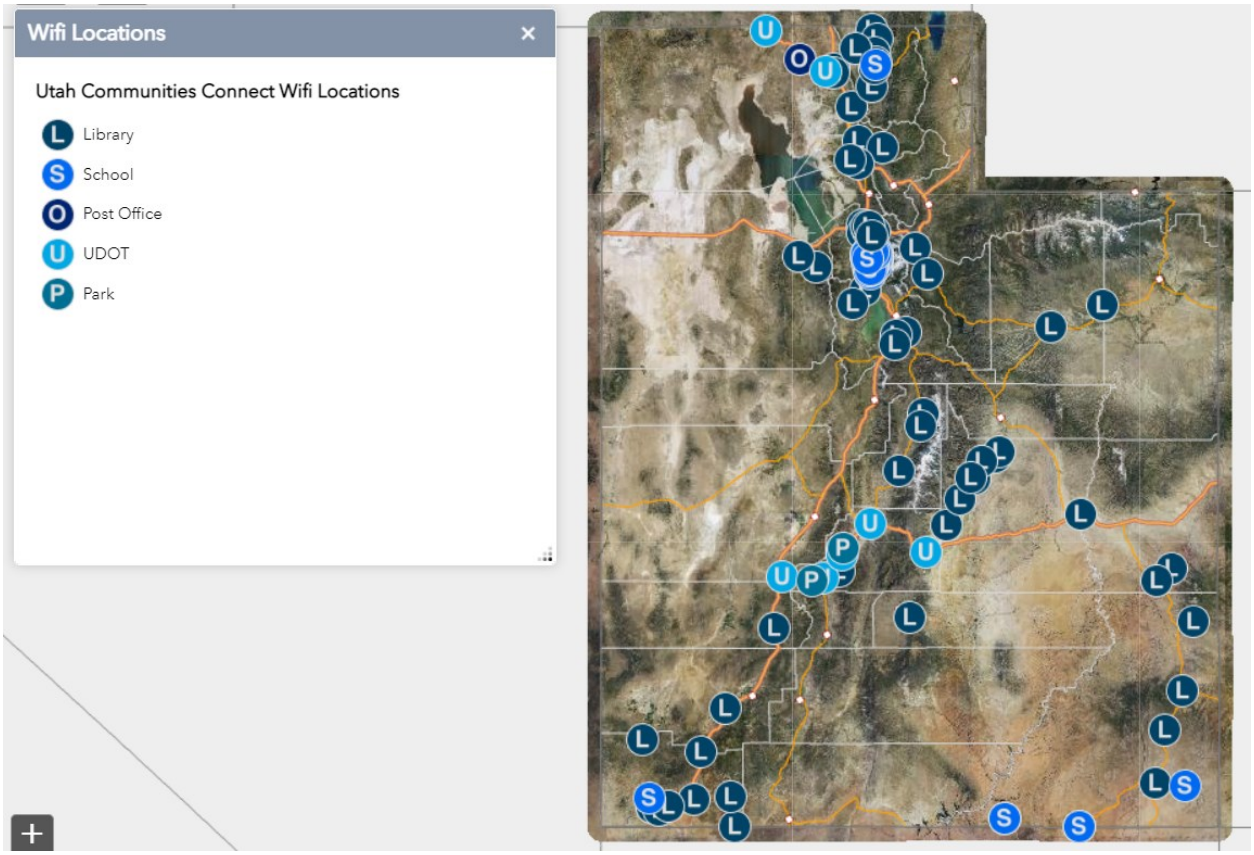

Figure 9. Utah Communities Connect Wi-Fi Locations

Wi-Fi Hotspot Loan Programs

The State Library Division has a program that provides free wireless hotspot devices to the public. Residents can check out a hotspot device to be able to connect online remotely at zero cost. These devices are available at most state- or municipality-owned libraries across the state.

The Wasatch County Library has 10 hotspot devices that may be reserved for 7 days at a time. There is a wait list of approximately 1-2 weeks to obtain a hotspot device.

Library Wi-Fi

The Utah State Library Division oversees and works with all public libraries within the state to ensure Wi-Fi is available to the public. All State, County, and City libraries offer public Wi-Fi connectivity. The speed of each Wi-Fi network depends on the location, but most libraries are connected with fiber optics, meaning the Wi-Fi supports robust connection speeds.

Mobile Wireless Access

Mobile wireless carriers provide strong coverage areas across the Wallsburg Valley. According to the data provided by the major mobile wireless carriers, Wallsburg Valley is a covered area

for mobile wireless. For those locations that are covered by mobile wireless, the majority of the service that is offered supports the “served” threshold of 100/20 Mbps broadband speeds. See Figure 10 for a mobile wireless coverage map of at least 100/20 Mbps speeds (data provided to the Utah Geospatial Resource Center).[14]

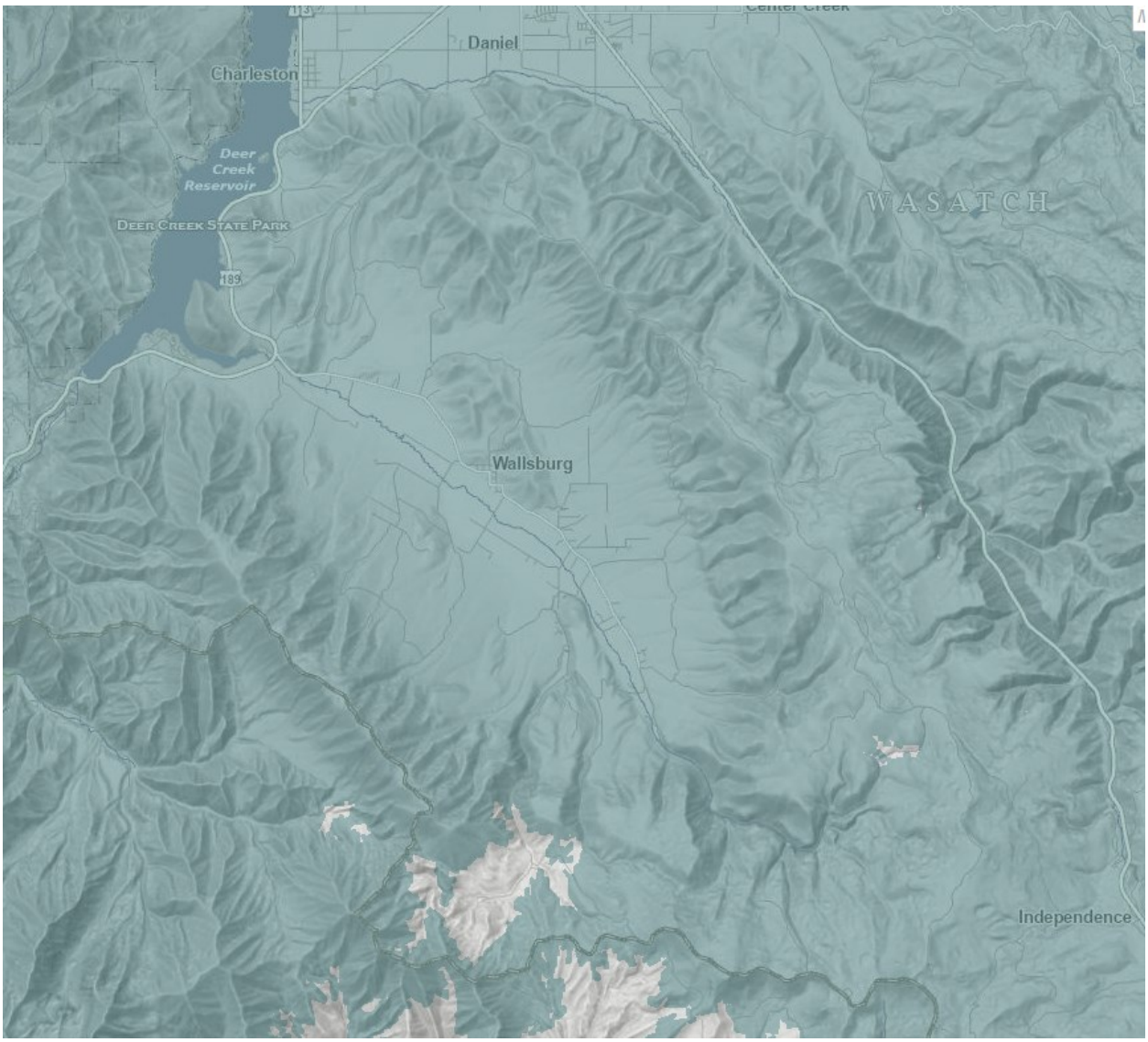

Figure 10. Mobile Wireless Coverage Area in Wallsburg Valley (100 Mbps Minimum Speeds)

[14] UGRC. Utah Residential Broadband Map. https://broadband.ugrc.utah.gov/

3.4.3 Broadband Affordability

Broadband affordability is a critical component of digital equity, as the cost of high-speed internet can be a significant barrier for many households. In Wallsburg Valley, the affordability of broadband varies depending on a variety of factors, including the availability of affordable broadband service plans and discounted or subsidized broadband programs. While some ISPs offer competitive pricing and bundles that can make high-speed internet more accessible, others may charge higher prices for their services. Understanding the overall affordability of broadband in Wallsburg Valley is essential for ensuring that all residents have access to the digital resources and opportunities they need to thrive. Table 7 outlines the providers available in the area, as well as their respective costs, available speeds, and participation in the Affordable Connectivity Program (ACP). Participation in the ACP program is a requirement for ISPs to be awarded federal BEAD implementation funding.

Table 7. Providers and Price

PROVIDER	PRICE	DESCRIPTION OF SERVICE TIER, ADVERTISED SPEEDS, AND AFFORDABILITY	PARTICIPATES IN THE AFFORDABLE CONNECTIVITY PROGRAM?
CenturyLink	$25 - $75 per month	10 Mbps – 1 Gbps download	Yes
Rise	$50 – $85 per month	10 Mbps – 100 Mbps download	Yes
Utah Broadband	$50 - $150 per month	10 Mbps – 10 Gbps download	Yes

There are various federal and state programs that aim to make broadband more affordable for low-income households, including the ACP, FCC's Lifeline program, the E-Rate program, and the Utah Universal Service Fund.

Affordable Connectivity Program (ACP)

The most impactful affordability asset currently available to residents of Wallsburg Valley is the ACP. This federal benefit provides a service discount of up to $30 per month on a home internet plan, and households on Tribal lands are eligible for up to $75 per month to mitigate the higher cost of service in rural and remote areas. Unfortunately, the ACP is underutilized in Utah. Other assets include efforts to increase the awareness and use of ACP, such as grant-funded projects and the state-led Act Now campaign. The FCC provides participation metrics for Utah[15].

[15] FCC. April 2023. Affordable Connectivity Program Providers. https://www.fcc.gov/affordable-connectivity-program-providers

Lifeline
Lifeline is an FCC program that helps make communications services more affordable for low-income consumers. Lifeline provides a discount on qualifying monthly telephone service, broadband internet service, or bundled voice-broadband packages. The Lifeline program offers $9.25 per month to certain qualifying households and plans, and the state of Utah provides an additional $3.25 per month.[16]

E-Rate
The Schools and Libraries Universal Service Support Program, commonly known as the E-rate program, helps schools and libraries to obtain affordable broadband. The E-rate program is administered by the Universal Service Administrative Company (USAC) under the direction of the FCC. USAC is responsible for processing applications for support, confirming eligibility, and reimbursing service providers and eligible schools and libraries for the discounted services. USAC also ensures that the applicants and service providers comply with the E-rate rules and procedures established by the FCC. Four service categories are eligible for E-rate funding: telecommunications, internet access, internal connections, and basic maintenance of internal connections.[17]

The Utah Education Network (UEN) is the E-rate consortium lead in applying for and implementing E-rate funds received in Utah. UEN helps schools and libraries apply for discounts on broadband services through the E-rate program. This program utilizes Utah Universal Service Funds (UUSF), which are collected through fees on consumers' phone bills.

There are currently 15 schools in Wasatch County that are utilizing E-rate.

Utah Universal Service Fund
The Utah Universal Service Fund (UUSF) enables rural customers to have access to the same quality of service as urban customers at a reasonably comparable price. Enacted in 1997 and governed by Utah Administrative Rule R746-8,[18] funding from UUSF is used to support programs that advance and maintain telecommunication networks and services in rural areas. This program provides rural telecommunication providers a rate-of-return to advance the operation and maintenance of rural networks.

3.5 NEEDS AND GAPS ASSESSMENT

To ensure that all residents of Wallsburg Valley have access to high-quality broadband internet, a needs and gaps assessment is essential. This assessment will identify gaps between the current state of broadband deployment and the needs of residents, businesses, and institutions. Through needs identification, data collection, and analysis, policymakers and community

[16] Universal Service Administrative Co. Jan. 2023. Lifeline Program Data. https://www.usac.org/lifeline/resources/program-data/#
[17] Universal Service Administrative Co. Eligible Services List. https://www.usac.org/e-rate/applicant-process/before-you-begin/eligible-services-list
[18] Utah Office of Administrative Rules. (January 2022). Rule 8: Utah Universal Public Telecommunications Service Support Fund. https://adminrules.utah.gov/public/rule/R746-8/Current%20Rules?

leaders can develop and implement strategies that address these gaps, ensuring that all residents have access to the digital resources necessary for success in today's economy.

3.5.1 Broadband Availability

The ability to interact with friends and family, access educational and health care resources, and fully engage in the digital economy are all made possible by having access to high-speed broadband. However, most of Wallsburg Valley does not have access to dependable and reasonably priced broadband connectivity, especially for the areas outside of Wallsburg Town.

The primary metric by which broadband availability is evaluated is what speeds are available to residents and businesses throughout Wallsburg Valley. The BEAD program aims to provide service of 100/20 Mbps speeds to every American. Serviceable locations with speeds under 25/3 Mbps are considered unserved locations that are given the top priority for broadband funding. Locations with speeds less than 100/20 Mbps are considered underserved locations and are the second priority for BEAD funding.

Figure 11 below shows the areas where there is no wired or fixed wireless service above 25/3 Mbps.

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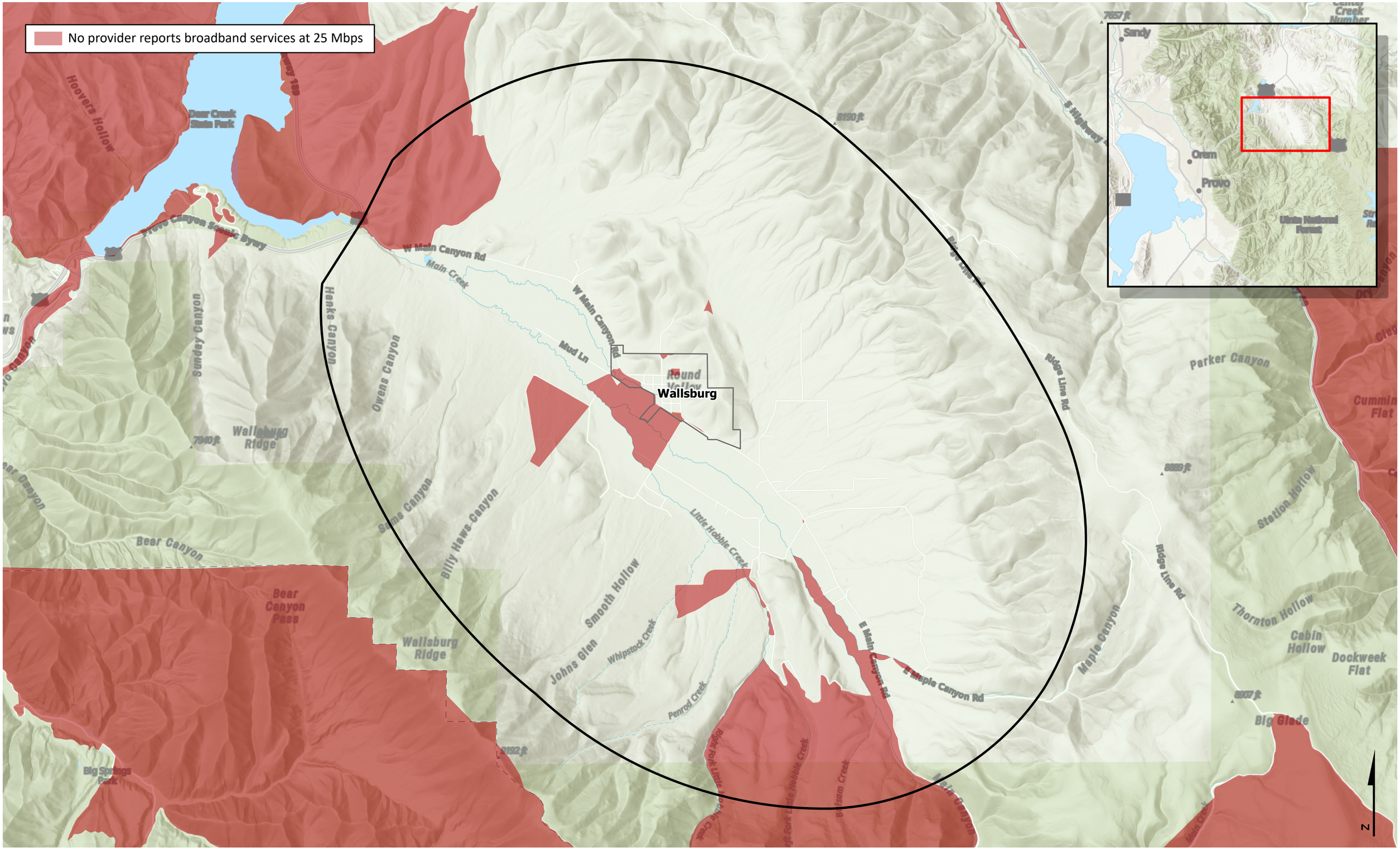

Figure 11: Areas with No Services at 25 Mbps in Wallsburg Valley

0 0.25 0.5 1 1.5 Miles

FCC Service Locations

The FCC has created a map[19] that shows the service availability at each broadband serviceable location. Residences and businesses that are classified as unserved or underserved will qualify to be included in BEAD funding projects. The data throughout section 3.5.1 generally supports the FCC service designations.

Figure 12 shows all FCC servicable locations while Figure 13 shows only the unserved and underserved locations. Table 8 shows the number of FCC locations that fall within each speed tier in Wallsburg Valley.

Table 8. Broadband Speeds Available

	UNSERVED (BELOW 25/3 MBPS)		UNDERSERVED (BELOW 100/20 MBPS)		SERVED (ABOVE 100/20 MBPS)		
CITY	NUMBER OF LOCATIONS	%	NUMBER OF LOCATIONS	%	NUMBER OF LOCATIONS	%	TOTAL FCC LOCATIONS
Wallsburg	279	72.1%	72	18.6%	36	9.3%	387

[19] FCC. National Broadband Map. https://broadbandmap.fcc.gov/home

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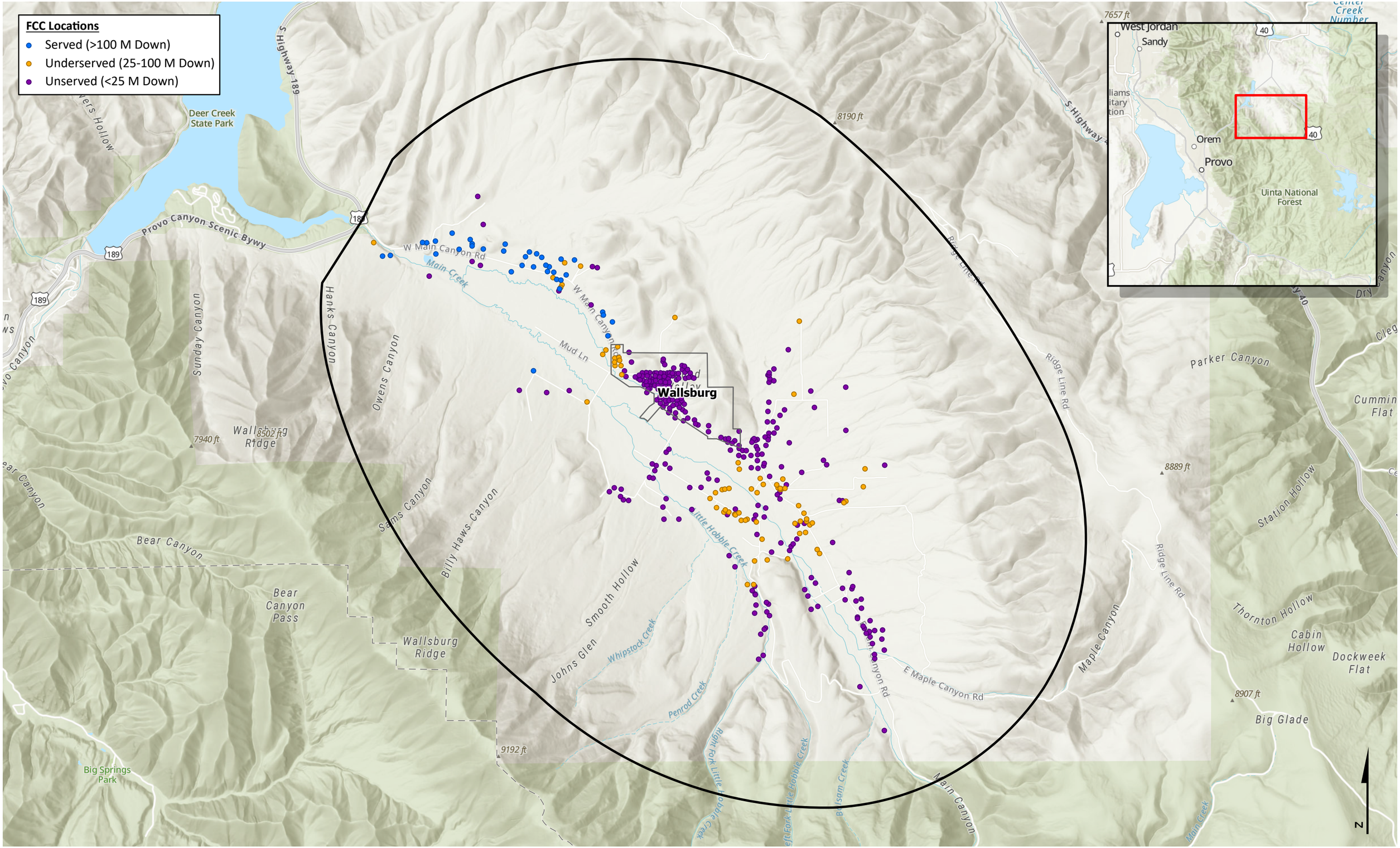

Figure 12: FCC Service Locations in Wallsburg Valley

0 0.25 0.5 1 1.5 Miles

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FCC Locations
- Underserved (25-100 M Down)
- Unserved (<25 M Down)

Wallsburg

Deer Creek State Park
Provo Canyon Scenic Bywy
S Highway 189
Hanks Canyon
Owens Canyon
Sunday Canyon
Moovers Hollow
W Main Canyon Rd
Main Creek
Mud Ln
Ridge Line Rd
Parker Canyon
Wallsburg Ridge
7940 ft
8502 ft
8190 ft
8889 ft
9192 ft
7657 ft
Sams Canyon
Billy Haws Canyon
Bear Canyon
Bear Canyon Pass
Big Springs Park
Smooth Hollow
Johns Glen
Whipstock Creek
Penrod Creek
Little Hobble Creek
Right Fork Little Hobble Creek
Left Fork Little Hobble Creek
Balsam Creek
Main Canyon
E Maple Canyon Rd
Maple Canyon
Station Hollow
Thornton Hollow
Cabin Hollow
Dockweek Flat
Big Glade
8907 ft
Main Creek
Dry Canyon
Cummin Flat

West Jordan
Sandy
Orem
Provo
Uinta National Forest
40
189

N

0 0.25 0.5 1 1.5 Miles

Horrocks.

