Trumbull County Connectivity Plan

Prepared by: Trumbull County Planning Commission | 12 November 2024

Acknowledgements

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Executive Summary

Trumbull County conducted the following Connectivity Plan assessment to gather the information needed to analyze, determine, and pursue the best solutions to improve broadband connectivity and affordability locally. This plan will prepare Trumbull County for the upcoming implementation of the Broadband Equity, Access, and Deployment (BEAD) and Digital Equity Act (DEA) federal funding programs.

Broadband networks are essential community assets that enhance the quality of life for residents and catalyze economic growth in the 21st century global economy. High Speed broadband internet access empowers e-commerce, remote work, online education opportunities, telehealth, entrepreneurial innovation, and more, all of which contribute to societal progress. The COVID-19 pandemic amplified the importance of having broadband with a connection that is accessible, affordable, and reliable.

This plan identifies three main needs, including the extension of broadband infrastructure to underserved and unserved areas, improvement of affordability programs, and increase of digital literacy within the community. These actions can be advanced by collaborating with ISPs to expand coverage, creating public Wi-Fi hotspots, and increased support for targeted digital literacy programs. However, these goals require financial support beyond what the county alone can fund, thus the importance of being prepared to leverage current and emerging programs.

Carrying out the suggested infrastructure would bring numerous benefits for residents, businesses, and anchor institutions, such as improved access to telehealth services, enhanced support for online learning, and increased economic opportunities through improved internet connectivity.

Furthermore, Trumbull County is dedicated to achieving digital equity. To this end, the plan includes specific recommendations such as increasing affordable device distribution programs, setting up community technology hubs through strategic partnerships, and working with ISPs to create affordable internet plans for low-to-moderate income households.

A competitive broadband market in Trumbull County can ultimately lead to a more connected and technologically advanced society. We would like to thank Oak Hill Collaborative, Trumbull County Trustees Association, Trumbull Community Action Partnership (TCAP), Trumbull Metropolitan Housing Authority (TMHA), Eastgate Regional Council of Governments, local ISPs, and all other stakeholders for their guidance, assistance, and support in the development of this plan.

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Trumbull County Courthouse | Warren, Ohio

Section 1

Preliminary Research & Readiness

Section 1. Preliminary Research and Readiness

A. Geographic and Demographic Profile

General Community Demographic Information

Trumbull County utilized demographic data from the State of Ohio, Census, American Community Survey, statistically significant community surveys, etc. to obtain the following information:

Demographic	Demographic Data
Total Population Number	201,749
Square Miles Covered	618.1
Number of People per Square Mile	326.8
Number of Residents Who Identify as White	184,444
Total Minority	25,868
Number of Residents Who Identify as Black	18,718
Number of Residents Who Identify as Hispanic or Latino	5,047
Number of Residents Who Identify as Indigenous	631
Number of Residents Who Identify as Other	1,472
Total Number of Households	96,163
Number of Households That Are Owner Occupied	68,180
Average Household Size	2.33
Mean Household Income	69,852
Median Household Income	53,537
Mean Family Income	82,116
Median Family Income	66,094
Per Capita Income	37,045
Number of People Living Below the Poverty Line	32,365
Number of Low to Moderate Income Residents	202,265

Observations

Below is a table of social determinants to consider when observing a service area and they can vary significantly from one community to another. Addressing these determinants is crucial for promoting equity and improving the overall well-being of historically marginalized or underinvested communities.

SOCIAL DETERMINANT	DESCRIPTION
Economic Factors	
Income Inequality	Significant disparities in income distribution; Gini index at 0.4544 based on U.S. Census ACS data, indicating high inequality and even higher within the City of Warren at 0.5017.
Unemployment Rate	Unemployment rate has fluctuated, reaching 5.4% in January 2024 and 6.2% in June 2024, with higher rates among minority groups.
Poverty Levels	About 17.1% of the population lives below the poverty line, with urban areas like Warren and Niles being more affected.
Lack of Economic Opportunities	Limited access to quality jobs, education, and career advancement, especially in rural and underserved urban areas.
Economic Mobility	Intergenerational mobility is low, with significant barriers for low-income families to improve their economic status.
Access to Capital	Limited access to financial resources and credit for small businesses and entrepreneurs, particularly in disadvantaged neighborhoods.