Figure 13: FCC Underserved/Unserved Service Locations in Wallsburg Valley

Internet Speed Test

In order to correctly gauge accuracy of FCC broadband data and ISP coverage areas, Wallsburg Valley and the state of Utah held a speed test campaign throughout the region. Residents could test the current speeds that their device was experiencing at the time of the test. Speed tests provide insight of additional unserved and underserved locations, showing gaps and discrepancies beyond the information provided by ISP data and FCC broadband data. These real-time internet download and upload speeds, while beneficial, did not come without limitations. For example, residents may be experiencing lower speeds because they are paying for a slower speed tier, which indicates an affordability issue. In addition, slower speeds may be due to personal hardware that's been incorrectly installed, which would be a digital access issue. The speed test cannot show if these other factors are happening, so it is best used to assess general trends.

Table 9 shows the results of the speed test. Out of the total 58 tests taken, nearly 66% (38 of the locations) classify as unserved (download speeds below 25 Mbps). Figure 14 shows the locations and results of the speed tests. Figure 15 shows the speed tests locations along with the FCC unserved and underserved locations. The speed tests verify the lack of service through the valley that the FCC data shows.

Table 9. Speed Test Results

CITY	NO SERVICE	LESS THAN 10 MBPS DOWNLOAD	LESS THAN 25 MBPS DOWNLOAD	LESS THAN 500 MBPS DOWNLOAD	GREATER THAN 500 MBPS DOWNLOAD	TOTAL
Wallsburg	0	15	23	20	0	58

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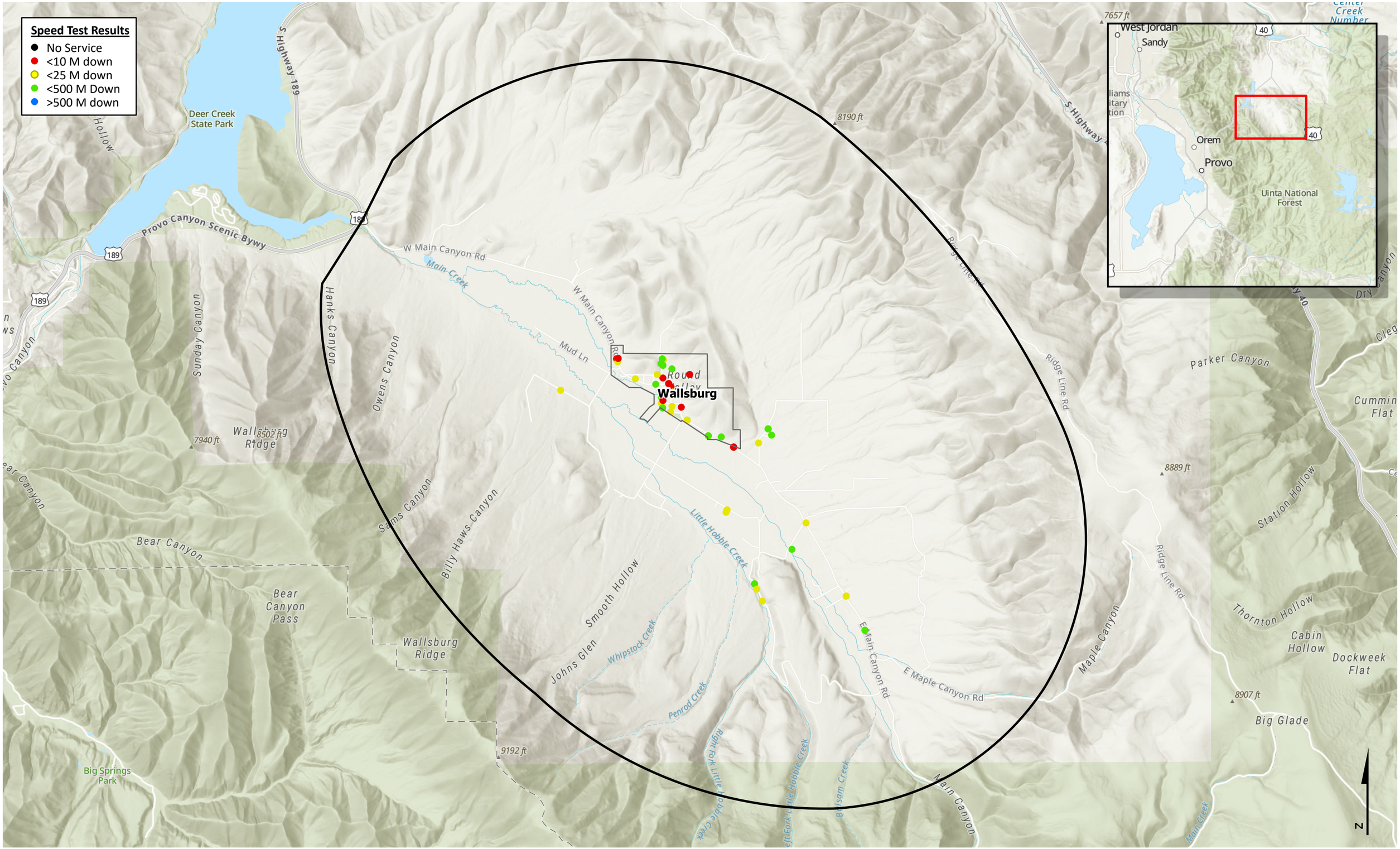

Figure 14: Speed Test Results for Wallsburg Valley

0 0.25 0.5 1 1.5 Miles

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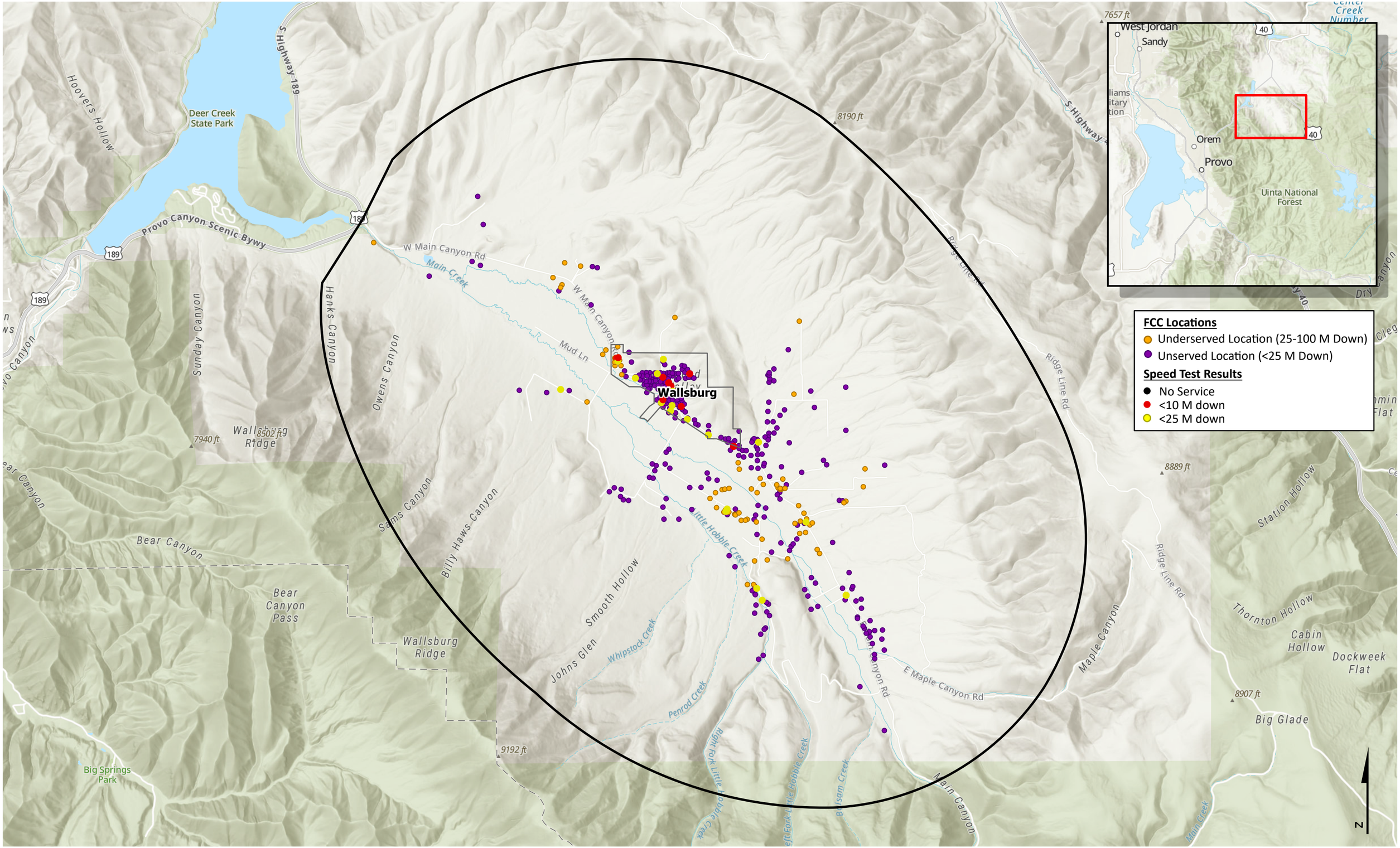

Horrocks.

Figure 15: Unserved Speed Test Results and Underserved/Unserved FCC Locations in Wallsburg Valley

Survey Results

The Wallsburg Valley Broadband Survey asked respondents to indicate if they had a household internet connection. Of 41 respondents, 39 responded, “Yes, I have an internet connection at my residence” and two selected “No, I don’t have an internet connection at my residence.” This data is detailed in Figure 16 below.

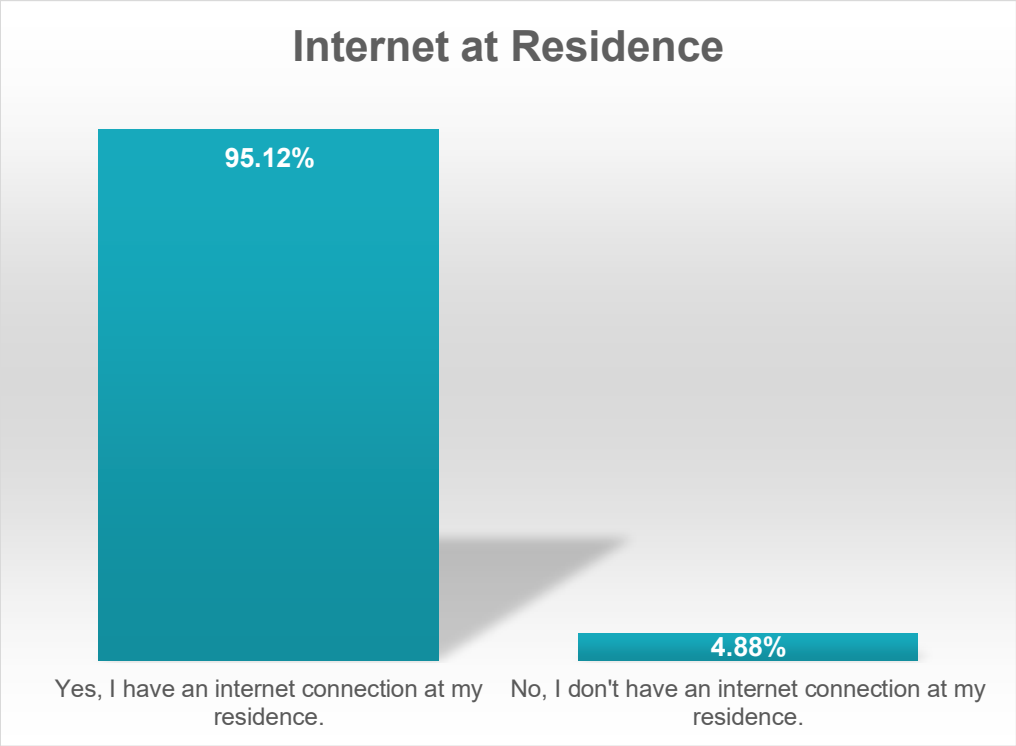

Figure 16. Percentage of Survey Respondents with a Household Internet Connection

The survey asked respondents what company they use for internet service. There were 20 responses to this question with 85% of respondents indicating that Utah Broadband was their ISP. This data is detailed in Figure 17 below.

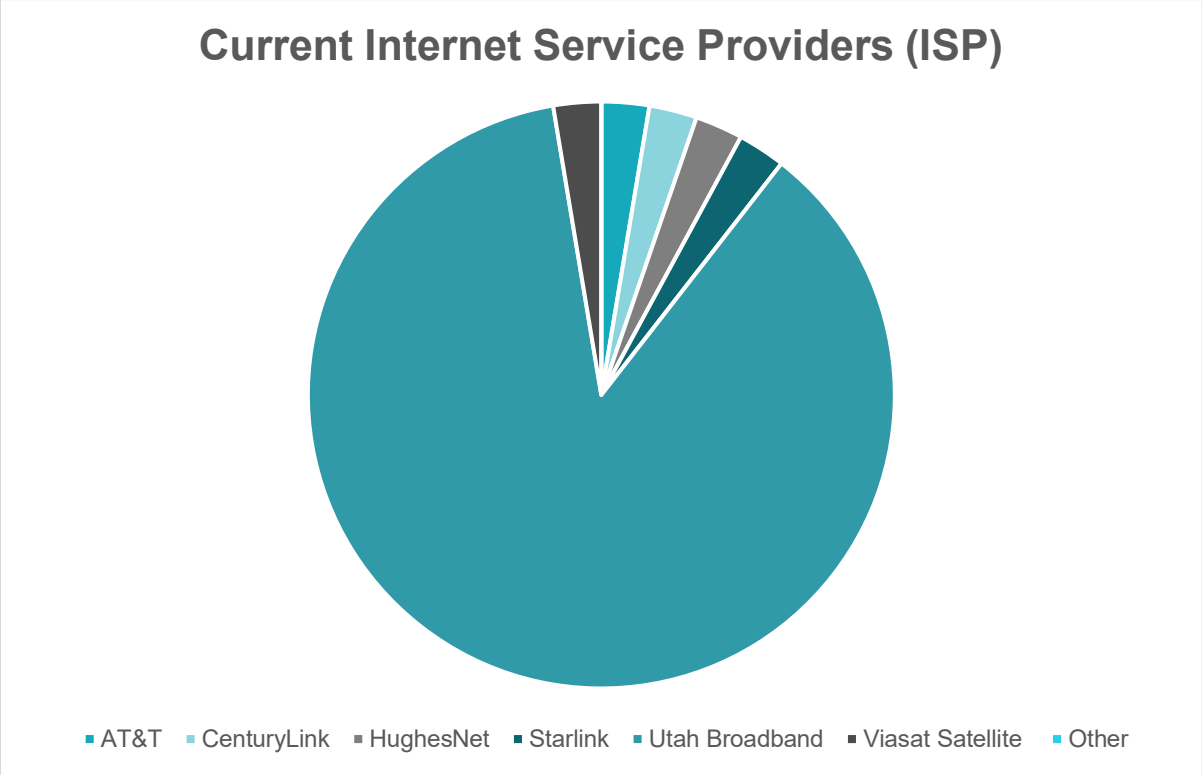

Figure 17. Internet Service Providers in the Wallsburg Valley Area

3.5.2 Digital Access

There are many barriers to digital access in Wallsburg Valley which have made it difficult for residents to access high-speed broadband internet. These barriers include affordability, digital literacy, lack of devices, language barriers, and community anchor institutions with lack of access to broadband connectivity and/or devices. To address these needs, it is important to prioritize initiatives that improve digital literacy and provide affordable access to high-speed internet, particularly in unserved areas of the Valley.

Covered Populations

A covered population refers to a group of individuals who are eligible for a particular program or intervention based upon economic or socioeconomic factors. The goal of defining a covered population is to target resources and focus them on those who are most in need. The table below shows covered populations in the Wallsburg Valley. In addition to margin of error estimates, categories are not mutually exclusive; as such, percentages do not total 100.

Table 10 below shows some of the covered populations in the Wallsburg Valley:

Table 10. Covered Populations

	PERCENT OF POPULATION			
WALLSBURG VALLEY	AGE 60 AND OVER	DISABILITY	VETERANS	NOT WHITE OR HISPANIC
Wallsburg	16.5%	13.7%	5.4%	1.3%

Survey Results

The Wallsburg Valley Broadband Survey asked respondents what they use the internet for in their household. There were 163 responses to this question, and most indicated they were using the internet for entertainment, shopping, and remote work/learning. This data is detailed in Figure 18 below.

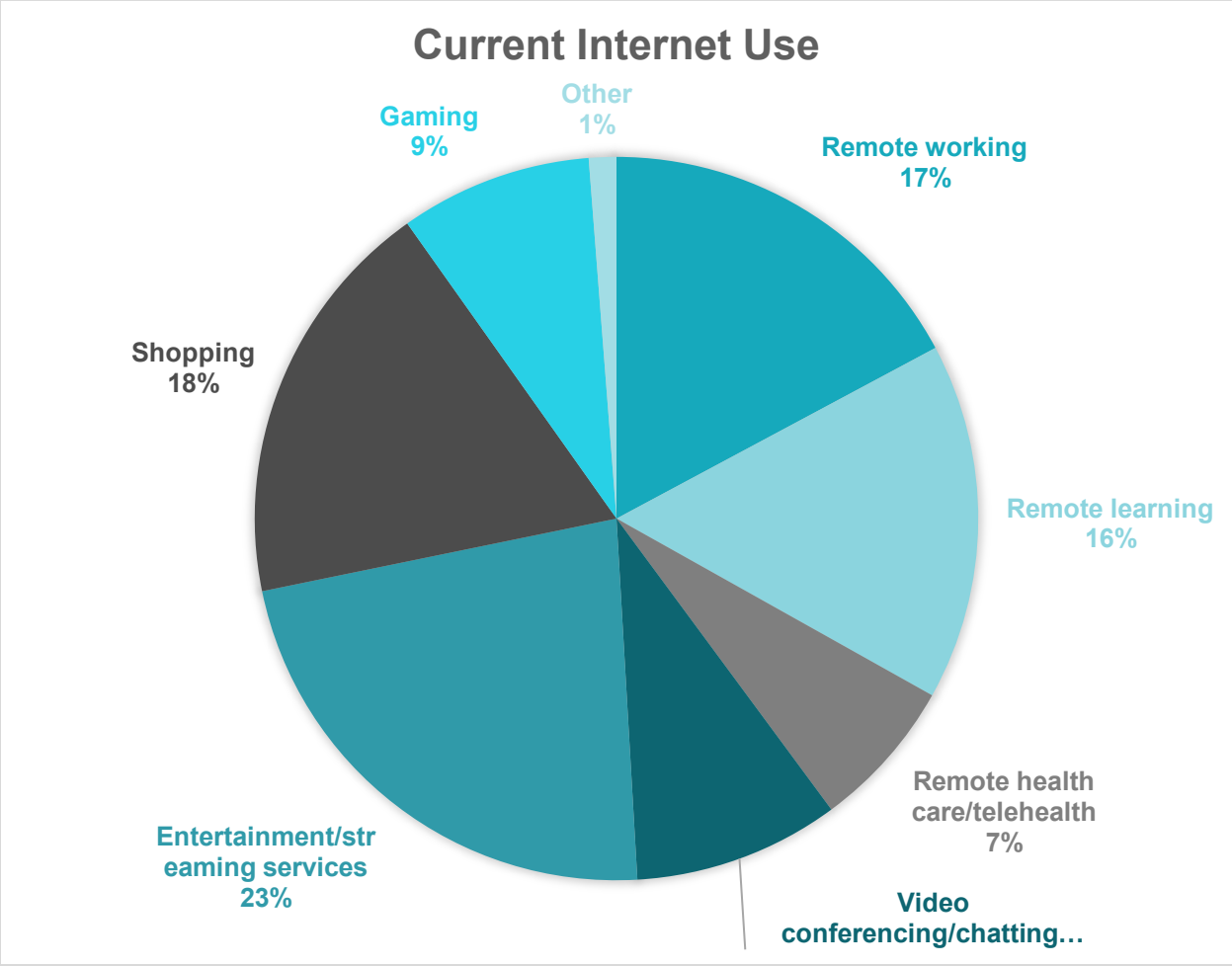

Figure 18. Household Internet Uses

3.5.3 Broadband Affordability

The Wallsburg Valley Broadband Survey asked respondents what the monthly charge is for their household internet service. There were 32 responses to this question, with 48% of respondents indicating they pay over $60 for monthly internet service. This data is detailed in Figure 19 below.

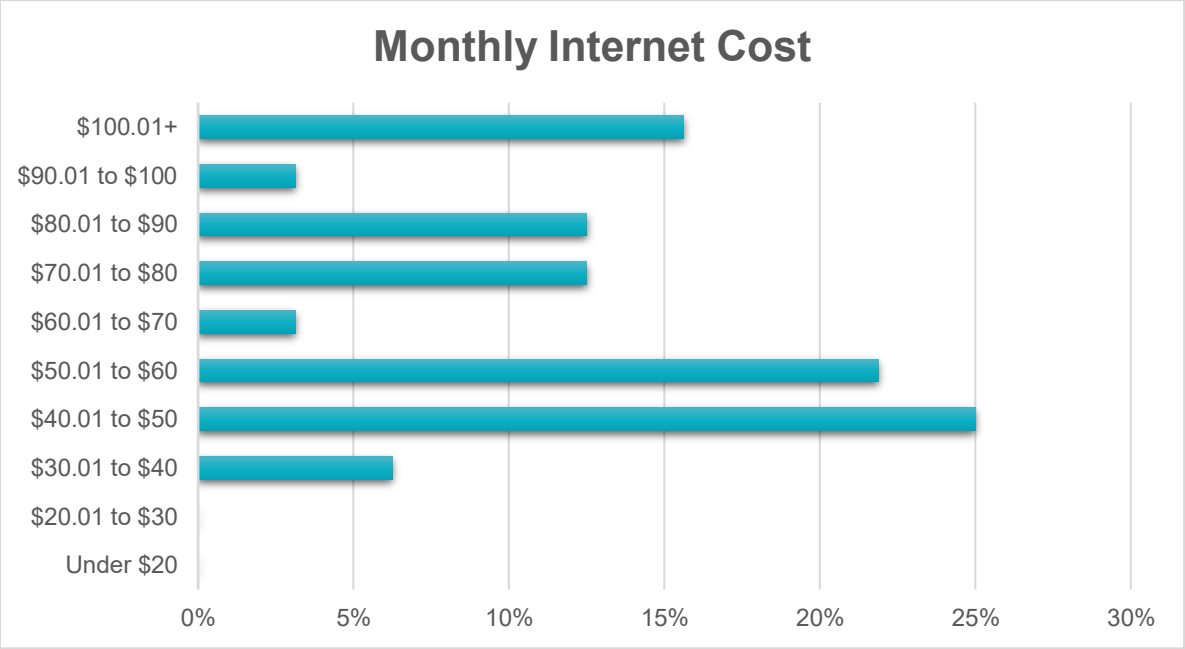

Figure 19. Monthly Household Internet Cost

4 OBSTACLES OR BARRIERS

The project team has identified various obstacles related to broadband deployment and adoption within the Wallsburg Valley. Specific obstacles related to high-speed broadband internet availability include terrain, low-density population, permitting, and right of way concerns. These obstacles are detailed below.

Terrain

The region surrounding Wallsburg Valley could present certain difficulties due to the terrain. The locality is relatively isolated, and certain dwellings are situated in elevated or mountainous areas. Additionally, the soil contains rocks. All of these factors pose challenges that make fiber placement more difficult and costly.

Low Density Population

Outside of the Town of Wallsburg boundary, the population density is low with a lot of open space between residences. The distance from one residence to another will likely be greater than many ISPs consider to be cost effective.

Permitting and Right-of-Way

It is important to obtain various permits at the earliest stages of implementation. This includes coordinating with utilities; addressing canal and waterway crossings; securing railroad permits; obtaining federal, state, and local permits in the right-of-way; and obtaining easements when broadband equipment encroaches land outside of the public right-of-way.

Table 11 shows many of the permitting entities within Wallsburg Valley with longer lead times. Figure 20 shows land ownership throughout the region, which informs permitting. In Wallsburg Valley it can take up to 180 days to receive all relevant permits. Initiating the permitting application process promptly is essential to meet any of the funding opportunity's implementation deadlines. It is important to note that this list is not an exhaustive list and may evolve between the publication of this plan and the construction phase.

Table 11. Permitting Entities

LEVEL	APPROXIMATE TIMEFRAME FOR PERMITTING	ENTITY
Local	30 Days	Wallsburg City Engineering
Local	30 Days	Wasatch County Engineering
State	30 Days	State Parks and Recreation
State	30 Days	State Trust Lands
State	30 Days	State Wildlife Reserve
State	30 Days	UDOT
Federal	180 Days	U.S. Forest Service
Utility	45 Days	Electrical Company
Utility	45 Days	Gas Company
Utility	45 Days	Other Telecom

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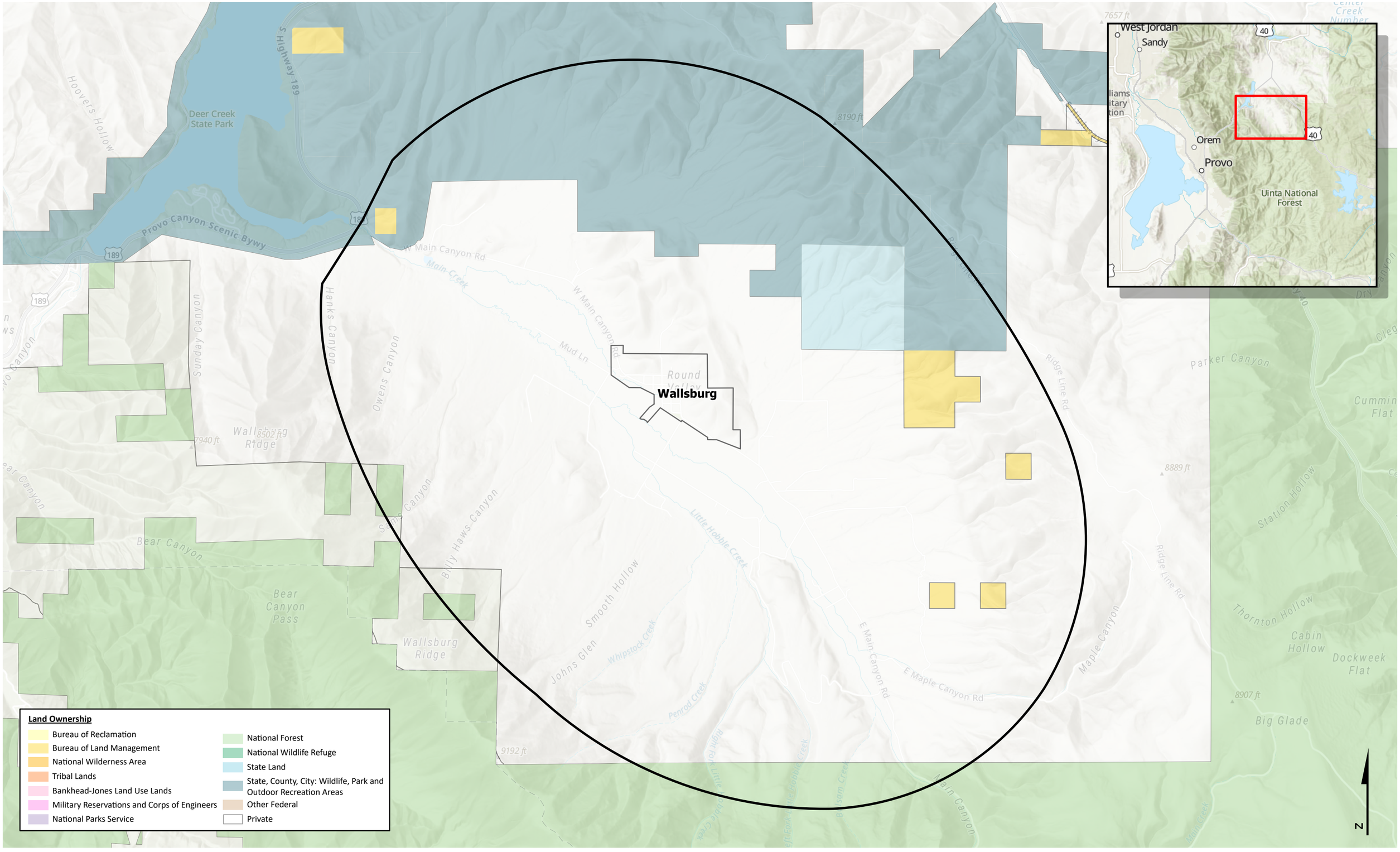


Horrocks.

Figure 20: Land Ownership in Wallsburg Valley

5 IMPLEMENTATION PLAN

The deployment of broadband infrastructure and expanded digital access throughout Wallsburg Valley follows the priorities, actions, strategies, and stakeholder involvement set forth in the implementation plan. With an emphasis on addressing the identified needs and gaps in broadband availability, affordability, and adoption, the plan lays out a roadmap for achieving universal access. The plan includes a projected timetable and cost as well as planned activities, key strategies, and stakeholder engagement. This implementation plan ensures that access to the possibilities and resources that come with dependable broadband infrastructure and connection are available to residents of Wallsburg Valley. The implementation plan seeks to build a more connected community with a strong commitment to stakeholder involvement and collaboration.

5.1 PRIORITIES

The priorities defined in Table 12 act as the foundation for executing Wallsburg Valley's broadband plan. These priorities have been established to ensure that the plan is in line with the community's vision for broadband infrastructure and digital access. By working together with the stakeholders, Wallsburg Valley's community can concentrate efforts on attaining the most crucial broadband goals and objectives.

Table 12. Priorities for Broadband Deployment and Digital Access

PRIORITY	RANKING	DESCRIPTION
Coordinating the ownership of the 6-mile fiber line from the school district to a private Internet Service Provider (ISP)	High	Understand current ownership and details involved in ownership transfer
Locate an Internet Service Provider (ISP) to establish connectivity throughout Wallsburg Valley	High	What are the costs to Wallsburg?
Engineer development of fiber network	High	
Provide fiber to every home that wants to establish a connection	High	ISP needs to come build
Offer educational resources and guidance on internet usage and cybersecurity	Medium	
Establish high-speed internet in low-density areas	Medium	Expand high-speed internet availability to residences in isolated settings

5.2 KEY EXECUTION STRAGEGIES

Drawing on the vision and goals in Section 1. Goals and Objectives, this section explains the specific strategies that Wallsburg Valley will undertake to realize those goals.

GOAL 1: Infrastructure Buildout

OBJECTIVE	STRATEGY
Provide broadband access to all residents of Wallsburg Valley, regardless of their location or economic status. This includes those residences located outside the formal town boundaries and should encompass all residences located in zip code 84082	• Coordinating the ownership of the 6-mile fiber line from the school district to a private ISP
Reduce dependence upon unreliable wireless and satellite options by creating a robust broadband infrastructure that can support higher speeds and greater capacities. The strong preference is for a fiber network.	• Initiate a broadband plan to begin planning and construction of broadband infrastructure
Select ISP partners that are practical and feasible and who are willing to undertake the challenges of bringing broadband to Wallsburg Valley	• Develop short list of potential ISP partners, then finalize selection

GOAL 2: Education

OBJECTIVE	STRATEGY
Foster digital inclusion that will lead to improved educational and health care outcomes, along with improved job opportunities and increased social connections.	• Work with Utah Commission on Aging • Add links to website (Aging, Heber senior center classes, HEAT program (MAG), Meals on Wheels, building checklist, etc.) • Add links and information to flyers at the Town hall and the Park and Horse arena • Enhance calendar and bulletin board for website for upcoming events • Collect email list from everyone in town and in valley, including XpressBill Pay's email addresses • Formalize who will update the website • Inquire if senior center can do internet training classes • Locate or develop training on using XpressBill Pay bill pay
Provide better connection and internet speeds for students of all ages, ranging from elementary school to college level.	• Work with UEN to identify and ensure that students have the tools and resources they need
Tutoring and Homeschool resources	• Enhance Town Hall schedule and other relevant information

GOAL 3: Communication

OBJECTIVE	STRATEGY
Improve town website to include relevant and up to date content, including online bill payment information	• Transition website from .org to .gov • Educate upon and increase adoption of Xpress bill pay
Establish email collection mechanism so that town clerk or other trusted individuals can easily distribute important information quickly	• Provide input form to collect email from community members
Communicate when new content, training classes or links etc. are available	• Determine best approach to notify community of new content or training

5.3 PLANNED ACTIVITIES

The purpose of this section is to outline activities that will support universal service, identify key players responsible for implementing these activities, specify funding sources, and highlight the expected outcomes in terms of broadband availability, digital access, and broadband affordability. Universal service is the principle that all Americans should have access to both telecommunications and high-speed internet at just, reasonable, and affordable rates.

Table 13. Broadband Availability

PLANNED ACTIVITY	KEY PLAYERS	FUNDING SOURCES	TIMELINE	EXPECTED OUTCOMES
Coordinating the ownership of the 6-mile fiber line from the school district to a private ISP	Karl Buchanan (formerly WSD), Steve McGhie & John Hagen (UBB), Lynne Yokom (UDOT fiber)	UBB	ASAP	Switching from CenturyLink to leased UDOT fiber from Wallsburg to Heber
Initiate planning and construction of broadband infrastructure	UBB			
Develop short list of potential ISP partners, then finalize selection	UBB, Senawave			
Town Policies – Add requirements for new developments to add HDPE Conduit for fiber during new builds				
Develop Relationship with ISPs	Steve McGhie (UBB) Dave Bradshaw (Senawave)			
Add broadband supportive language to community master plans				
Identify grants and funding sources	BEAD Grants, Check with UBC, Other grants			

Table 14. Digital Access

PLANNED ACTIVITY	KEY PLAYERS	FUNDING SOURCES	TIMELINE	EXPECTED OUTCOMES
Work with Utah Commission on Aging	Scott or Alisha			

Add links to website (Aging, Heber senior center classes, HEAT program (MAG), Meals on Wheels, building checklist, ACP Program, etc.)	Scott or Alisha			
Add links and information to flyers at the Town hall, park, and the Horse arena	Scott or Alisha			
Add additional bulletin board information to website for upcoming events	Scott or Alisha			
Collect email list from everyone in town and in valley	Alisha (and get emails from XpressBillPay			
Formalize who will update the website	Andrew Wooley, Alisha			
Inquire if senior center can do internet training classes	Alisha			
Locate or develop class on using Xpress bill pay	Alisha			
Add the Town Hall schedule and other relevant information	Alisha			
Transition website from .org to .gov	Scott, Alisha, Andrew Wooley			
Educate upon and increase adoption of XpressBillPay	Alisha check with Xpress Bill Pay to see if they have any materials			

Provide input form to collect email from community members	Alisha			
Determine best approach to notify community of new content or training	Alisha			
Work with UEN to identify and ensure that students have the tools and resources they need	Check with Karl Buchanan or Joanne Muir about best person to work with			

Table 15. Broadband Affordability

PLANNED ACTIVITY	KEY PLAYERS	FUNDING SOURCES	TIMELINE	EXPECTED OUTCOMES
Raise awareness of programs such as ACP and Lifeline on town website	UBC			
Only partnering with ISPs that offer a no-cost plan in conjunction with ACP for low-income individuals	UBB			
Partner with organizations that raise awareness of the ACP program	UBC			

5.4 ONGOING STAKEHOLDER ENGAGEMENT

Continued stakeholder engagement is vital to the success of Wallsburg Valley's broadband deployment strategies. Wallsburg Valley will continue to build strong relationships with community partners and key stakeholders as this plan is implemented. The success of getting all residents connected to reliable high-speed internet will be dependent on the ability to continually coordinate efforts with local community partners.

Key initiatives to support continued engagement include:

- **Create a Broadband Working Group:** This working group should be diverse and represent a variety of roles. Important representation in this group includes municipal officials, educators, community influencers, business leaders, technical experts, and organizations that represent the covered populations. A broadband working group will ensure that there is city-wide support for resulting broadband projects.
- **Meet with Internet Service Providers:** Building a relationship with an internet service provider (ISP) can be beneficial for both Wallsburg and the ISP. By working together, Wallsburg can help to ensure that their residents have access to high-quality, affordable broadband internet.

  The following strategies promote the establishment of a collaborative partnership with local ISPs:

  - IMPORTANT: Only meet with one ISP company at a time. Ask them to share their future build-out plans for Wallsburg. They are more willing to share information when their competition is not in the room.
  - Streamline permitting and processes: Review and streamline the permitting and approval processes for ISPs to facilitate efficient infrastructure deployment.
  - Create incentives: Offer incentives such as tax breaks or expedited permit processing for ISPs that invest in broadband infrastructure.
  - Foster public-private partnerships: Explore opportunities for public-private partnerships with ISPs to leverage resources, expertise, and funding.
  - Collaborate on funding opportunities: Work together with ISPs to identify and pursue available funding sources, grants, or subsidies for broadband projects.
  - Share infrastructure resources: Explore possibilities for sharing existing infrastructure, such as utility poles or conduit, to reduce costs and deployment timelines.
  - Regular communication and updates: Establish regular communication channels to keep ISPs informed about city initiatives, policies, and upcoming projects related to broadband infrastructure.
- **Continue Stakeholder Communication:** Stakeholder communication that is frequent and transparent helps build and maintain community support. Wallsburg Valley should aim to educate, garner support, and celebrate accomplishments through stakeholder communication. Tactics for communicating with stakeholders should be varied and represent traditional and virtual engagement. Specific tactics to continue stakeholder communication include:

- Meet and coordinate regularly with local ISPs to understand expansion priorities and track progress of ongoing projects.

- **Identify and Update Community Priorities**: Each community within Wallsburg Valley has different needs, resources, technologies, financing, and partnership options. Reevaluation of priorities will be required to keep community members engaged, achieve a local vision of connectivity, and increase broadband utilization. Updates to the Local Broadband Plan may become necessary through the process of planning, implementing, and evaluating success.
    - Continue gathering input and perspectives through a year-round, publicly available local broadband survey. As projects and initiatives are implemented, the survey may be adapted to measure the success of that programming.
- **Understand Regional Context:** By establishing and strengthening working relationships with a variety of stakeholders, Wallsburg Valley may identify additional opportunities, barriers, or initiatives. Continued coordination with key stakeholders will allow Wallsburg Valley to clearly communicate the benefits of connectivity, empower local entities to advocate for broadband initiatives, and build enthusiasm and support for projects. This may be accomplished through:
    - Outreach initiative specific to understanding regional context and specific to the Wallsburg Valley area.
- **Advertise and continue to increase enrollment in the Affordable Connectivity Program.** The ACP is an FCC benefit program that helps ensure that all households can afford broadband.
    - Outreach initiative specific to ACP awareness and enrollment and specific to the Wallsburg Valley area.

5.5 ESTIMATED TIMELINE FOR UNIVERSAL SERVICE

Universal service is the goal of providing broadband service to every resident of Wallsburg Valley. Achieving this goal depends upon receiving sufficient funding for broadband infrastructure projects, the timeline by which ISPs build at, and the timeline by which the BEAD program is administered by. Due to this timeline being determinant on external elements, Wallsburg intends to communicate closely with all ISPs building in the area and follow the state timeline as listed in the statewide Digital Connectivity Plan. The state aims to provide universal broadband service for all Utahns by December 31, 2028. The timeline more specific to items relevant to Wallsburg officials are listed in Section 5.3 of this plan.

Individual Broadband Project Minimum Timeline

It will be up to the ISPs to carry out the design and construction of broadband infrastructure projects within Wallsburg Valley, however, a sample broadband project timeline is listed here for

reference. An estimated timeline concerning activities necessary to implement broadband services include the following:

Table 16. Broadband Infrastructure Project Design and Build Phase Estimated Timeline for ISPs

STEP	DESCRIPTION	TIMELINE
High-Level Design (HLD)	Create a preliminary FTTP (Fiber to the Premise) design before fielding and jurisdictional research	30-60 Days
Low-Level Design (LLD)	Create a FTTP design that is constructable using fielding data and jurisdictional research	60-90 Days
Permitting	Get approval from the appropriate jurisdictions for construction	Up to 180 Days
Construction	Build a functioning FTTP network	90-180 Days
Project Audit	Review construction documents, conduct AARs, create audit documentation	Up to 90 Days

Note that some of these phases may overlap, while others must be completed sequentially. Unforeseen circumstances or delays might impact the overall timeline.

Minimum duration: 30 days (HLD) + 60 days (fielding and LLD) + 180 days (permitting) + 90 days (construction) = 360 days (about 1 year) for full turn-key implementation.

If some phases can be completed concurrently, the duration could be shortened. For example, construction can be started on certain segments of the broadband build that have approved permits much sooner than the predicted 180 days, shortening the original estimate for the overall project duration.

It is crucial to account for potential delays and other factors that may affect the project schedule. Regular communication with relevant stakeholders and close monitoring of progress can help mitigate risks and keep the project on track.

5.6 ESTIMATED COST FOR UNIVERSAL SERVICE

An estimated cost for the project is calculated using GIS analysis, incorporating data from various sources such as the State of Utah's roads layer and address points, as well as FCC data on served, underserved, and unserved points. The length attribute from the roads layer is used to determine the distance, taking into account several key parameters including aerial percentage, aerial cost, and underground cost (can vary based on the location geology).

The estimated cost for materials, design, and installation can vary. Costs for aerial fiber hung on power poles can range up to $10/FT. Underground fiber costs range from $30/FT when installing in easy-to-bore areas, up to $35-$60/FT when boring in rocky or hilly areas.

The formula for calculating the total cost of construction is as follows:

Total Cost of Construction = ((Road Length * Aerial Cost * Aerial Percentage) + (Road Length * Underground Cost * (1 – Aerial Percentage)))

For this estimate, the following numbers were used:

Aerial Cost: $10/FT

Underground Cost: $30/FT

Aerial Percentage: 99%

To obtain the cost per passing, the total cost of construction is divided by the count of address points (in some instances FCC points) within a defined geographic area, as determined by a polygon selection. This methodology ensures that the estimated cost is derived from reliable data sources and takes into account the specific characteristics of the project area, providing an accurate and comprehensive financial projection for the implementation of universal services (see Table 17 and Figure 21).

Table 17. Estimated Cost for Broadband Deployment in Wallsburg Valley

MEASURE	MAIN WALLSBURG VALLEY	WALLSBURG VALLEY NORTHEAST	WALLSBURG VALLEY SOUTHWEST
Total Length (Miles)	31.81	9.01	10.03
% Aerial	99%	99%	99%
Total Cost (Dollars)	$1,712,927.65	$485,180.73	$554,751.94
Cost Per Passing (Dollars)	$6,588.18	$6,646.31	$15,850.06
# Of Locations (Number)	260	73	35
Underserved (Number)	78	11	13
Unserved (Number)	76	17	13
Cost for Just Unserved & Underserved Locations	$1,014,579.72	$186,096.68	$412,101.56

Figure 21. Cost Estimate Land Areas

5.7 ALIGNMENT

Planning for and implementing a Local Broadband Plan aligns with Wallsburg Town policies by increasing digital inclusion and planning for a future well-being and development. Having a solid broadband infrastructure will be vital for any community to grow and develop, and this is especially true for those in a rural setting.