Education	
Educational Attainment	Low levels of educational attainment; high school graduation rate is around 90.8%, with high dropout rates in certain areas.
School Funding	Insufficient funding for schools, leading to disparities in educational quality and resources between districts.
Access to Quality Education	Limited access to quality schools and educational resources, especially in low-income and rural areas.
Healthcare	
Healthcare Access	Limited access to healthcare facilities and services, particularly in rural areas.
Health Disparities	Higher rates of chronic illnesses such as diabetes and heart disease among minority populations.
Food Deserts	Several areas are classified as food deserts, lacking access to fresh and nutritious food options.
Housing	
Affordable Housing	A shortage of affordable and safe housing options, with a significant portion of income spent on housing costs.
Housing Segregation	Historical and ongoing segregation in housing patterns, leading to unequal access to resources.
Homeownership	Low rates of homeownership, with a significant proportion of the population living in rental housing, specifically in urban areas and qualified census tracts.

Housing Quality	Many housing units are in poor condition and lack energy efficiency.
Criminal Justice	
Criminalization of Poverty	Laws and practices that disproportionately penalize poverty-related issues, such as minor infractions and fines.
Community Policing	Lack of effective community policing strategies, contributing to mistrust between law enforcement and residents.
Infrastructure and Environment	
Infrastructure Investment	Lack of investment in infrastructure, including roads, public transit, and digital connectivity, hindering economic growth.
Environmental Hazards	Presence of environmental hazards such as industrial pollution, affecting health and quality of life.
Transportation Access	Limited access to affordable and reliable transportation options, impacting mobility and access to jobs and services.
Digital Infrastructure	Poor broadband access in rural areas, impacting education and economic opportunities.

Social Support	
Community Resources	Limited access to social services and support networks, particularly for vulnerable populations.
Social Capital	Weakened social bonds and trust within the community, reducing collective efficacy and resilience.
Discrimination	Experiences of discrimination and bias, particularly against racial and ethnic minorities, limiting social and economic mobility.
Civic Engagement	Low voter participation and civic involvement, weakening community advocacy and political influence.

References

- United States Census Bureau, ACS
- Data USA: Trumbull County, OH Data USA
- FRED: Federal Reserve Bank of St. Louis FRED
- U.S. Bureau of Labor Statistics BLS
- Equitable Growth Equitable Growth
- Opportunity Insights Opportunity Insights

Based on social determinants, geographic, and demographic information of the Trumbull County, the following observations can be made:

Economic Mobility

Economic mobility is essential for the long-term development of any community. In Trumbull County, the limited intergenerational mobility poses significant challenges to economic growth and equality. Studies indicate that children from low-income families in underprivileged neighborhoods face restricted opportunities to enhance their economic standing as adults. This cycle of poverty and hinders overall progress within the community (Equitable Growth) (Opportunity Insights).

Healthcare Access and Health Disparities

Limited access to healthcare—stemming from a shortage of providers, insufficient appointment availability, and lack of health insurance—poses a significant challenge to community health. Uninsured individuals often delay seeking care due to costs, which leads to a greater likelihood of not having a regular source of care, forgoing necessary treatments, and postponing prescriptions. This can worsen health conditions and increase overall treatment costs. Recent estimates show that nearly 30% of the population in both counties is insured through public health programs, which is slightly higher than the averages for peer counties and the state. Furthermore, Trumbull County has a larger proportion of residents enrolled in Medicaid and Medicare compared to its peer counties. (Trumbull County Community Health Report)

Affordable Housing and Housing Stability

A shortage of affordable housing significantly contributes to housing instability in Trumbull County. Many residents- nearly one in four (24.1%) spend a significant portion of their income (30% or more) on housing, leaving little for other essential needs. Ensuring access to safe, affordable housing is essential for improving quality of life and economic stability. (FRED St. Louis Fed) (FRED St. Louis Fed).