5.8 TECHNICAL ASSISTANCE

The successful implementation of the local broadband plan in Wallsburg Valley requires support and technical assistance from the UBC. This support encompasses various areas, such as broadband infrastructure development, policy guidance, and access to funding opportunities.

Technical assistance from the UBC alleviates the complexities of navigating broadband deployment, leveraging available resources, and aligning specific priorities with statewide broadband initiatives.

UBC (Utah Broadband Center) has been invaluable in providing Wallsburg with information about Grants and resources to move forward with Broadband development in Wallsburg Valley. Wallsburg will continue to work with UBC for the following:

1) Grants:
    - Finalize Planning Grant
    - Applying for BEAD Grant for infrastructure buildout directly or through ISPs
    - Identifying other sources of Grants for infrastructure buildout
2) Communication with ISPs, contractors, and government associations
3) Training
    - Help in moving forward to finish this grant and future developments
    - Guidance in modifying Wallsburg website to achieve improvements, links, etc.

6 CONCLUSION

In conclusion, the Wallsburg Valley Local Broadband Plan serves as a comprehensive road map for maximizing the potential of broadband technology to drive economic growth, enhance connectivity, and foster innovation. By expanding infrastructure, affordability, reliability, and accessibility, the plan aims to connect households and create a more prosperous Wallsburg Valley. Through collaboration among government entities, private sector partners, agencies, and community stakeholders, this Local Broadband Plan establishes a solid foundation for harnessing the transformative power of high-speed internet to empower individuals, businesses, and communities alike.

Appendix A: Survey Data

The following pages include the individual responses from surveys gathered as part of the Wallsburg Valley local broadband planning outreach. Survey responses gathered as part of the Connecting Utah statewide survey in the Wallsburg Valley area are also included as part of this appendix.

Appendix A. Town of Wallsburg Survey Responses

Wallsburg Survey Response #	Timestamp	Do you rent or own this property?	Do you have an internet connection at your residence?	What kind of internet connection do you have? (Select all that apply)	What speed is your internet service (download speed)? (Megabits per second = Mbps)	Which company do you use for internet? (E.g. Utah Broadband, Century Link, Rise Broadband, Hughes Net, Xfinity, etc.)	What is the monthly charge for your internet service? Write "unknown" if unknown	Does your internet bill include other services such as phone, TV, or premium content?	What do you use the internet for? Select all that apply.	Are you aware of the Affordable Connectivity Program, which provides a $30 monthly discount for internet to low-income households?
1	4/24/2023 17:13	Own	Yes, I have an internet connection at my residence	Wireless	Up to 25 Mbps	UBB	59.95	No	Remote working, Remote learning, Video conferencing/streaming services, Entertainment/streaming services, Shopping, Gaming	No, and I am not interested
2	4/24/2023 21:19	Own	Yes, I have an internet connection at my residence	Wireless	10 Mbps or less	Utah Broadband	$39.95	No	Remote working, Remote learning, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
3	4/24/2023 21:58	Own	Yes, I have an internet connection at my residence	I do not know, Whatever Utah broadband is	Up to 25 Mbps	Utah Broadband	$80	No	Remote working, Remote learning, Remote healthcare/telehealth, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, and I am not interested
4	4/25/2023 17:24	Own	Yes, I have an internet connection at my residence	I do not know	10 Mbps or less	Utah Broadband	Unknown	Yes	Remote working, Remote learning, Remote healthcare/telehealth, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
5	4/25/2023 19:29	Own	Yes, I have an internet connection at my residence	Wireless	10 Mbps or less	UBB	59.95	No	Remote learning, Remote healthcare/telehealth, Entertainment/streaming services, Shopping, Gaming	No, and I am not interested
6	4/25/2023 19:30	Own	Yes, I have an internet connection at my residence	Wireless, Fiber optics	10 Mbps or less	Utah Broadband	$50	No	Remote learning, Video conferencing/streaming services, Entertainment/streaming services	No, but I would like information to learn if my household qualifies
7	4/25/2023 19:36	Own	Yes, I have an internet connection at my residence	Wireless	Up to 25 Mbps	utah broadband	unknown	No	Remote working, Remote learning, Video conferencing/streaming services, Entertainment/streaming services, Shopping, Gaming	No, but I would like information to learn if my household qualifies
8	4/25/2023 20:26	Own	Yes, I have an internet connection at my residence	Fiber optics	Up to 25 Mbps	Utah Broadband	60	No	Remote working, Remote learning, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
9	4/25/2023 21:45	Own	Yes, I have an internet connection at my residence	Wireless	10 Mbps or less	Utah Broadband	$39.95	No	Remote working, Remote learning, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
10	4/26/2023 5:58	Own	Yes, I have an internet connection at my residence	Satellite or mobile	Up to 100 Mbps	Utah Broadband	89	No	Remote working, Entertainment/streaming services, Gaming	No, and I am not interested
11	4/28/2023 13:24	Own	Yes, I have an internet connection at my residence	Wireless, Satellite or mobile	Up to 100 Mbps	Utah Broadband and Starlink	180	No	Remote working, Remote learning, Video conferencing/streaming services, Entertainment/streaming services, Gaming	No, but I would like information to learn if my household qualifies
12	4/29/2023 21:08	Own	Yes, I have an internet connection at my residence	Wireless	Up to 100 Mbps	Utah Broadband	Unknown	No	Remote working, Remote healthcare/telehealth, Video conferencing/streaming services, Entertainment/streaming services, Shopping, Gaming	No, and I am not interested
13	5/1/2023 16:39	Own	Yes, I have an internet connection at my residence	Satellite or mobile	Up to 25 Mbps	Utah Broadband	$79	No	Remote healthcare/telehealth, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
14	5/2/2023 17:07	Own	Yes, I have an internet connection at my residence	Wireless	Up to 25 Mbps	Century Link	$84.27	Yes	Remote working, Remote learning, Remote healthcare/telehealth, Video conferencing/streaming services, Entertainment/streaming services, Shopping, text	Yes, I am aware of the program, but do not participate in it or am not eligible
15	5/2/2023 18:41	Own	Yes, I have an internet connection at my residence	Satellite or mobile	Up to 25 Mbps	Utah Broadband	89.95	No	Remote learning, Entertainment/streaming services, Shopping, Gaming	No, but I would like information to learn if my household qualifies
16	5/3/2023 6:33	Own	No, I don't have an internet connection at my residence	We don’t have internet	10 Mbps or less	We don’t have internet	0	No	Entertainment/streaming services	No, but I would like information to learn if my household qualifies
17	5/3/2023 14:16	Own	Yes, I have an internet connection at my residence	Wireless	Up to 25 Mbps	Utah Broadband	45	No	Remote working, Remote learning, Remote healthcare/telehealth, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, and I am not interested
18	5/3/2023 16:16	Own	Yes, I have an internet connection at my residence	Wireless	10 Mbps or less	Utah Broadband	$50	No	Remote working, Remote learning, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
19	5/4/2023 20:00	Own	Yes, I have an internet connection at my residence	Wireless	Up to 100 Mbps	Utah Broadband	$70	No	Remote learning, Remote healthcare/telehealth, Video conferencing/streaming services, Entertainment/streaming services, Shopping	No, but I would like information to learn if my household qualifies
20	5/6/2023 21:34	Own	No, I don't have an internet connection at my residence	none yet	Up to 1 Gigabit	In Utah County Xmission, moving to Wallsburg	$100	No	Remote working, Remote learning, Video conferencing/streaming services	No, but I would like information to learn if my household qualifies

Appendix A. Town of Wallsburg Survey Responses

Wallsburg Survey Response #	(Optional) What is your race/ethnicity? Select all that apply	(Optional) What language is spoken most often in your household?	(Optional) What is your household's gross annual income?	(Optional) Which age groups live in your home? Select all that apply	(Optional) Do students live at your household?	(Optional) Which education level? Select all that apply	(Optional) What is the highest level of education completed by someone in your household?
1	White	English	$75,000-$99,999	51-60	No	College or University	Master's degree or doctorate
2	White	English	$75,000-$99,999	0-10, 31-40	Yes	Elementary School (K-6th Grade)	Associate degree
3	White	English	$100,000-$149,000	0-10, 11-20, 41-50	Yes	Elementary School (K-6th Grade), Middle School (7th Grade to 9th Grade)	Master's degree or doctorate
4	White	English		61-70	No	College or University	Master's degree or doctorate
5	White	English			No	College or University	Associate degree
6	Hispanic/Latino or Spanish Origin	English		0-10, 11-20, 41-50	Yes	Elementary School (K-6th Grade), High School (9th Grade to 12th Grade)	Bachelor's degree
7	White	English	$100,000-$149,000	0-10, 11-20, 31-40, 41-50	Yes	Elementary School (K-6th Grade), Middle School (7th Grade to 9th Grade)	Master's degree or doctorate
8	White	English	$100,000-$149,000	0-10, 11-20, 41-50, 61-70	Yes	Elementary School (K-6th Grade)	Bachelor's degree
9	White	English	$75,000-$99,999	0-10, 31-40	Yes	Elementary School (K-6th Grade)	Associate degree
10	White	English	$100,000-$149,000	11-20, 21-30, 41-50, 51-60	Yes	Middle School (7th Grade to 9th Grade), High School (9th Grade to 12th Grade)	High school diploma or equivalent (GED)
11	White	English	$50,000-$74,999	31-40	No	College or University	Associate degree
12							
13	White	English	$50,000-$74,999	61-70, 71 or Older	No		Career or technical education certificate
14	White	English		51-60, 71 or Older	No		Master's degree or doctorate
15	White	English	$25,000-$49,000	11-20, 41-50, 61-70	Yes	Middle School (7th Grade to 9th Grade)	High school diploma or equivalent (GED)
16							
17	White	English	$100,000-$149,000	61-70	No	College or University	Master's degree or doctorate
18	White	English	$50,000-$74,999	0-10, 31-40	Yes	Elementary School (K-6th Grade)	Associate degree
19		English	$25,000-$49,000	71 or Older	No	Elementary School (K-6th Grade), Middle School (7th Grade to 9th Grade), High School (9th Grade to 12th Grade), College or University, Adult Education or Technical Training	Bachelor's degree
20	White	English	$50,000-$74,999	0-10	No		Some college but no degree

Appendix A. UBC Statewide Survey: Town of Wallsburg Responses

UBC Statewide Survey - Resident Response #	Date		Do you rent or own this property?	Do you have an internet connection at your residence?	What kind of internet connection do you have? (Select all that apply)	What speed is your internet service (download speed)? (Megabits per second = Mbps)	Which company do you use for internet? (E.g. Xfinity, Google Fiber, Connext, Emery Telecom, CenturyLink, etc.)	What is the monthly charge for your internet service? Write "Unknown" if unknown.	Does your internet bill include other services such as phone, TV, or premium content?	What do you use the internet for? Select all that apply.						
		City/Town	Response	Response	Response	Response	Open-Ended Response	Open-Ended Response	Response	Remote working	Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	Gaming
1	2023-04-24 16:45:09	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	10 Mbps or less	Utah Broadband	Unknown	No	Remote working	Remote learning		Video conferencing/chatting			
2	2023-04-24 14:57:44	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	10 Mbps or less	Utah Broadband	$50	No	Remote working	Remote learning		Video conferencing/chatting	Entertainment/streaming services	Shopping	
3	2023-04-17 21:48:11	Wallsburg	Own	Yes, I have an internet connection at my residence.	Wireless	10 Mbps or less	Utah Broadband	$60.00	No	Remote working	Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	
4	2023-04-17 21:41:50	Wallsburg	Own	Yes, I have an internet connection at my residence.	Wireless	Up to 25 Mbps	Utah Broadband	60	No	Remote working	Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	Gaming
5	2023-04-15 17:12:19	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	Up to 25 Mbps	Viasat Satellite	$150.00	No	Remote working		Remote health care/telehealth		Entertainment/streaming services	Shopping	
6	2023-04-15 10:03:20	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	Up to 100 Mbps	Utah Broadband	$90	No	Remote working	Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services		
7	2023-04-15 08:41:26	Wallsburg	Own	Yes, I have an internet connection at my residence.	I do not know	10 Mbps or less	Utah Broadband	50	No		Remote learning	Remote health care/telehealth		Entertainment/streaming services	Shopping	
8	2023-04-15 07:16:05	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	I do not know (you can test your internet speed at speedtest.utah.gov)	Utah Broadband	$60	No	Remote working		Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	
9	2023-04-14 23:27:46	Wallsburg	Own	Yes, I have an internet connection at my residence.		Up to 25 Mbps	Utah Broadband	59.95	No	Remote working	Remote learning		Video conferencing/chatting	Entertainment/streaming services	Shopping	
10	2023-04-14 14:39:38	Wallsburg	Own	Yes, I have an internet connection at my residence.												
11	2023-04-14 11:37:22	Wallsburg	Own	Yes, I have an internet connection at my residence.		I do not know (you can test your internet speed at speedtest.utah.gov)	A T & T	Unknown	Yes		Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	

Appendix A. UBC Statewide Survey: Town of Wallsburg Responses

UBC Statewide Survey - Resident Response #		Why don't you have internet access at your residence? Select all that apply.											How much would you pay for internet per month if it was accessible to you at your residence?	If you are willing, please share how a high-speed internet connection would improve your quality of life.	Are you aware of the Affordable Connectivity Program, which provides a $30 monthly discount for internet to low-income households?	What is your race/ethnicity? Select all that apply.
	Other (please specify)	Initial connection fees are too expensive	Monthly charges are too expensive	I do not have a computer or tablet to use	I do not know how to use a computer or tablet	I do not know how to get internet service	I do not need it/am not interested in it	I have physical limitations	I am worried about privacy and others getting my information	An internet connection isn't available in my area	I access the internet at a public internet source, such as a library or a community center	Other (please specify)	Open-Ended Response	Open-Ended Response	Response	Response
1															No, and I am not interested.	White
2															No, and I am not interested.	White
3															No, and I am not interested.	White
4															No, and I am not interested.	White
5	Information														No, and I am not interested.	White
6															No, and I am not interested.	White
7															Yes, I am aware of the Program, but do not participate in it or am not eligible.	White
8															No, and I am not interested.	White
9															No, and I am not interested.	White
10																
11															No, and I am not interested.	White

Appendix A. UBC Statewide Survey: Town of Wallsburg Responses

UBC Statewide Survey - Resident Response #		What language is spoken most often in your household?		What is your household's gross annual income?	Which age groups live in your home? Select all that apply.								Do students live at your household?	Which education level? Select all that apply.					What is the highest level of education completed by someone in your household?
	Multiple ethnicity / Other (please specify)	Response	Other (please specify)	Response	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71 or older	Response	Elementary school (kindergarten to 6th grade)	Middle school (7th grade to 9th grade)	High school (9th grade to 12th grade)	College or university	Adult education or technical training	Response
1		English						31-40	41-50	51-60	61-70		Yes						
2		English		$75,000-$99,999	0-10			31-40					Yes	Elementary school (kindergarten to 6th grade)					Bachelor's degree
3		English		$75,000-$99,999						51-60			No						Master's degree or doctorate
4		English		$100,000-$149,999							61-70		No						Master's degree or doctorate
5		English		$100,000-$149,999						51-60			No						Some college but no degree
6		English		$150,000 or more		11-20		31-40					Yes		Middle school (7th grade to 9th grade)	High school (9th grade to 12th grade)			Bachelor's degree
7		English		$25,000-$49,999								71 or older	No						High school diploma or equivalent (GED)
8		English		$100,000-$149,999	0-10			31-40					Yes	Elementary school (kindergarten to 6th grade)					Career or technical education certificate
9		English		$100,000-$149,999	0-10	11-20		31-40					Yes	Elementary school (kindergarten to 6th grade)	Middle school (7th grade to 9th grade)	High school (9th grade to 12th grade)			Associate degree
10																			
11		English		$75,000-$99,999			21-30				61-70		Yes				College or university		Master's degree or doctorate

Appendix A. UBC Statewide Survey: Town of Wallsburg Responses

UBC Statewide Survey - Resident Response #	Date		Do you rent or own this property?	Do you have an internet connection at your residence?	What kind of internet connection do you have? (Select all that apply)	What speed is your internet service (download speed)? (Megabits per second = Mbps)	Which company do you use for internet? (E.g. Xfinity, Google Fiber, Connext, Emery Telecom, CenturyLink, etc.)	What is the monthly charge for your internet service? Write "Unknown" if unknown.	Does your internet bill include other services such as phone, TV, or premium content?	What do you use the internet for? Select all that apply.						
		City/Town	Response	Response	Response	Response	Open-Ended Response	Open-Ended Response	Response	Remote working	Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	Gaming
12	2023-04-14 11:08:36	Wallsburg	Own	Yes, I have an internet connection at my residence.	Wireless	10 Mbps or less	Utah Broadband	49.95	No	Remote working	Remote learning	Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	Gaming
13	2023-04-14 09:58:21	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	Up to 1 Gigabit	Utah Broadband	$150	No	Remote working			Video conferencing/chatting	Entertainment/streaming services		
14	2023-04-14 09:22:18	Wallsburg	Own	Yes, I have an internet connection at my residence.	Utah Broadband	Up to 100 Mbps	Utah Broadband	115	No	Remote working			Video conferencing/chatting	Entertainment/streaming services		Gaming
15	2023-04-23 13:25:57	Wallsburg	Own	Yes, I have an internet connection at my residence.	Cable or digital subscriber line (DSL-telephone line), Wireless, Satellite or mobile	Up to 25 Mbps	UBB	78	No			Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	Gaming
16	2023-04-21 08:35:25	Wallsburg	Own	Yes, I have an internet connection at my residence.	Wireless	Up to 25 Mbps	Utah Broadband	79.99	No	Remote working				Entertainment/streaming services	Shopping	Gaming
17	2023-04-14 22:30:42	Wallsburg	Own	Yes, I have an internet connection at my residence.	Satellite or mobile	I do not know (you can test your internet speed at speedtest.utah.gov)	Hughes Net	120	No					Entertainment/streaming services	Shopping	Gaming
18	2023-04-14 20:36:12	Wallsburg	Own	Yes, I have an internet connection at my residence.												
19	2023-04-14 16:34:15	Wallsburg	Own	Yes, I have an internet connection at my residence.	Wireless		Utah Broadband	50	No	Remote working		Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	
20	2023-04-14 11:22:21	Wallsburg	Own	Yes, I have an internet connection at my residence.	I do not know	10 Mbps or less	UBB	50$	No			Remote health care/telehealth	Video conferencing/chatting	Entertainment/streaming services	Shopping	
21	2023-04-14 09:18:37	Wallsburg	Own	Yes, I have an internet connection at my residence.	Wireless	Up to 100 Mbps	UB	Unknown	No	Remote working	Remote learning		Video conferencing/chatting	Entertainment/streaming services	Shopping	Gaming

Appendix A. UBC Statewide Survey: Town of Wallsburg Responses

UBC Statewide Survey - Resident Response #		Why don't you have internet access at your residence? Select all that apply.											How much would you pay for internet per month if it was accessible to you at your residence?	If you are willing, please share how a high-speed internet connection would improve your quality of life.	Are you aware of the Affordable Connectivity Program, which provides a $30 monthly discount for internet to low-income households?	What is your race/ethnicity? Select all that apply.
	Other (please specify)	Initial connection fees are too expensive	Monthly charges are too expensive	I do not have a computer or tablet to use	I do not know how to use a computer or tablet	I do not know how to get internet service	I do not need it/am not interested in it	I have physical limitations	I am worried about privacy and others getting my information	An internet connection isn't available in my area	I access the internet at a public internet source, such as a library or a community center	Other (please specify)	Open-Ended Response	Open-Ended Response	Response	Response
12															No, but I would like information to learn if my household qualifies. If this option is selected, please complete the contact form at the end of this survey.	White
13															No, but I would like information to learn if my household qualifies. If this option is selected, please complete the contact form at the end of this survey.	White
14															No, and I am not interested.	White
15															No, but I would like information to learn if my household qualifies. If this option is selected, please complete the contact form at the end of this survey.	White
16															No, and I am not interested.	White
17	Cell phone														Yes, I am aware of the Program, but do not participate in it or am not eligible.	White
18																
19															Yes, I am aware of the Program, but do not participate in it or am not eligible.	White
20															No, and I am not interested.	White
21															Yes, I am aware of the Program, but do not participate in it or am not eligible.	

Appendix A. UBC Statewide Survey: Town of Wallsburg Responses

UBC Statewide Survey - Resident Response #		What language is spoken most often in your household?		What is your household's gross annual income?	Which age groups live in your home? Select all that apply.								Do students live at your household?	Which education level? Select all that apply.					What is the highest level of education completed by someone in your household?
	Multiple ethnicity / Other (please specify)	Response	Other (please specify)	Response	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71 or older	Response	Elementary school (kindergarten to 6th grade)	Middle school (7th grade to 9th grade)	High school (9th grade to 12th grade)	College or university	Adult education or technical training	Response
12		English		$50,000-$74,999	0-10	11-20			41-50	51-60			Yes	Elementary school (kindergarten to 6th grade)	Middle school (7th grade to 9th grade)				Master's degree or doctorate
13		English		$50,000-$74,999			21-30						No						Bachelor's degree
14		English		$150,000 or more	0-10		21-30	31-40					Yes	Elementary school (kindergarten to 6th grade)					Bachelor's degree
15		English		$25,000-$49,999		11-20	21-30				61-70	71 or older	Yes			High school (9th grade to 12th grade)			High school diploma or equivalent (GED)
16		English		$50,000-$74,999			21-30		41-50				No						Some college but no degree
17		English		$100,000-$149,999						51-60			No						Bachelor's degree
18																			
19		English		$100,000-$149,999						51-60			No						Some college but no degree
20		English		$50,000-$74,999						51-60			No						Career or technical education certificate
21																			

Appendix B: Notes from Stakeholder Meetings

The following pages include notes from stakeholder meetings and workshops gathered as part of the Wallsburg Valley local broadband planning outreach. Stakeholder meeting and workshop notes gathered as part of the Connecting Utah statewide outreach in the Wallsburg Valley area are also included as part of this appendix.

One-on-one with Karl Buchanan during the Utah Confluence | June 7, 2023

People

- Karl Buchanan – Former IT director at Wasatch County School District
- Scott Larsen – Wallsburg Town Council
- Eleise Lowe – Horrocks Engineers Consultant

Discussion

- Karl built out fiber networks throughout Wasatch County to connect the schools. The network was installed, owned, and operated by the school district. The school district made fiber trade agreements with other ISPs in the area, which brought the fiber leasing costs down to zero for the school district.
    - School district no longer has the resources to maintain their fiber network. They are looking into selling their infrastructure to a local ISP that partners with UEN.
- School District built fiber line into Wallsburg in 2020. Placed wireless broadcasting equipment at city hall so students could continue learning during Covid.
    - School district owns the equipment, Utah Broadband provides the service
    - Rents from backbone fiber in the canyon from Century Link
    - Could be cheaper network cost if the ISP that connects Wallsburg (such as Utah Broadband) does a fiber trade with UDOT so they don't have to pay Century Link.
- Photo below shows the location of the main network hub in near 600 South, 200 East in Heber

Wasatch County | Statewide Connecting Utah Workshop | January 30, 2023

Elected Official Workshop Notes

- ACP
    - Question on how many students qualify for free/reduced lunch in county
    - Tried to promote ACP, people had a very difficult time enrolling because didn't have documents on phone
    - Vikram recommended applying through SNAP, Medicaid, or free/reduced school lunch, also mentioned the ACP outreach grant/navigators.
        - A lot of schools aren't using this program as much because of emergency connectivity fund, but ACP will be crucial when those funds end in 2024
- Infrastructure funds questions
    - Who will qualify?
        - Mostly ISPs, Clint mentioned private/public partnerships
        - Heber City not eligible for funding, most places in county will be eligible
            - Putting fiber in ground during water renovations, working with Strata
            - East side of town mostly
            - Hoping to have a high enough take rate to be able to purchase fiber from Strata and have broadband considered as the fourth utility
            - Strata very open to it; much more open to it than Utopia was
            - Would like to have ubiquitous fiber if possible, have some incumbents in the area already, need to look at that in terms of how to include areas that are already served
            - Also looked at doing Heber Line Power, a lot of areas in county that would have been eligible (covers most of the county, Rocky Mountain Power covers some parts of it)
    - When will funds come in?
        - Vikram thinks mostly winter/spring 2024 for first round of funding out
        - Formal numbers of what the states will receive, will be in June. Estimating that Utah will receive around $400 million
        - Can apply for planning funds, especially for digital access
- Reviewed speed test data for Heber
    - Talked about going up 40 to Strawberry; really unserved
        - Strata has fiber up 40, but hasn't split out to households yet
- FCC map
    - Questions about challenges, have areas that show up as served but aren't. Want to submit a challenge; how to do that? Rebecca mentioned that they can submit bulk challenges
        - Hard to get people to respond
        - Have cities considered using comms to get word out? Could certainly use it to get word out about speed tests, etc.
        - Lynne recommended newsletters, especially for seniors
        - Put in light and power bills
            - We can print out and provide for county
            - Heber willing to share on social media as well
- Midway

    - Connection depends on neighborhoods
        - Some have decent connectivity from Xfinity or Quest
        - Older neighborhoods don't
        - Have a big problem with last mile connectivity, not seeing willingness from providers to build out that last mile and city doesn't have financial resources to connect them (no bonds, no city credit)
- CAIs
    - Libraries
        - Is there a need for classes or instructions? Technical assistance?
        - Financial literacy with tech literacy would be helpful
            - Particularly in Spanish
    - Senior Center
        - One for the valley
        - Has computers
        - Used, but not for technology
        - Has good connectivity, integrated with library
            - UEN
        - Have done some classes in the past, ongoing need though
            - Cybersecurity
            - Taxes (AARP doing taxes right now)
    - Lot of Spanish-speaking population, information for that group is critical
        - Some resources for students: Latinos in Action
        - Churches can be a good resource as well
- Economic Development
    - Growth is continuing
        - Lot of growth around Jordanelle, anticipate that continuing
        - New building brings new infrastructure
        - Hideout served by AllWest, have an initial contract to provide service so will probably stay with them (franchise agreement)
            - Demand always exceeded supply, reviewing fiber in some areas of town
            - FTTH is new, what they are looking at right now
            - Traffic signals are on Utopia at Hideout
                - May be serving HOAs or something else there
            - Have an area of town that is subsidized housing, looking at that
- Timber Lakes
    - County area
    - Have some connections, more and more primary residences
    - Generally difficult to get cellular access due to topography
    - Lower section is all FTTH
- Wallsburg
    - County area
    - Ran a line in during COVID to help with student population
    - AllWest provided connection, Utah Broadband was reselling, pushing for free to students. Joint venture with school district (NOTE: This was done by Utah Broadband, not Allwest)
    - Utah Broadband is overbuilding their coverage with fiber (all through Strawberry and Charleston)

        - Bought out Strawberry Communications
- Brighton Estates
    - On top of the mountain, county land
    - Mostly cabin community
    - No roads in
- Bypass
    - UDOT looking at impact right now, won't know until fall
    - Road won't be in for 10 years, possibly
- Barriers to expansion
    - Don't want to trench and retrench, terrible on roads
        - Good to be doing it at time of building
        - Hideout making developers add conduit when build
        - Heber adding conduit when redoing roads/water
        - Bypass will probably have 8 conduits
- Any existing broadband plans?
    - Heber City: annexation agreements are required to provide STRATA
- What are top priorities for county?
    - Providing internet/broadband is largely done by commercial entities and the market. Citizens are at the mercy of the market. Anything in the funding that helps alleviate this?
        - Funding is intended to help alleviate that
        - Match of 25%

Public Workshop Notes

- Feedback that the unserved/underserved data we have is low—based on personal experience
- AllWest—connection isn't always better than satellite
- Impression is that people who have broadband are ones in larger neighborhoods
- Generally the providers are satellite, CenturyLink (which is horrible)
- Wallsburg—only option is Starlink for most people
    - Don't have in-ground option there
- Grant questions—who is eligible? Not ISPs or for-profits
- CAIs
    - Universities
        - UVU
            - Most part have good connectivity, supposed to be getting an upgrade
            - Have people sitting outside the windows trying to access internet
                - Usually not students
            - Staff regularly complains about home connectivity, especially when have people visiting and wanting to do remote work, video meetings
            - About 100 people on campus, other students are online, come in for resources
        - USU has space at UVU campus
            - Typically UEN puts internet in
            - In past, used interactive video-conferencing system, have to have solid internet connection to work
            - USU is land-grant, Wasatch region is UVu
            - Lots of classes offered online, more students doing that
            - During COVID, had students show up in parking lot to access internet

- Big challenge in Blanding Campus, with Navajo Nation students
  - Homes without electricity, how to figure out how to finish class
- Recommends connecting with USU across the state
  - SW region in particular; USU doesn't own buildings, partners with universities, high schools, city buildings, etc.
- Had 1 in-person student for broadcast class last year
- Another challenge—student registers for class in Wasatch County, counts as a SLC section. Need to find out where they are actually planning to attend (if for in-person)
- Online is crucial here
- Wasatch, Summit, SLC, Utah Counties—student demographics
  - Average age 29
  - 70% female
  - 20% first generation students
  - 70% taking at least an online class, if not an online program
  - Majority are part time, coming to advance career
  - Very few traditional students
  - 1200 students; maybe 50 are first time freshmen
  - Majority of students are transfers from SLCC
- Use CenturyLink in Orem, but UEN techs verify it
- Transitioning to Zoom from Cisco, saving a lot of money
  - Making it easier for people to connect if they are traveling, etc.
- Uses of internet
  - USU has a hard time keeping employees in Logan during COVID; challenge to get them back, shows flexibility and how appealing it is. Telework policy, employees can apply to telework. Retention tool. Have requirements of what tech they need to have. Some teleservices:
    - Counseling
    - Advising
    - Financial aid counseling
  - COVID forced USU ahead about 20 years

- Research that hybrid schedule has best retention for college students; some in-person, some online
- Would the university be willing to open public spaces to support community access?
  - UVU happy to have a public space with wifi. If funding was provided, could potentially have a staff member be a digital navigator
  - Also interested in a coworking space
  - Building interested in being part of community space—Heber has incorporated it, developers are coming in
  - Would like facility to have education, working, and telehealth
  - USU would be interested as well; would probably be best to talk to Extension VP (Ken White)
- Replacing broadcast equipment is $20K; can be cheaper without UEN network. Equipment is so expensive

- Business perspective

  - Haven't heard a lot of complaints because most of them are along the main thoroughfares. Those issues haven't surfaced as much
  - Remote workers
    - KSL did article about Heber being best remote work location; a lot of people came during COVID and never left
  - During pandemic, every child in school district had iPad to connect with teachers
    - If all students have one, that's a lot of needs
  - Library used CARES money to buy and fund hotspots
    - Have 5 or 6 hotspots
  - Had a neighbor that was sharing passwords, once COVID hit had to change practice (both families had 4 kids, wasn't enough to share)
  - Zoning question—commercial space is right along the thoroughfare, so that's where most businesses are
  - Rebecca mentioned that the mayor had said that businesses were the ones most complaining about connectivity—different feedback from this workshop
- Where are the areas that don't have connectivity?
  - Strawberry
    - Won't be a lot of businesses out there
    - Part of allure is lack of connectivity
  - Timber Lakes
- Old Town Heber
  - Not a lot of ways to wire up Old Town Heber
    - Possibly an aerial option
    - Difficult to connect, more economically disadvantaged than rest of county
  - Not a lot of options—core of the high bandwidth options are located along those highways
  - Wireless is problematic because of trees, density
  - Mix of residential and businesses
  - Have seen homes be converted into businesses
- Weather
  - Lots of downtime with the snow
- Geography
  - Sprawl, farther from nodes, the worse the connectivity gets
  - All West doesn't really pick up people on the west side
  - There are good telecom facilities, but the farther from the highways the worse it get
- Other resources
  - Senior Center
  - Library
  - Children's Justice Center (may be hooked up with a school)
  - Hospital, right off of 40
- Impression is that it is largely a residential issue due to the layout of the community
  - Comcast serves Main Street
  - Some issues in Old Town
  - Once get out the main Comcast-served areas, gets quite spotty
    - Service you have is less reliable, slower
  - Never talked to a resident that is happy about their home internet
- Development

    - 3900 ERUs around the university; one of biggest areas for development
    - South side of Jordanelle
    - Some developers are putting conduit in, some aren't; depends on the agreement with the county
- A lot of areas on east side have issues
- Not all communities are excited about ISPs coming in to put in new infrastructure, first reaction is often "don't want more development"
- Top priorities:
    - Connectivity has become an educational tool regardless of whether doing classes in-person or online. If you want education elevated, broadband needs to be a priority
    - Lay conduit with development
    - Being able to connect is an equity issue, really important
    - Economic development important for county, education can help people
        - Certificate courses, remote working course
        - Would be important to invest in for remote jobs
        - Continuing ed without needing to quit jobs
        - Figure out how to make sure there is equity

Appendix C: Notes from Internet Service Provider Meetings

The following page contains notes from a meeting held with Utah Broadband as part of the Wallsburg Valley local broadband planning efforts.

Utah Broadband | July 26, 2023

Attendees:

- Utah Broadband – Steve McGhie, Jon Hagen
- UDOT – Lynne Yocom
- Karl Buchanan (Coordinated the construction of the current fiber line in Wallsburg with former role at Wasatch School District)
- Horrocks Engineers – Eleise Lowe

Meeting Summary:

UBB uses Century Link from Fiber Application Building in Heber to base of Wallsburg Valley

10G fiber

Built out towers throughout Wallsburg

Goals

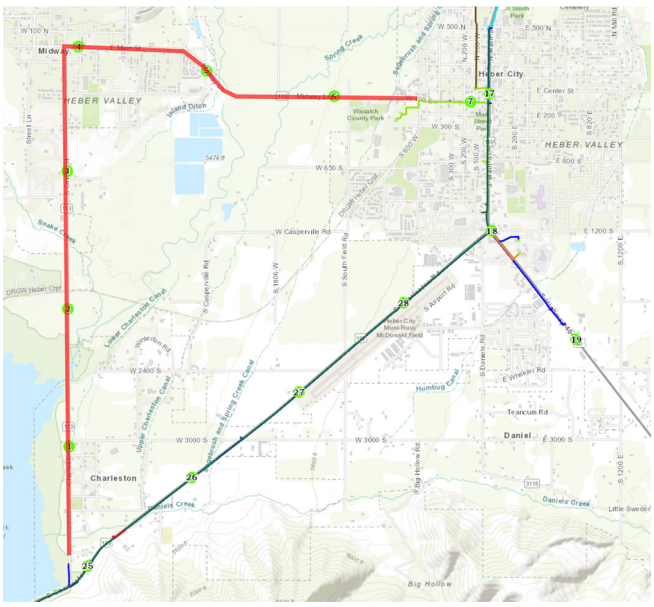
1. Get their own middle mile fiber – obtain trade with UDOT
2. Apply for Bead funding
3. Build fiber throughout Wallsburg

What would a trade look like with UDOT?

- UDOT needs fiber from Daniels to Duchesne
- Midway to signal (red line on map below)
- Need to set up trade agreement and account with JJ

Potential Problems

- Not a redundant link going into Wallsburg
- UDOT will inform in advance if they're doing scheduled maintenance, but there are sometimes accidental line hits with road work



Appendix D: Sample Specifications and Policies

Attachments in this section include:

1. UDOT specifications for fiber conduit
2. UDOT standard drawing for fiber junction box and utility vault
3. “Dura-line Dig Once Best Practices” with state legislation examples

SECTION 13553

ATMS CONDUIT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. ATMS conduit for communications and fiber optic cables.

B. Detectable pull tape, conduit, and all materials, labor, workmanship, equipment, and incidental items required for a complete system of conduit.

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow, and Backfill

B. Section 02221: Remove Structures and Obstruction

C. Section 02705: Pavement Cutting

D. Section 02741: Hot Mix Asphalt (HMA)

E. Section 02776: Concrete Sidewalk, Median Filler, and Flatwork

F. Section 02842: Delineators

G. Section 03575: Flowable Fill

1.3 REFERENCES

A. ASTM D 2241: Poly-Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)

B. ASTM F 2160: Solid Wall High Density Polyethylene (HDPE) Conduit based on Controlled Outside Diameter (OD).

C. National Electrical Code (NEC)

D. National Electrical Manufacturers Association (NEMA)

E. State of Utah Administrative Rules

F. Underwriters Laboratories (UL)

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Manufacturer's product data sheets and recommended installation instructions.

B. Manufacturer's warranties and parts lists

C. Conduit Mandrel Test Form prior to substantial completion.

D. Refer to http://www.udot.utah.gov/go/standardsreferences for blank forms for this Section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Conduit and fittings for ATMS communication and fiber optic conduit
   1. Schedule 40 PVC rated at 194 degrees F as specified in NEMA TC-2, NEMA TC-3, ASTM D 2241,
   2. High Density Polyethylene (HDPE) SDR11 rated complying with ASTM F 2160.
      a. HDPE conduit with smooth outer wall and ribbed or smooth interior wall.
      b. Fittings and couplers rated for a minimum of 130 psi.
      c. Mechanical type couplers when joining HDPE and PVC conduits.
   3. Microduct
      a. HDPE microduct with an outside/inside diameter of 0.500/0.394 inch (12.7/10 mm) or 0.630/0.512 inch (16/13 mm) or 0.709/0.551 (18/14 mm), as shown.
      b. Microduct having a ribbed interior.
      c. Watertight couplers rated for a minimum of 200 psi.
      d. Microduct bundle within a single 0.100 inch thick polyethylene oversheath.
      e. Microduct bundles must contain a factory installed #14 AWG solid, insulated locate wire and a minimum of two rip cords for removal of oversheath.

B. Conduit Banks
   1. New, prefabricated
   2. ATMS Multi-duct Conduit Types
      a. 1D = four 1.25-inch conduits

b. 2D = eight 1.25-inch conduits
c. 4D = sixteen 1.25-inch conduits

3. Color-code each conduit or cell as follows:
   a. One, two, or three conduits gray
   b. 1D Bank 1 blue, orange, green and brown
   c. 2D Bank 1 blue, orange, green, and brown
      Bank 2 slate, white, red, and black
   d. 4D Bank 1 blue, orange, green, and brown
      Bank 2 slate, white, red, and black
      Bank 3 same as bank 1 with a contrasting stripe
      Bank 4 same as bank 2 with a contrasting stripe
4. Microduct types:
   a. Individual 0.500/0.394 inch (12.7/10 mm) or 0.630/0.512 inch (16/13 mm) microducts installed loosely within new or existing conduit.
   b. MD2, MD3, MD4 and MD7: microduct bundle containing two, three, four or seven 0.709/0.551 inch (18/14 mm) microducts respectively.
   c. Factory-assembled bundles for bundled applications.
5. Color-code microducts and oversheaths as follows:
   a. Individual microducts installed loosely within conduit or bundled within oversheath:
      1) blue
      2) orange
      3) green
      4) brown
      5) slate
      6) white
      7) red
      8) black
   b. Oversheaths:
      Bundle #1 blue
      Bundle #2 orange
      Bundle #3 green
      Bundle #4 brown

C. Meet or exceed all of the conduit manufacturer's recommendations for materials used in the installation of conduits including sweeps, adapters, couplings, glue, plugs, and fittings.
   1. Conduit plugs must seal the conduit and allow the secure fastening of detectable pull tape.

D. PVC conduit sections – Nominal 20 ft sections. Couplings and fittings must provide watertight integrity.

E. Sweeps – factory manufactured sweeps (11¼, 22½, 45, and 90 degree angles) complete with bell and spigot.

F. Detectable Pull Tape – flat profile, low stretch polyester, detectable, sequential footage marked, 1,200 lb tensile strength pull tape in each conduit.

G. Backfill
   1. Flowable Fill – Refer to Section 03575.
   2. Free Draining Granular Backfill – Refer to Section 02056.
   3. Sand
      a. Friable natural river or bank aggregate, free of loam, detrimental, or soluble or organic matter.
      b. 3/8 inch minus, well graded.
   4. Hand-mix grout
      a. Minimum strength – 50 psi
      b. Maximum strength – 150 psi
      c. Slump – 5 inches to 10 inches

H. Rigid Metal Conduit (RMC) complying with UL-6. Zinc galvanized exterior coating complying with ANSI C80.1.

I. Liquidtight Flexible Metal Conduit (LFMC), -30 degrees C to 80 degrees C rated, UL 360 listed.

J. Liquidtight Flexible Nonmetallic Conduit (LFNC), 80 degrees C dry, 60 degrees C wet rated, sunlight resistant, UL 1660 listed.

PART 3 EXECUTION

3.1 GENERAL

A. Maximum spacing between junction boxes and vaults
   1. 500 ft for electrical cable.
   2. 1,000 ft for fiber optic cable on tangent surface street installations.
   3. 2,500 ft for fiber optic cable on tangent highway installations.
   4. Reduce maximum spacing if horizontal or vertical deflection incurred during installation prevents the installation of cable within maximum pulling tension rating of the cable.
   5. Notify the Engineer if utility avoidance requires junction box and conduit locations differing from requirements for deflection in this Section, article 3.2.

B. Minimum Cover of Conduit
   1. Minimum cover under pavement is 4ft and minimum cover under sidewalks is 3 ft.
   2. Minimum cover in highway right-of-way, greater than 20 ft from the edge of the pavement is 3 ft.
   3. Minimum cover in highway right-of-way, within 20 ft of the edge of the pavement is 5 ft.
   4. Refer to State of Utah Administrative Rule 930-7

3.2 INSTALLATION

A. Prevent conduit from deflecting vertically or horizontally along its length by a ratio greater than 10:1, (no more than 4-inch deflection per 40 inch in length) when installing conduit that houses communication cable.

B. Prevent sum total of the vertical and horizontal conduit deflection or bend between any two junction boxes from exceeding 270 degrees when installing conduit.

C. Install conduit within 1 ft of existing parallel conduit run if the planned location of conduit is parallel to the existing traffic signal or ATMS conduit.

D. Obtain approval for field bending of conduit with the Engineer in cases where factory sweeps are not appropriate. Field bending must be performed using a heat box or heat blanket. Torch heating conduit is prohibited. Install all conduit bends to have a radius that is not less than the following:
   1. 24 inches within the cabinet and pole foundations
   2. 36 inches in all other locations
   3. 46 inches for MD7 microduct bundle
   4. 40 inches for MD4 microduct bundle
   5. 36 inches for MD3 microduct bundle
   6. 32 inches for MD2 microduct bundle
   7. 12 inches for individual microduct

E. Install conduits that cross finished curbs and gutters, sidewalks, concrete flatwork, or textured or decorative surfaces by boring, jacking, or drilling. Replace any damaged concrete sections, joint to joint. Refer to Section 02221.

F. Proof all conduit before installation of cabling and detectable pull tape.
   1. Use a mandrel at least 80 percent of the conduit diameter, at least twice as long as the conduit diameter, and composed of rigid material.
   2. Schedule proofing with the Engineer at least 5 working days in advance of performing the work.

3. Proof all conduit with a Department representative witness present.
4. Complete and submit a completed Conduit Mandrel Test Form for all ATMS conduit.
5. Proof microducts using proofing balls.
6. Proofing balls must maintain a minimum 80 percent fill ratio of inside diameter of the microduct being tested.
7. Proofing must occur after all junction boxes have been installed to final grade, including placement of flowable fill or hand-mix grout at junction box walls, and after all excavation in the immediate proximity of the conduit system has been completed.
    a. Re-proof any conduit segment where excavation has occurred near the conduits following initial proof testing.

G. Provide detectable pull tape in all conduits.
1. Install continuously between junction boxes.
2. Fasten securely to conduit plug and leave 6 ft of pull tape slack inside of the conduit.
3. Do not splice detectable pull tape in conduit.
4. Use flat profile, low stretch polyester, 1,200 lb tensile strength detectable pull tape that is sequential footage marked.
5. Verify that the pull tape is detectable throughout its entire length by performing a continuity test or equivalent verification.
6. Detectable pull tape not required in microducts.

H. Encase open trench conduit in sand backfill covered by flowable fill within existing roadway, proposed roadway and sidewalk pavement areas only.
1. Seal junction box wall around conduits using flowable fill or approved hand-mix grout.
2. Use 6 inches of sand backfill covered with native material in all other areas.
3. Refer to AT Series Standard Drawings.

I. Use rigid metal conduit or schedule 80 PVC conduit for above ground application.
1. Liquidtight flexible metal conduit (LFMC) or liquidtight flexible non-metallic conduit (LFNC) is permitted in lengths not exceeding 6 ft where not subject to physical damage.
2. Apply corrosion protection to any portion of rigid metal conduit buried in the ground or encased in concrete.

J. Use PVC or HDPE conduit for underground application.

K. Warning Tape
1. Install orange warning tape with black legend “Caution - Buried Communication Cable,” in all trenches containing multi-duct conduit or conduit containing communication cables.

2. Install red warning tape with black legend “Caution - Buried Electric” in all other trenches.
3. Not required when flowable fill is directly overlaid with asphalt pavement or PCCP.
4. Not required when boring or plowing conduit.

L. Install a bushing or adapter at ends of all conduits that contain a conductor according to the NEC.

M. Furnish and install Utility Marker Posts along the longitudinal conduit running line. Refer to AT Series Standard Drawings and Section 02842.

N. Install a #14 AWG solid, insulated locate wire inside of new or existing conduit with individual microducts.
1. Verify that all locate wires are detectable throughout their entire length by performing a continuity test or equivalent verification.

3.3 TRENCH

A. Paved Asphalt Surface
1. Install T-patch over trenched area according to AT Series Standard Drawings.
2. Cut pavement from roadway surface to roadway base on both sides of trench to provide a clean, straight wall for T-patch before any backhoe use according to Section 02705.
3. Refer to AT Series Standard Drawings for depth of flowable fill under paved surfaces.
4. Evenly apply tack coat on final backfill before installing T-patch.
5. Place restoration patch – match the composition, density, and elevation (±¼ inch), of the existing surface according to Section 02741.
6. Apply a hot-pour rubberized asphalt joint sealant or approved equal after the patch is installed.

B. Sidewalk or Decorative Pavement
1. Use flowable fill to bottom of new pavement or sidewalk.
2. Match existing pavement thickness. New pavement thickness must be 3½ inches minimum and 8 inches maximum.
3. Restore sidewalk or decorative pavement to original condition or better after work is completed. Refer to Section 02776.

C. Unpaved Surface
1. Backfill using native material, if suitable, that matches the composition, density, and elevation (±0.2 inch), of the existing surface according to Section 02056.

2. Dispose of surplus material promptly.
3. Sand Backfill
    a. Use sand backfill in trench sections outside of existing roadway, proposed roadway, and sidewalk pavement areas, including exposed conduit locations when plowing or boring.
    b. Provide 6 inches of sand backfill above conduit in trench.
        1) Backfill trench above sand to finished grade using native material.
            a) Backfill and tamp in 6 inch lifts.
    c. Compaction of sand backfill is not required.

D. Sleeve foreign utilities that cross a trench so they are not encased in flowable fill.

E. Place all conduits in the same trench whenever possible.

F. Flowable Fill or Hand-mix Grout
1. Install flowable fill or approved hand-mix grout to the wall of junction box to seal conduit entry into junction box.
2. Clean excess flowable fill or hand-mix grout from the inside of the junction box.

G. Install all conduits so the flowable fill or sand backfill completely encases all exterior surfaces of the conduit.
1. Separate multi-duct conduits using a commercially available conduit spacer or approved equivalent.
2. Place spacers no more than 4 ft apart and not more than 2 ft from each coupler.

H. Anchor the conduit in trench at 16 ft intervals to maintain the required conduit depth during flowable fill placement.

I. Minimum separation between all conduits and the wall of the trench is 1½ inches.

3.4 BORE OR PLOW

A. Immediately contain, remove, and properly dispose of all excess drilling fluid.

3.5 USE OF EXISTING OR OCCUPIED CONDUIT

A. Maintain the physical condition and functional integrity of all cabling and wiring in existing or occupied conduit.

B. Cable or wire installation in an existing or occupied conduit.

1. Remove any existing fiber optic cable or copper wire.
2. Test the integrity and clean the conduit by successfully pulling a Department-approved mandrel through the conduit.
3. Re-pull existing and new fiber optic cable or copper wire together.
4. Perform all necessary splices and replace any impacted fiber cable and spider fan-out kits according to Section 13594.

C. Use existing conduit in-situ only if shown and as approved by the Engineer.

D. Intercept individual microducts from existing microduct bundle mid-span and reroute to new junction box location:
   1. Type II-PC junction box
      a. Bury at existing microduct bundle depth.
      b. Notch the 24-inch box walls and install junction box over existing microduct bundle.
      c. Provide 12 inches of free draining granular backfill borrow underneath junction box.
      d. Encase all conduit in flowable fill orhand-mix grout where the conduit enters the junction box.
      e. Place locate ball or disk in junction box.
      f. Ground rod, and grout floor are not required.
   2. Conduit and microduct bundle inside of buried Type II-PC junction box.
      a. Install conduit from buried junction box to new junction box location for rerouting of individual microducts. Provide #14 AWG solid, insulated locate wire inside of new conduit between junction boxes.
      b. Extend conduit and microduct oversheath 6 inches beyond inside wall of the junction box.
      c. Expose microducts by removing no more than 20 inches of oversheath.
      d. Identify and cut only the individual microducts to be rerouted.
      e. Use approved couplers and extend microducts to new junction box using corresponding microduct color.
      f. Splice all locate wires together using an approved waterproof connector.
         1) Verify that the locate wire conductors are not exposed.
   3. New junction box location
      a. Install new junction box within 20 ft of buried junction box or within 20 ft of edge of roadway when existing microduct bundle is underneath roadway, to provide access to locate wire for mapping and locating purposes.

3.6 REPAIR OR RESTORATION

A. Restore all areas, including landscaping, concrete pavement, asphalt, finished curbs and gutters, box culverts, sewers, underground water mains, sprinkler systems, sidewalks, concrete flatwork, colored, textured, or decorative surfaces damaged during conduit and junction box installation.

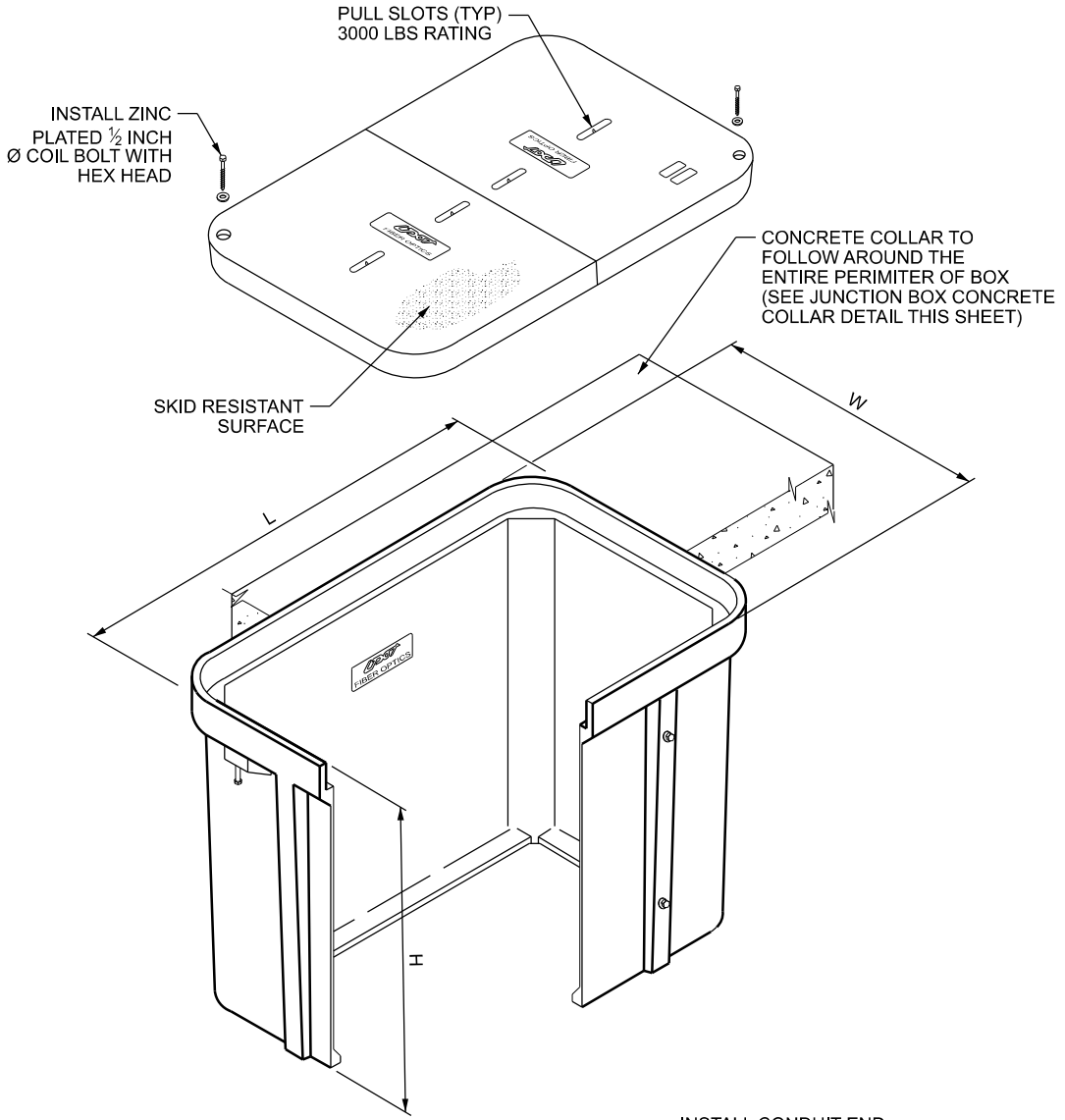
B. Coordinate with local utilities for utility repair.

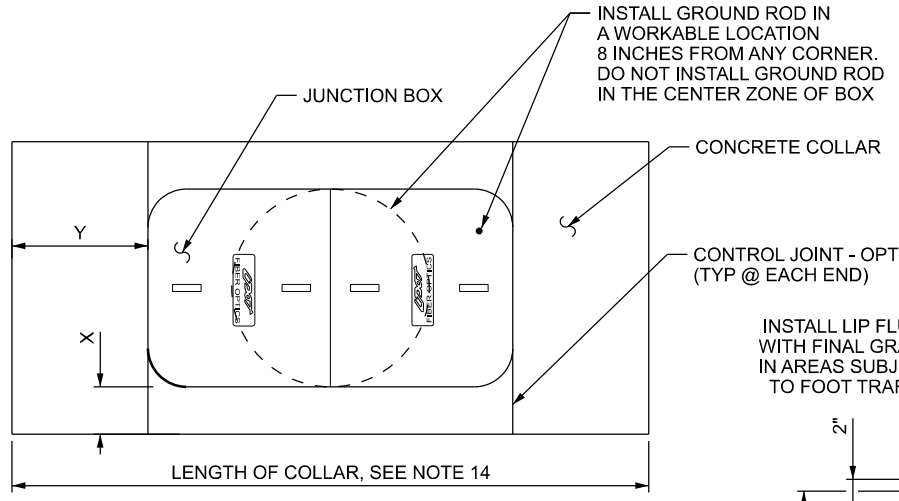
C. Notify the Engineer of all necessary repairs.

D. Replace all damaged facilities in kind.

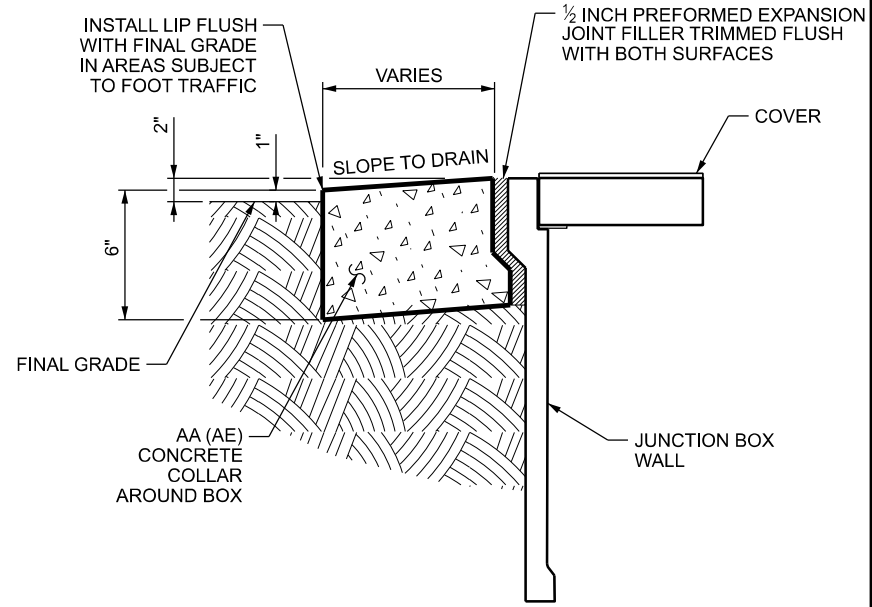
E. Buried microduct bundle coupling and repair:
   1. Expose microducts by removing no more than 12 inches of oversheath beyond area to be coupled or repaired.
      a. Trim microducts to length as necessary to eliminate all bends and deflection.
   2. Use approved couplers.
   3. Splice the locate wires together using an approved waterproof connector.
      a. Verify that the locate wire conductors are not exposed.
   4. Protect exposed microducts, couplers and locate wire using split duct.
      a. Seal split duct joints and split duct ends around microduct bundle oversheath using approved waterproof sealing tape or other approved methods prior to backfill.
      b. Do not use heat-shrink or cold-shrink protection methods.

END OF SECTION





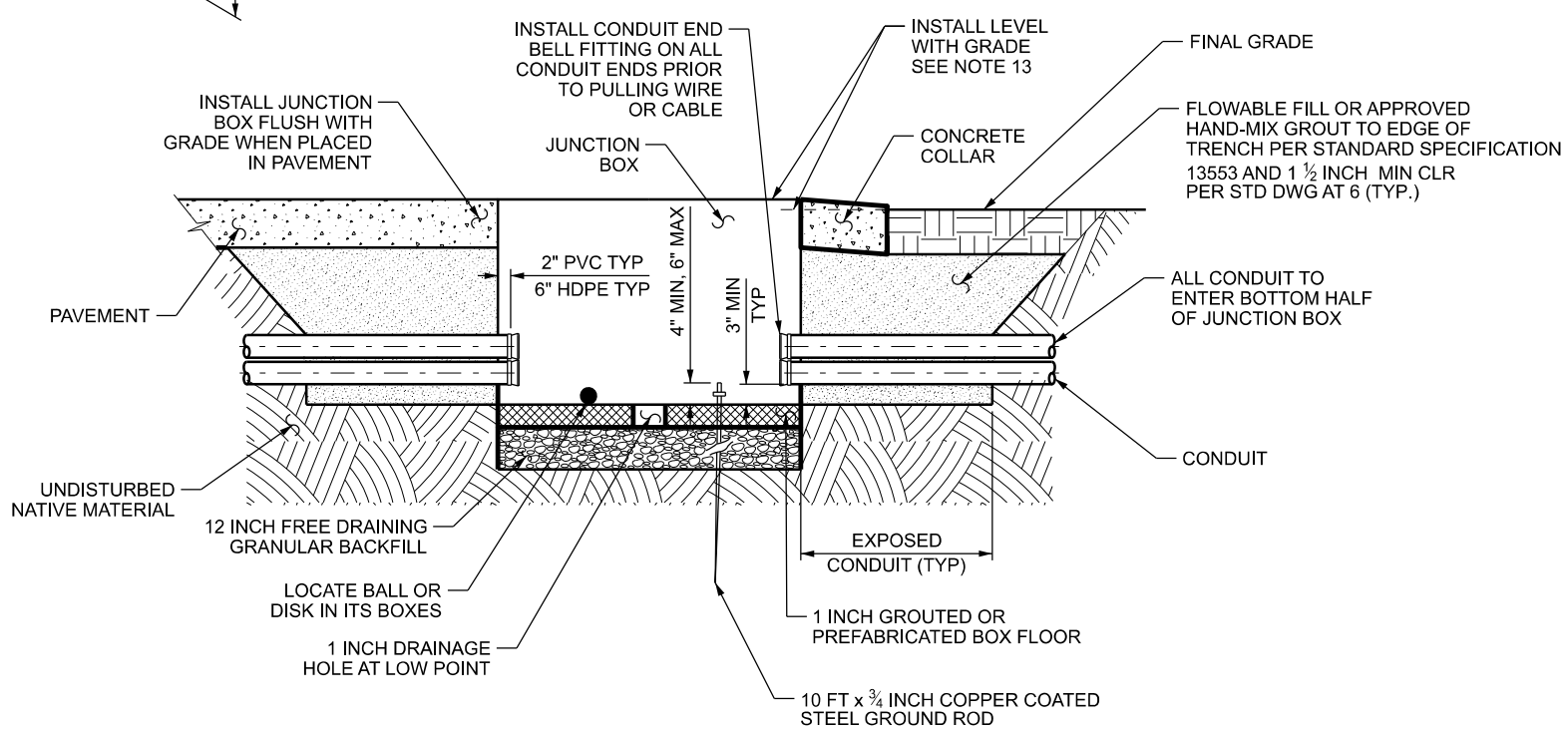
PLAN VIEW - JUNCTION BOX AND CONCRETE COLLAR



JUNCTION BOX CONCRETE COLLAR DETAIL

TABLE OF DIMENSIONS

BOX TYPE	"W" inch	"L" inch	"H" inch	"X" inch	"Y" inch	LOADING
I-PC	13	24	24	10	10	TIER 22
II-PC	24	36	36	10	24	TIER 22
III-PC	30	48	36	10	24	TIER 22



JUNCTION BOX CONDUIT PENETRATION DETAIL

NOTES:

1. BOX LOGO OR NAME PLATE, REFER TO STANDARD SPECIFICATION 13554.
2. DO NOT PLACE JUNCTION BOXES IN THE TRAVELED WAY OR ON FREEWAY SHOULDERS.
3. CONCRETE COLLAR WIDTH VARIES WHEN ADJACENT TO ITS CABINETS. REFER TO AT AND SL SERIES STD DWGS.
4. PROVIDE CONCRETE COLLARS EXCEPT WITHIN CONCRETE PAVED AREAS.
5. INSTALL CONDUIT PLUG PER STANDARD SPECIFICATION 13554.
6. ALIGN ITS CONDUIT BY COLOR ON EACH SIDE OF THE JUNCTION BOX.
7. PROVIDE TYPE III-PC JUNCTION BOXES WITH A SPLIT LID.
8. CONFORM TO ANSI/SCTE-77 "SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY" TIER 22 LOADING FOR ALL JUNCTION BOXES. TIER 22 ID PLATE TO BE VISIBLE ON BOX.
9. EXTEND GROUND ROD A MINIMUM OF 4 INCHES AND A MAXIMUM OF 6 INCHES ABOVE BOTTOM OF JUNCTION BOX.
10. USE INTER SYSTEM GROUNDING BRIDGE CLAMP FOR BONDING TO GROUND ROD. ATTACH NOT MORE THAN 4 WIRES PER CLAMP.
11. DO NOT CUT GROUND RODS.
12. PROVIDE CLEAR SPACE OF AT LEAST 36 INCH FOR PERSONNEL TO PULL LID OFF BOX WITHOUT CONFLICT.
13. PLACE JUNCTION BOXES AND CONCRETE COLLARS LEVEL WITH GRADE ON SLOPES 6:1 OR FLATTER. REFER TO PLANS FOR DETAILS OF JUNCTION BOX PLACEMENTS ON SLOPES STEEPER THAN 6:1. SLOPE CONCRETE COLLAR TO DRAIN AS SHOWN.
14. INSTALL ENTIRE PAD UNIFORMLY TO LONGEST LENGTH WHEN SEVERAL JUNCTION BOXES ARE BEING PLACED ADJACENT TO ONE ANOTHER.

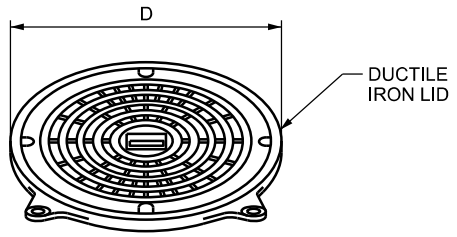
NO.	DATE	APPR.	REMARKS
1	12/07/22	MAA	CHANGE ATMS TO ITS
	4/30/20	MAA	ADDED "OPTIONAL" TO CONCRETE COLLAR DETAIL

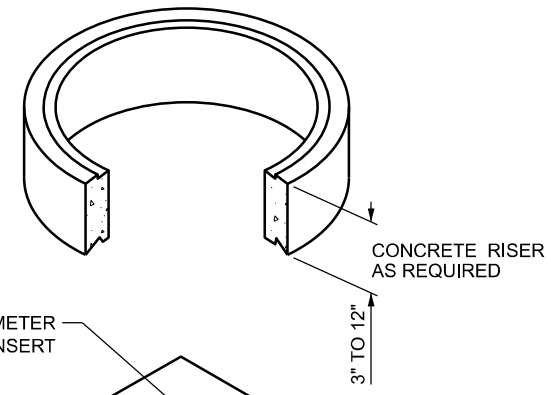
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH
STANDARD DRAWING EDITION

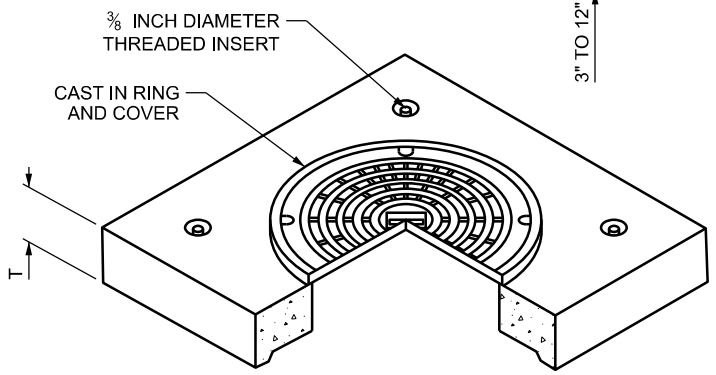
2024 Standard Drawing

POLYMER CONCRETE JUNCTION BOX DETAILS
STANDARD DRAWING TITLE

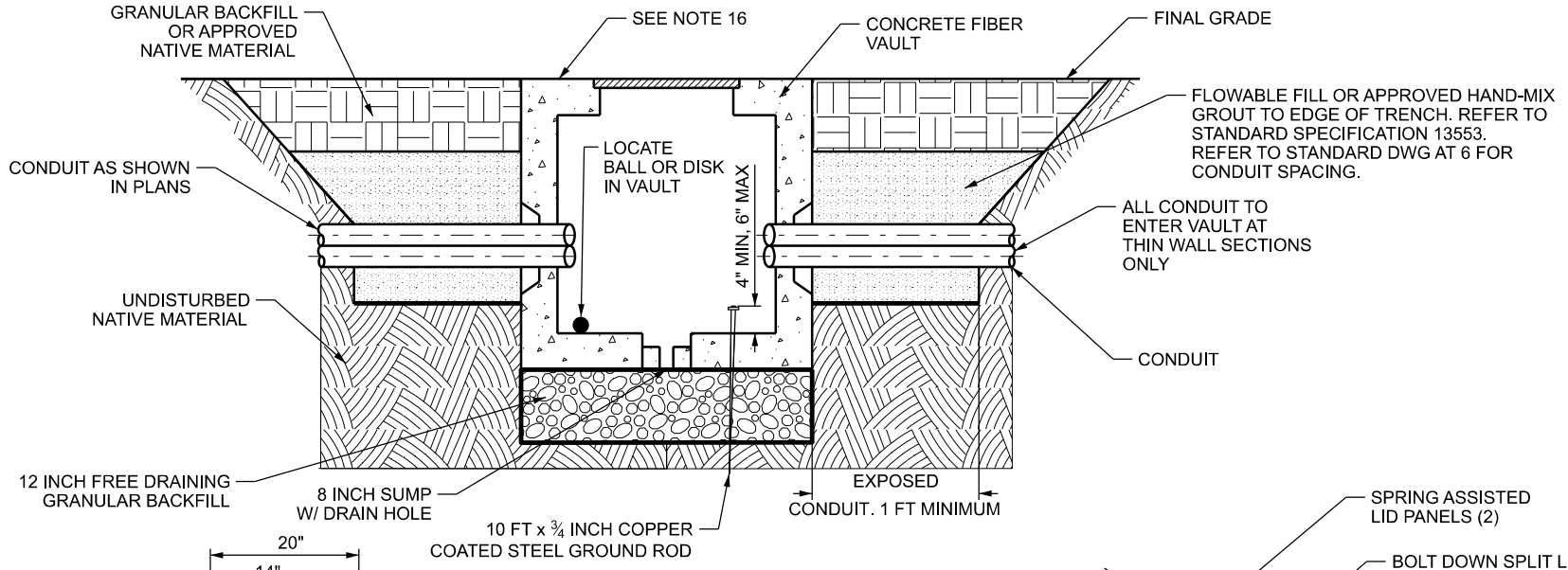
STD. DWG. NO.
AT 7A



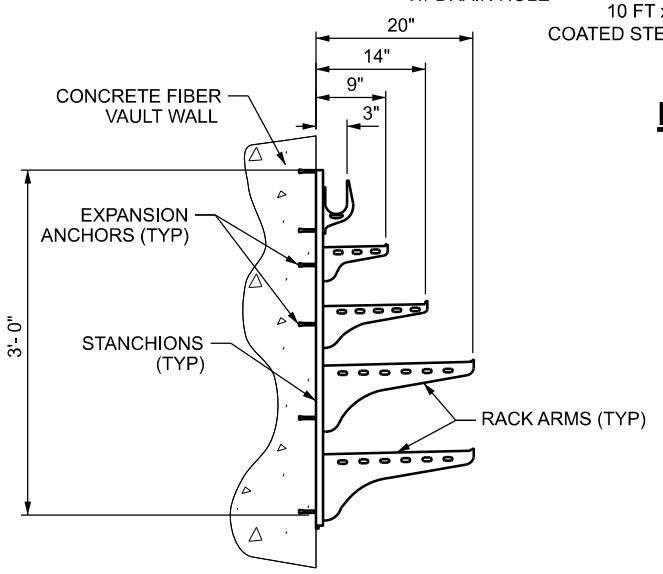




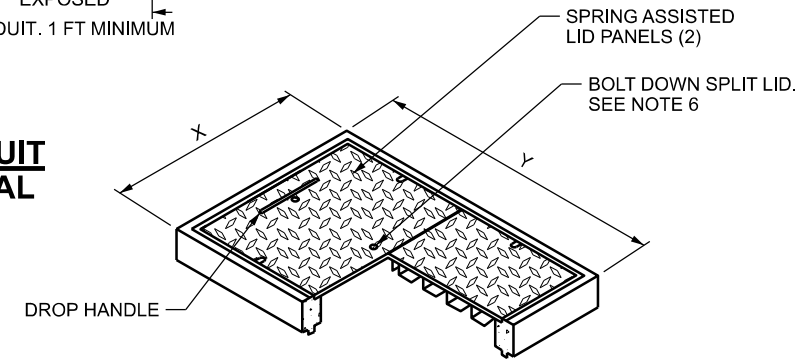
CONCRETE FIBER VAULT WITH MANHOLE LID



FIBER VAULT CONDUIT PENETRATION DETAL



TYPICAL CABLE RACK



METAL LID FOR TYPE IV-CV FIBER VAULT

VAULT DIMENSIONS

VAULT TYPE	"L" INCH	"W" INCH	"H" INCH	"T" INCH	LID	"X" INCH	"Y" INCH	"D" INCH
IV-CV	48	48	48	6 MIN	HINGED OR MANHOLE	24	36	36
V-CV	48	72	72	6 MIN	MANHOLE ONLY	N/A	N/A	36

NOTES:

1. SUPPLY TYPE IV FIBER VAULT WITH A TAMPERPROOF HINGED METAL LID FOR UNPAVED AREAS, OR A TAMPERPROOF HEAVY DUTY MANHOLE-STYLE LID IN PAVED AREAS. SUPPLY FIBER VAULTS, LIDS, AND COVERS RATED FOR AASHTO LRFD HL-93 LOADING.
2. SUPPLY TYPE V-CV FIBER VAULT WITH A MANHOLE-STYLE LID ONLY.
3. SUPPLY MANHOLE LIDS WITH A HOLE OR SLOT FOR REMOVAL WITH A LEVER OR HOOK. SUPPLY HINGED METAL LIDS WITH DROP HANDLES.
4. SUPPLY VAULTS WITH A PERMANENT INTERNAL LADDER.
5. PROVIDE FIBER VAULT LIDS MARKED, "UDOT FIBER OPTIC" USING MIN 3 INCH HIGH LETTERING WITH ⅛ INCH THICKNESS. FORM LETTERS BY ENGRAVING, CASTING, STAMPING, OR WITH A PRECISE WELD BEAD.
6. PROVIDE HINGED METAL LID WITH A MINIMUM OF 3/32 INCH HIGH DIAMOND PATTERN OR SIMILAR SURFACE.
7. PROVIDE FIBER VAULTS WITH A HEAVY-DUTY NON-METALLIC CABLE STORAGE RACK SYSTEM. PROVIDE RACK ARMS AND STANCHIONS CAPABLE OF SUPPORTING A MINIMUM OF 250 LB FOR TYPE IV-CV FIBER VAULT RACKS, INCLUDE A MINIMUM OF 36 INCH RACK STANCHIONS AND 4 RACK ARMS. FOR TYPE V-CV FIBER VAULTS, INCLUDE A MINIMUM OF 45 INCH RACK STANCHIONS AND 5 RACK ARMS.
8. CONDUITS PENETRATE FIBER VAULT AT THIN WALL SECTIONS ONLY. CORE DRILL HOLE IN THIN WALL SECTION TO CONDUIT SIZE PLUS ¼ INCH. DO NOT "KNOCK OUT" THE THIN WALL SECTION.
9. COMPLY WITH OSHA REQUIREMENTS FOR ENCLOSED WORK SPACES.
10. BOND AND GROUND ALL EXPOSED METALLIC COMPONENTS OF THE FIBER VAULT PER NEC 250 IF ARMORED FIBER OPTIC CABLE IS USED.
11. INSTALL CONDUIT PLUGS ACCORDING TO STANDARD SPECIFICATION 13553.
12. ALIGN ATMS CONDUIT BY COLOR ON EACH SIDE OF FIBER VAULT.
13. EXTEND GROUND ROD A MINIMUM OF 4 INCHES AND A MAXIMUM OF 6 INCHES ABOVE BOTTOM OF FIBER VAULT.
14. USE GROUND ROD BRIDGE CLAMP FOR BONDING TO GROUND ROD. ATTACH NOT MORE THAN 4 WIRES PER CLAMP.
15. DO NOT CUT GROUND RODS.
16. INSTALL VAULT PLUMB AND LEVEL. GRADE BACKFILL FLUSH WITH VAULT.

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH
STANDARD DRAWING EDITION

2024 Standard Drawing

PRECAST CONCRETE FIBER OPTIC AND UTILITY VAULT DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 7B

Dig Once Best Practices Overview

SECTION 1: GOALS OF THE LEGISLATION

Economic Viability Exists in a Digital Connection

No one can predict the demand for data in the next 10 to 20 years, but we know our lives are going to be even more connected. By consolidating the installation of broadband infrastructure at the time of road construction, communities are positioned to participate in the digital economy in the most cost-effective way for the taxpayers.

Saving Tax-Payers Dollars

The U.S. DOT's Intelligent Transportation Systems Joint Program Office estimates the average cost of deploying fiber-optic cable is about $27,000 per mile. According to the Federal Highway Administration, the Dig Once legislation has the potential to eliminate up to 90 percent of the cost of deployment.

Dig Once U.S. Federal Legislation

In an effort to make high speed broadband more affordable and accessible, the U.S. Federal Government passed "Dig Once" legislation. After a decade of various versions of the concept, the bill received overwhelming bi-partisan support with more than 30 co-sponsors.

Eliminating Duplicate Expenses

Essentially, the legislation provides for the notification of federally funded road construction projects where conduit or fiber could be included at the same time. Digging one time for two or more projects and enabling future upgrades without additional expense brings tremendous added value and efficient use of resources.

Digging Deeper into Saving Taxpayer's Money

The law allows for some flexibility: installation of fiber, conduit, or both fiber and conduit. If fiber is direct buried alone, it will still be a leap forward in streamlining and investing in broadband infrastructure. However, when an upgrade is needed, it eventually means more digging to replace the fiber cable.

The Federal Communications Commission, or FCC, recommended State policies should require contractors to install spare fiber and empty conduit to accommodate "reasonably anticipated" future demand. The use of a conduit network system provides the flexibility of upgrading (adding additional fiber) without the cost of digging. Fiber can be placed by air-jetting into the conduit quickly and easily without the expense and disruption of construction. Burying empty conduits in the ground at the time of road construction allows the potential for expansion when it is necessary and can be immediately revenue-generating by leasing or renting.

SECTION 2: BEST PRACTICES OF DIG ONCE POLICIES

The law allows for some flexibility: installation of fiber, conduit, or both fiber and conduit. The Federal Communications Commission, or FCC, recommended State policies should require contractors to install spare fiber and empty conduit to accommodate "reasonably anticipated" future demand.

Best Practice #1: Education

- The extra effort spent on educating the stakeholders will result in on-going cooperation
- Explain the cost-savings benefits
- Demonstrate the high-speed broadband connectivity economic impact
- Clarify the definition of "reasonably anticipated" future demand in conjunction with the installation of fiber, conduit, or both fiber and conduit
- Describe the ability to upgrade for the future (if conduit is used)

Best Practice #2: Ordinances (see pages 3-9: https://broadbandnow.com/report/dig-once-digital-divide/)

- Use existing laws and practices and integrate ideas into statutes and processes
- Explain expectations for compliance and how to cope with expectations
- Underscore who is responsible in the text of ordinance
- Encourage or require companies to use your conduit
- Maintain public ownership of conduit as much as possible

Best Practice #3: Coordination

- Establish relationships and expectations by keeping track of private projects and streamlining bureaucratic systems
- Create effective coordination committees
- Provide clear explanation of costs
- Line up departments' budgets for potential large projects

Best Practice #4: Installation of Conduit Network Systems (see pages 10-13)

- Create a master plan
- Publish clear and consistent guidelines (with engineering standards)
- Choose the type of conduit that makes sense for your community — plan for the future
- Do not underestimate the added value of MicroTechnology and MicroTrenching *(Note: MicroTrenching is different than NanoTrenching, which puts the conduit only a few inches below the surface and is unproven. MicroTrenching has been around 10+ years and is a proven installation method with the correct reinstatement material.)*
- Document and verify your conduit

NOTE: Incremental funding required to pass 90 percent of U.S. households with high-speed fiber broadband by 2025 is estimated at a cost of $70 billion.* Dig Once has the potential to reduce that expense significantly. *(*Source: Cartesian, FCC Form 477, US Census, American Community Survey, Company Presentations)*

SECTION 3: STATE LEGISLATION EXAMPLES

(SOURCE: https://broadbandnow.com/report/dig-once-digital-divide/)

NORTH CAROLINA

Law(s): Executive Order 91 forming the Task Force on Connecting North Carolina
Date enacted: 2019
Description: The Governor of North Carolina formed the Task Force on Connecting North Carolina in March 2019, aimed at increasing Internet access to North Carolina residents and aligning state agencies policies in order to remove barriers to broadband deployment. It's comprised of officials representing an array of state departments, including the department of transportation (DOT) and the department of information technology (DIT). The governor asked representatives from the DOT and DIT to jointly develop and implement a statewide "Dig Once" policy promoting the installation of broadband conduit or cables during road construction projects by July 1st, 2019.

UTAH

Law(s): R907-64. Longitudinal and Wireless Access to Interstate System Rights-of-Way for Installation of Telecommunication Facilities; Section 72-7-108
Date enacted: 1999
Description: Utah's state government began implementing Dig Once policies ahead of the 2002 Salt Lake City Olympics. The state's DOT has since expanded the policy, requiring the installation of oversized conduit for certain road construction projects, while interested telecom parties can then extend that infrastructure to neighboring communities. The state's DOT owns the conduit and leases it to telecom companies that want to use it. The state's Telecommunications Advisory Council reviews and approves valuations and trades between the state's DOT and telecom companies for access to conduit, and maintains a map of fiber locations.

ARIZONA

Law(s): Arizona REV. STAT. ANN. § 28-7381
Date enacted: 2012
Description: Arizona's Dig Once policies are targeted specifically at expanding broadband access to rural communities. The policy states that during road construction projects along rural highways, the DOT can coordinate with telecom companies to install conduit and it enables the agency to lease the conduit to telecom providers at a cost-based rate.

MINNESOTA

Law(s): 116J.39-116J.40: Coordination of Broadband Infrastructure Development
Date enacted: 2013
Description: Minnesota's state laws encourage the state's Office of Broadband Development to coordinate with the state's DOT for "Dig Once" measures in planning, relocation, installation, or improving broadband conduit within a right-of-way. It enables the Office of Broadband Development to evaluate procedures and criteria for contracts or lease agreements with telecom companies, as well as pricing requirements. It also allows for co-location of fiber and conduit with other utilities in the same trench.

NEVADA

Law(s): SB 53, creating the Nevada Telecommunications Advisory Council
Date enacted: 2017
Description: Nevada state legislature formed the Telecommunications Advisory Council within the state's DOT in 2017, outlining parameters and regulations for the DOT in coordinating with telecom companies for access to rights-of-way for installing telecommunications equipment. The law charges the council with seeking input from telecommunications providers and the public relating to broadband access, providing recommendations to the state DOT on offering access to rights-of-way to telecommunications providers, as well as approving or denying proposed fiber trade agreements between the DOT and a telecom provider. The DOT is also authorized to enter into agreements with telecom companies and charge fees to access to public rights-of-way or receive in-kind compensation.

MARYLAND

Law(s): SB 717 –Connecting Rural Maryland Act of 2017, creating the Task Force on Rural Internet, Broadband, Wireless, and Cellular Service; HB 961-Rural Broadband Communication Services
Date enacted: 2017-present
Description: Maryland's DOT coordinates with telecom providers and local utilities for installing conduit. The Connecting Rural Maryland Act created the Task Force on Rural Internet, Broadband, Wireless and Cellular Service, which was charged with facilitating cooperation between telecom providers to reduce redundancy, save money, and ensure that the all fiber assets are being used efficiently. The task force focused on facilitating cooperation between electric cooperatives and telecom companies. The task force's last report recommended the state include fiber optic cable as part of the state's definition of telecommunications equipment, and that it allow utilities to lease excess fiber and/or pole attachment rights for telecommunications, including broadband, without obtaining a separate easement, in order to promote broadband access in rural parts of the state. It has requested that the state's legislature draft authority for electric cooperatives to coordinate with telecom providers in laying fiber. That bill was expected to be introduced in 2019. HB 961, meanwhile, specifies that nonprofit telecommunications services providers in rural and underserved areas of the State must be allowed to use the right-of-way or easement of specified State agencies for the installation of broadband communication infrastructure without being charged to do so.

GEORGIA

Law(s): SB 402 — Achieving Connectivity Everywhere (ACE) Act
Date enacted: 2018
Description: Georgia state legislature passed the ACE bill in 2018, which enables the state DOT to develop and implement a long-term policy allowing public rights-of-way to be used for the deployment of broadband services and other "emerging communication technologies" either by the state or private providers. It also requires local governments' comprehensive plans to include elements to facilitate the deployment of broadband services, and it amends the OneGeorgia Authority Act to include broadband services. Finally, the bill authorizes the Georgia Technology Authority to establish policies and programs necessary to coordinate

statewide efforts to promote broadband deployments between state agencies, local governments and industry representatives.

WEST VIRGINIA

Law(s): HB 4447, creating new codes §17 – 2 E- 1-E-9
Date enacted: 2018
Description: West Virginia's state government has developed a uniform system for conduit installation for telecom companies that are applying to install telecom infrastructure. Telecom companies must enter into an agreement with the state's Division of Highways for installing conduit in public rights-of-way; companies must also notify the West Virginia Broadband Enhancement Council and all other carriers on record within the state of their installation permit. Other telecom companies that are interested in installing their own fiber have 30 days to notify the applicant of interest in sharing the trench. The telecom company is also required to run an advertisement in the relevant media for two weeks advertising the project to allow other carriers the opportunity to respond. The law also allows the Division of Highways to charge fees for access to public rights-of-way, or accept in-kind compensation from sources such as conduit, dark fiber, access points, other telecom equipment or services, or even bandwidth.

MAINE

Law(s): Chapter 344, Sec. 1. 35-A MRSA §2503, sub-§2
Date enacted: 2018
Description: Maine's law requires any public entity involved in a construction project to install broadband conduit and authorizes that entity to lease the conduit to telecom companies for installing broadband and/or wireless facilities for the purpose of providing service.
The law states that telecom companies proposing broadband deployments must notify the ConnectME Authority with the location and description of the proposed facility and that the Authority must then disseminate that information to all other telecom companies or other entities that may be interested in installing broadband at the same time. The Authority is also tasked with maintaining a map of broadband conduit installations through the state.

ILLINOIS

Law(s): 605 ILCS 5/9-131) Sec. 9-131.
Date enacted: 2009
Description: Illinois state law requires the state DOT and the Department of Central Management Services (DCMS) to collaborate in installing fiber network conduit, where it does not already exist, in every new state-funded construction project that opens trenches along state-owned roadways. Either department is authorized to allow a third-party company to manage the leasing of the conduit to telecom companies, as long as the state can receive market-based pricing for the lease. The state's DOT also coordinates with the Illinois Broadband Deployment Council to compile Dig Once best practices and draft ordinances for county and city agencies within the state.

CALIFORNIA

Law(s): Section 14051 of the Government Code
Date enacted: 2016
Description: California requires the state DOT to notify telecom companies of state-led highway construction projects through its website to enable companies to collaborate with the state on installing conduit in public rights-of-way during each project.

SECTION 4: CITY AND COUNTY LEGISLATIONS EXAMPLES

(SOURCE: https://broadbandnow.com/report/dig-once-digital-divide/)

LOMA LINDA, CA

Law: Ord. 629 §1
Date enacted: 2004
Description: The city of Loma Linda requires all new construction to connect to the city's existing fiber network through ordinances laid out in their Loma Linda Connected Community Program. Residential and commercial builders in Loma Linda are required to include broadband-capable internal wiring and fiber-optic interfaces in new structures. Loma Linda was one of the first communities in the US to adopt a comprehensive future-facing dig once construction policy, and one of the only ones to extend the ordinance to building wiring specifications.

BRENTWOOD, CA

Law: Ordinance No. 609
Date enacted: 1999
Description: Brentwood began implementing Dig Once policies 20 years ago. The city requires developers to design and install two advanced technology system conduits dedicated to the city within public rights-of-way during new construction and to each lot line within the development. It goes on to require developers to install a fiber optic system in one of the two conduits designed to serve the development by either the city itself or a licensed franchisee. The second conduit must remain empty and is reserved for future use by other franchisees. Over the last 20 years, the city now has 150 miles of conduit passing over 8,000 homes. ISP Sonic.net has relied heavily on the conduit to provide broadband service to residents.

SANDY, OR

Law: Development code 17.84.60
Description: The city of Sandy requires private developers to install conduit when disturbing existing roads or building new ones and offers maps of existing installations so that developers can be strategic in how they install conduit. The city has added broadband fiber to the list of municipal infrastructures (such as water, sewer, power lines and mailboxes) that all new developments must include.

BOSTON, MA

Date enacted: 1998; expansion in 1994
Description: Boston is possibly the very first city to implement a Dig Once policy, back in 1988. Initially, the city required all construction projects that involved excavators in a public right-of-way to install conduit and the city then leased that conduit to telecom companies through a one-time fee plus a $5 per foot annual charge. However, the city found its offering wasn't attractive enough to telecom companies, who had begun building their own conduit along parallel streets. The city has since revised its laws to require telecom companies to lease space from the installed conduit before being allowed to install their own conduit, thereby encouraging companies to make use of what's already been installed. In 1994, Boston implemented a policy that required all telecom companies to install conduits in the same trench at the same time, on a shared-cost basis. This policy requires a lead company to

coordinate with other telecom entities in drafting engineering plans and estimating costs for the trenching and conduit installation.

BERKELEY, CA

Law: Ord. 7083-NS § 4 (part) Excavations for video and telecommunications systems
Date enacted: 2009
Description: Berkeley has implemented a suite of policies and procedures outlining best practices for telecom companies in order to minimize the inconveniences of installation, maintenance, and removal of telecom facilities in public rights-of-way. The city requires existing facilities be moved underground alongside new facilities when feasible, and that telecom companies coordinate construction projects with utilities installing infrastructure in public rights-of-way. Telecom companies must also alert the city to any excess or surplus conduit to be installed, and that new facilities be installed within existing facilities where there is sufficient excess capacity.

BELLEVUE, WA

Description: The city of Bellevue doesn't have a formal Dig Once policy in place, but the city has set Dig Once conditions within some of its development projects in the past. The city asks excavator projects include installing conduit along roads when feasible, as well as during street lighting and traffic signal upgrades. It also requires transportation projects that interrupt public sidewalks to include installed conduit.

GONZALES, CA

Law: "Dig Once" Policy for Public Works Projects in Gonzales
Date enacted: 2016
Description: Gonzales city government has implemented a Dig Once policy for public works projects that requires the city to install conduit during projects such as construction and maintenance of utility infrastructure or public roadways, or during excavations for installing communications, in public rights-of-way. The conduit is owned by the city.

ARLINGTON COUNTY, VA

Description: Arlington County does not have a specific Dig Once policy, but the county has reached "Dig Once" agreements with utility providers in the past. The county entered into one such agreement with electric utility Dominion Virginia Power. The utility needed to install underground conduit along a congested urban public right-of-way. The county required the utility to install fiber in parallel conduit for the county's use. The county is in the midst of installing a fiber network and is building extra capacity for use at a later date.

SAN FRANCISCO, CA

Law: Ordinance 220-14
Date enacted: 2014
Description: San Francisco laws requires any government-led construction project involving a public right-of-way to include improvements to communications infrastructure when feasible. It also requires a telecom company applying to install communications infrastructure to notify the city's Department of Technology so the department can participate in installing conduit at

the same time. The law encourages the department to participate to create a more efficient delivery of broadband services to the public and for the city's needs.

MONTEREY, CA

Law: MBEP/CCBC Shadow Conduit Specifications version 1.0
Date enacted: 2016
Description: The city of Monterey and the Central Coast Broadband Consortium (CCBC) have developed a set of conduit specifications and guidelines for reducing redundancy in installation. Its recommendations range from the conduit size and number of conduits to install, whether future conduit installation would be problematic or impossible, and whether any partners or customers will make immediate use of it. However, the specifications leave out guidance on when conduit installation is required and who should be required to install it.

SANTA CRUZ, CA

Law: Telecommunications Improvement Ordinance
Date enacted: 2014
Description: The city of Santa Cruz, also part of the Central Coast Broadband Consortium (CCBC), adopted the Santa Cruz county's ordinance in 2014, which in turn, was based on the city of San Francisco's Dig One policy. It requires that any entity proposing construction projects in public rights-of-way for utility improvements also install conduit or other telecommunications equipment when practical and feasible. City staff will work with contractors to identify the most cost-effective approach to installing conduit to meet the city requirements and will notify and coordinate with other telecom companies to join the project.

SAN BENITO COUNTY, CA

Law: Multi-use streets policy
Date enacted: 2015
Description: San Benito County, part of the CCBC, implemented a Dig Once practice as part of its multi-use streets policy. It requires county roadway construction projects to include installation of underground utility conduit. The county, which is part of a municipal broadband network, can then use the conduit to expand the network. The county may also utilize the CCBC's shadow conduit policy, which recommends trenching digging projects include a 60-day window so other telecom or utility providers who may be interested in installing conduit at the same time may be notified. The county encourages local jurisdictions to adopt similar policies.

CHICAGO, IL

Description: The City of Chicago has created a specific office that handles coordinating construction projects across agencies and companies to minimize disruptions to the public. The Project Coordination Office, within the city's DOT, was formed in 2012 at the direction of Mayor Rahm Emanuel to coordinate projects within public rights-of-way between different service providers and utilities. In 2013, the mayor expanded the scope of the office to include telecommunications. The office has helped the city save an estimated $150 million in construction costs since 2012.

CELINA, TX

Law: Subdivision Ordinance; Division 4. Design Standards; Section 10.03.126: Improvements; Subsection 10.03.126(i)
Date enacted: 2017
Description: The city of Celina has adopted a conduit ordinance that requires any city-led or developer-led construction project that includes underground excavation to install conduit and fiber-optic cable at the same time to accommodate future telecommunications uses. Private developers must pay for the conduit installation, which then becomes the property of the city. The city also requires that telecom companies looking to install fiber make use of the city's fiber assets when available first and pay fees to the city for access to the infrastructure.

MOUNT VERNON, WA

Law: Municipal code 12.20.015 Construction standards for the regulation of use of public rights-of-way and public property.
Date enacted: 1999
Description: Mount Vernon requires private developers to install conduit when engaging in construction projects that either disturb existing roads or create new roads. The city maintains maps of conduit installations so developers can strategically place the conduit.

EL DORADO COUNTY, CA

Law: Broadband Infrastructure Installation Policy
Date enacted: 2018
Description: El Dorado County adopted a conduit installation requirement for capital improvement projects. The policy requires construction projects from the county's Department of Transportation, the Facilities Division and the Parks, Trails and Rivers Division to include installing conduit when digging trenches or excavating underground as part of the construction.

HUMBOLDT COUNTY, CA

Law: General Plan
Date enacted: 2017
Description: Humboldt county's 2017 updated general plan includes provisions to expand broadband access that include implementing Dig Once policies. The plan recommends that new residential and commercial development projects include requiring developers to install conduit within joint utility trenches for future telecommunications use. It also recommends flexibility in conduit placement requirements in order to allow for retrofitting of communications systems.

POULSBO, WA

Law: 12.02.010 Construction and development standards
Date enacted: 2003
Description: Poulsbo requires any new public street construction, by either the city or a private developer, to include the installation of conduit that can accommodate two telecom companies' fiber infrastructures. The law requires that the conduit be dedicated to the city upon completion and any telecom company looking to deploy infrastructure must first lease conduit space from the city if available.

SECTION 5: CONDUIT NETWORK SYSTEMS

A well-engineered plan will ensure the application can achieve benefits well in excess of the costs of the plan and the conduit network system deployment. Generally, the actual cost of the conduit network systems is only approximately three percent of the overall project costs. Conduit is widely used in most industries, accommodating simpler initial installations and providing a Dig Once permanent pathway.

It is common for cables to be buried in ducts to provide further protection, allowing for simple repair, and potentially providing upgrade paths. In some circumstances, ducts are only used for sections of deployment (e.g. under roads or rivers) where excavation would pose a difficulty, but increasingly ducts are being used for the entire route. This is possible because conduits can provide several benefits without a significant project cost impact.

Brief History of Conduit Network Systems

In the early to mid-1980s, tremendous growth occurred in the deployment of fiber optic cables, linking major metropolitan areas. Fiber optic cables were quickly becoming the technology of choice for streaming huge amounts of voice, video, and data. These cables were installed in very long lengths, up to 30,000 feet, with the goal of using as few splice points as possible to minimize signal attenuation. Because of the more fragile qualities of these long, thin strings of glass, individually no thicker than a strand of human hair, they needed more protection and different handling procedures than traditional jacketed metallic cables. There was an immediate need for a conduit system that offers improved installation efficiencies and cable protection.

Existing conduit network systems typically were 3.5 inches to 6 inches in diameter to accommodate the very large diameter of copper cables that filled the duct banks. As copper cables were being replaced with fiber optic cables, which are much smaller in diameter, smaller high-density polyethylene (HDPE) conduits ranging from 1 inch to 1.25 inches were pulled into the vacated conduit creating multiple pathways to be used for initial and future fiber optic cable placement and for redundancies if a cable got damaged.

This new method of deployment using MicroDucts in existing pathways was called “innerducts” and is still used today. Additionally, now conduit suppliers offer bundled MicroDucts under one oversheath for ease of placement and to maximize fiber count in limited underground and aerial spaces. Multiple variations of standard HDPE conduit and bundled HDPE MicroDucts are available. The installation methods and tools are the same for both.

In addition to traditional trenching, over the years newer installation methods also evolved to minimize the above and below ground surface damage, restoration requirements, and disruption to traffic: plowing, horizontal directional drilling (HDD), and MicroTrenching.

In 1999, new technology was introduced to help solve the issue of overcrowded right-of-ways. Using the same installation methods and tools as traditional HDPE standard conduit, bundled MicroDucts under one oversheath maximized the fiber count in the same space. As technology advances, fiber optic cables are higher capacity in a smaller size, called MicroCables, and conduits are following in size, called MicroDucts. Multiple configurations allow for easy connection to existing networks and efficient transition to current technology.

All conduit is not created equal, and the type of conduit can determine which type of fiber cable you need. Conduit has an inner diameter (ID) and an outer diameter (OD); the standard is to refer to the outer diameter when describing the conduit. A common engineering practice is to not fill each conduit subduct more than about 65 percent full of fiber cables. This space is necessary to air-jet, or pull, the fiber through the conduit without damaging the fiber.

As fiber technology continues to evolve, the fiber cable diameter will continue to get smaller. Microfiber cables can fit many strands of fiber in small diameter conduit. MicroTechnology continues to improve. For decades, conduit has been the preferred manner of installing fiber cable underground and now even in aerial applications.

Installation Advantages

It is easier to install, as it can be put in section-by-section between access points, with the fiber cable later air-assisted and pushed or pulled in as a continuous run.

It is also easier to handle unexpected changes in the route, such as having to go around an obstacle, as compared to directly placing fiber cable.

The continuous run of fiber cable can help reduce the cost of splice points and improve the fiber loss budget and performance for the total system.

The conduit itself can be locatable, which allows the fiber cable to be constructed with only non-conductive dielectric materials which can allow easier access to the fibers.

Protection of the Fiber

The conduit provides mechanical protection of the fiber cable, both during installation of the fiber cable and over the entire life of the fiber cable.

Typically, direct buried fiber cables require additional design enhancements to withstand environmental conditions, whereas the conduit can provide that environmental, tensile and crush protection itself. This enables the fiber density to increase significantly for a given outer diameter cable.

Permanent Pathways

Conduit provides for an always-present pathway for upgrades and changes whenever needed. For example:

1. Remove and change out a fiber cable that is damaged
2. Swap out with improved technology
3. Use the additional empty conduits for increasing capacity
4. Re-route the conduit pathway if there is a change in route

The Dig Once legislation stresses the importance of burying conduit once, with the possibility to add new cables, upgrade existing ones, and increasing capacity. By planning for the future by installing extra permanent pathways, the networks are able to adapt to changes more quickly.

Communication Needs

Communication needs could be for telecommunications, cameras, data transfer, security and many others.

Revenue Opportunity

There is a financial opportunity that network and right-of-way owners are realizing and planning whereby empty pathways can be used, to grant access to difficult right-of-ways or be leased to carriers.

By installing multiple MicroDucts, take full advantage of the new high-density MicroCables that fiber cable providers are shrinking and improving year over year.

It is important to realize that there are different types of conduits suited for different purposes:

- In a more traditional system, 1, 2, or 3 standard conduits could be installed together. However, the outside diameter of these conventional ducts is often quite large compared to the smaller outer diameter of MicroDucts now available. While these large dimensions, perhaps 1.5 inches or 2 inches in diameter, are still used in the industry, they were developed at a time when fiber cables were of much larger diameter with lower fiber density. Since typically only one cable is placed per duct, they actually limit the number of fiber cables that can be placed in a right-of-way.

- Smaller diameter MicroDucts are designed to take advantage of the advances the higher fiber density MicroCables that have much smaller outer diameter. Amazingly, there are 288 and 432 fiber cable diameters on the market on the order of 8 to 10mm, so by sizing the MicroDucts for better space utilization, you can achieve much greater overall fiber density in any right-of-way space.

SECTION 6: ADDED VALUE OF FIBER OPTIC SENSING OPPORTUNITIES

Distributed Acoustic Sensing in Conduit

Optical fiber sensing (FOS) interrogator companies have been installing commercial sensing system in conduit of many years. Information from several market leading companies has indicated that as approximately 50 percent of sensing systems are comprised of fiber cables installed within conduit pathways. The reasons for doing this included conduit pathways provide tremendous added protection, easier installation, flexibility for changes, repairs, and technology upgrades, as well as added capacity for additional use and monetization. When it comes to distributed acoustic sensing, however, an additional reason is that commercially sensitive systems work extremely well in conduit. FOS use is increasing in many vertical markets, with new applications and use cases growing with experience. The following presents an overview of common applications and finding relative to sensing using the advantages of conduit.

Predominant Vertical Markets

- The Security and Asset Integrity Market
- The Pipeline Market
- Emerging Smart City applications

Monitor Assets

- Manual excavation (perimeter security)
- People walking
- Traffic flow
- Leak prevention (oil and gas line)

Research Shows

- Standard telecom-grade fiber is well suited for DAS installations
- Cable design specifically engineered for FOS purposes does impact DAS performance
- For current commercial quality Fiber Optic Sensing systems, there is a negligible difference between performance of a cable in a duct and a cable not in a duct. The protection and advantage the conduit offers far outweighs any difference in signal sensitivity in most all commercial cases.
- The cable to conduit fill-ratio should be considered when selecting a conduit and cable mix, in that an overly large conduit with too much air gap may impact performance. The conduit can be sized for both easily installation through jetting or pulling into the conduit, with sensing consideration also accommodated.
- Typical cable Installed in conduit: Gel-filled, loose tube, unarmored

About Dura-Line

At Dura-Line we aspire to a more connected world, because we believe every company, every community, every person deserves the chance to advance their lives through better access to high-speed broadband. Strengthening our fiber optic network and conduit system infrastructure is critical to supporting the next wave of digitization. And, Dura-Line is at the forefront of the industry creating strategic solutions that solve the issue of the unpredictable needs of tomorrow's fiber cable requirements.

As a TL 9000 and ISO 9001 rated manufacturer, Dura-Line takes pride in our state-of-the-art quality products and being recognized a key partner with all of the major telecommunications companies across the world. In one year, Dura-Line produced over 1.4 billion feet of digital network infrastructure. Through our innovative product solutions and unparalleled customer insight, we are the ones who enable the physical build-out of this new technology realm that impacts education, healthcare, agriculture, energy, transportation, industry, and more.

SILICORE™

Several advanced manufacturing techniques set Dura-line apart as an industry-leader, including low friction SILICORE™ permanently lubricated lining. SILICORE™ is proven to reduce installation time, thus reducing installation costs.

Advantages of Dura-Line's FuturePath (multi-bundled MicroDuct conduit)

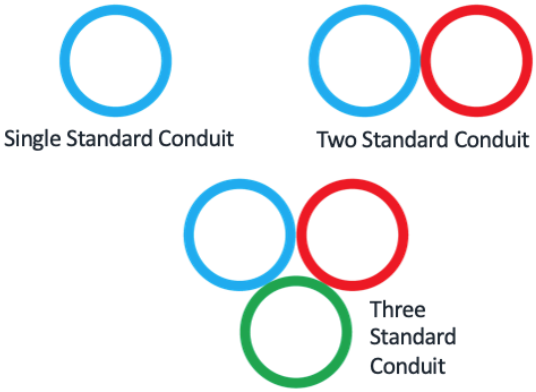
Dura-Line manufactures FuturePath, which are smaller MicroDucts are packaged together under one sheath. There are combinations of FuturePath all the way from 2-MicroDucts, under a single sheath to 24-MicroDucts under a single sheath. Other configurations have mixed sizes of MicroDucts and standard conduit to accommodate both smaller and larger diameter cables.

Dura-Line's FuturePath HDPE Product Line is Sustainable

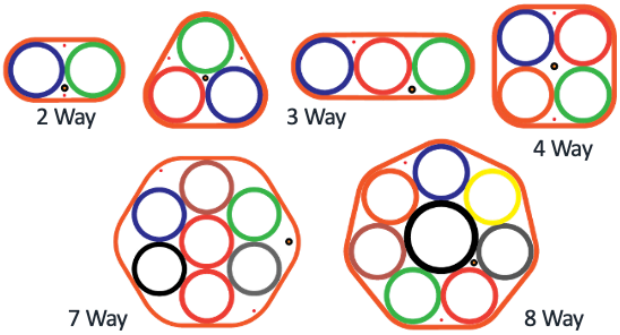
- Supports Dig Once initiatives
- Saves space in overcrowded right-of-ways
- Requires fewer and smaller handholes
- Reduces manpower and machine power for installation
- Reduces fuel consumption, gas emissions, and lower material handling requirements
- Lessens soil displacement Environmental Benefits of HDPE
- Non-leaching
- Flexible, non-rusting materials minimizes leaks common in corroded steel pathways
- Resin and pipe have a superior resistance to failure, corrosion, tuberculation, deposits, and rapid crack propagation (RCP)
- Modern manufacturing methods allow for hundreds, or even thousands, of feet of continuous extrusion, which results in fewer joints
- High performance in extreme temperatures, which greatly reduces compromised pathways Reduced transportation, handling, and installation due to quick installation with less heavy machinery which reduces fuel and labor usage as well as ground disturbance when compared with installation of steel counterparts

- Joints typically use a mechanical coupler, rather than a glue-based solvent which gives off noxious fumes
- Fewer and smaller handholes required
- Low lifecycle costs
- Useful life of HDPE is estimated at 50+ years
- Studies have shown that HDPE can withstand scratching and gouging up to 10-20 percent with no detrimental effects to the long-term performance of the pipe
- Versatility of design allows for multiple applications in several industries

Standard Conduit with a single fiber cable



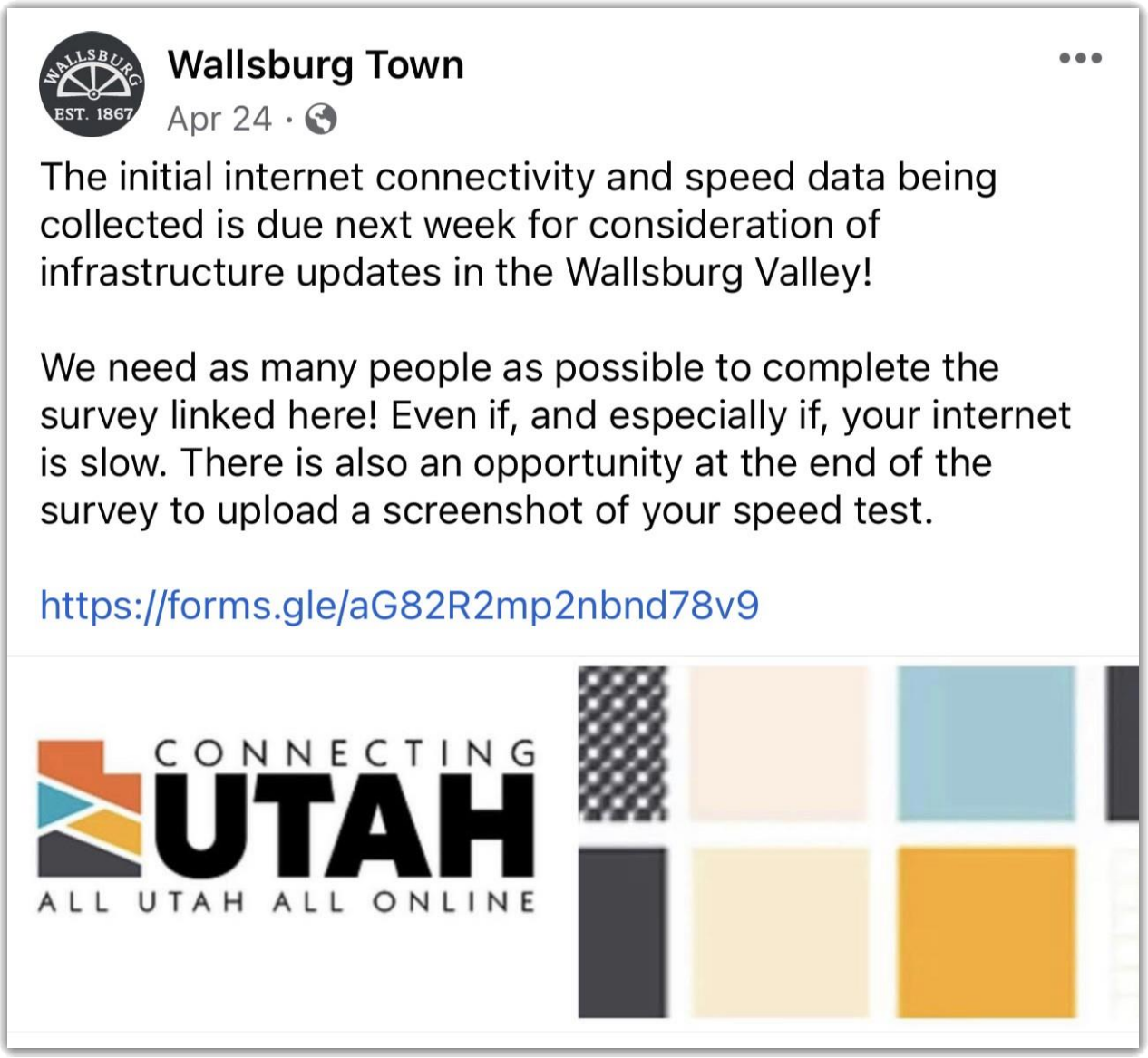
MicroDucts or FuturePath with high-density fiber cables



Appendix E: Outreach Collateral

Collateral created and distributed as part of the local broadband planning outreach is included within this appendix.


Wallsburg Town
Apr 14 ·
There is funding coming to increase high-speed internet accessibility in the Wallsburg Valley!
We need as many people as possible to complete a speed test (link below). Even if, and especially if, your internet is slow.
Please visit:
https://www.connectingutah.com/resident
To take the 60-second Utah Internet Speed Test and share what internet connectivity is like where you live by taking a quick survey!
CONNECTING UTAH
ALL UTAH ALL ONLINE
https://www.connectingutah.com/resident
If you currently have internet access, take the 60-second Utah Internet Speed Test at speedtest.utah.gov to help us map internet speeds.
The speed test results will help identify areas that lack high-speed internet connections and direct dedicated federal funding towards providing high-speed internet access where it is needed most throughout the state.
What is connectivity like where you live? Is your internet connection amazing, or do you wish it were faster or more reliable? Take this quick, five-minute survey and share your story to let us know what your connection is like and help us identify areas in Utah that need better internet connectivity.
Share Your Story and Take the Connecting Utah Resident Survey Now
Speed Test
Survey


Wallsburg Town
Apr 24 ·
The initial internet connectivity and speed data being collected is due next week for consideration of infrastructure updates in the Wallsburg Valley!
We need as many people as possible to complete the survey linked here! Even if, and especially if, your internet is slow. There is also an opportunity at the end of the survey to upload a screenshot of your speed test.
https://forms.gle/aG82R2mp2nbnd78v9
CONNECTING UTAH
ALL UTAH ALL ONLINE

Ask (Wallsburg, UT)

Wallsburg Town · May 2 ·

We are working to bring fiber internet to the Wallsburg Valley and need to supply data showing internet connectivity and speeds by this Friday!

Please complete the short survey here and pass the link along to local family and friends! https://forms.gle/aG82R2mp2nbnd78v9

Also- you may have seen these printed versions of the survey at the Post Office and Town Hall, if you took a paper copy to fill out- please return it so that your information is included! 😊