Community Income Data that Supports Eligibility for Federal Funds (e.g. CRA eligibility)

According to the Federal Reserve Bank of Dallas' report, "*Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements*", the Community Reinvestment Act (CRA) is a law that encourages banks to make loans and investments and provide services to low- and moderate-income (LMI) communities. The report notes that each year, the CRA catalyzes more than $100 billion in capital to LMI communities throughout the United States and provides an opportunity to help address the digital divide.

As recommended in the report, Trumbull County identified the following additional demographic data to assist in determining eligibility for CRA investment:

Deposit Market Share

Local Banks' Market Share: Community banks and credit unions are crucial in serving low- and moderate-income (LMI) communities in Trumbull County, showcasing strong potential for Community Reinvestment Act (CRA) investments.

Home Mortgage Disclosure Act (HMDA) Market Share

Mortgage Lending: Recent HMDA data shows a significant portion of mortgage applications in Trumbull County come from LMI borrowers, highlighting the need for affordable housing financing and CRA-eligible products.

CRA Small-Business/Small-Farm Share

Small Business Lending: Small businesses in underserved areas benefit from CRA lending, with robust demand for loans emphasizing the need for ongoing support.

Applicable Opportunity Zone IDs

Opportunity Zones: Designated Opportunity Zones along the Mahoning River present strategic investment opportunities, offering tax incentives that can spur economic development and job creation.

Identified Needs

- **Affordable Housing:** There is a critical shortage of safe, affordable housing. CRA investments can help fund new construction and rehabilitation efforts.
- **Economic Development:** Investments in infrastructure, small businesses, and job training are essential for improving living standards in LMI communities.
- **Healthcare Access:** Limited healthcare access in rural Trumbull County signals a need for CRA investments in health facilities to enhance community health outcomes.
- **Digital Inclusion:** Addressing the digital divide through CRA-eligible investments in broadband and digital literacy can significantly improve opportunities for LMI residents.

References

- Federal Reserve Bank of Dallas, "Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements"
- Opportunity Insights, "Mobility Report Cards: Income Segregation and Intergenerational Mobility Across Colleges in the United States" Opportunity Insights

Documented Presence of Covered Populations

Specific to both the Digital Equity and Broadband Equity, Access, and Deployment (BEAD) programs, Trumbull County has identified the following impact to covered populations, as defined in the Infrastructure Investment and Jobs Act (IIJA), as a result of the proposed project(s):

Covered Population	Presence in Trumbull County (Scale 1 to 5, i.e. 1 = Low)	Potential Impact (i.e., Low, Moderate, High)
Individuals who live in covered households	4	High
Aging individuals	5	High
Incarcerated individuals, other than individuals who are incarcerated in a Federal correctional facility	3	Moderate
Veterans	3	Moderate
Individuals with disabilities	3	Moderate
Individuals with a language barrier	1	Low
Individuals who are English learners	2	Low
Those with low levels of literacy	4	High
Individuals who are members of a racial or ethnic minority group	4	High
Individuals who primarily reside in a rural area	4	High

In general, Trumbull County's proposed project(s) will create a high impact on disabilities, members of racial or ethnic minority groups, and those residing in rural areas by **improving access to high-speed internet, enhancing educational and employment opportunities, and reducing social isolation**. Additionally, **the county would see moderate impacts on aging individuals, incarcerated individuals, and those with low levels of literacy**. The project aims to bridge the digital divide, offering better connectivity that can improve access to healthcare, educational resources, and economic opportunities. Trumbull County will continue to engage and seek feedback and participation from the covered populations with the greatest impact to ensure that the proposed project creates positive and measurable outcomes.

General Community Economic and Workforce Status

Trumbull County utilized additional data resources from the U.S. Census[1] and Appalachian Regional Commission[2] to further identify current and past economic drivers.

Based on the data from the U.S. Census regarding Persistent Poverty Areas in the United States, the following observations were made:

- **High Poverty Rates**: Certain areas within Trumbull County, particularly urban centers like Warren and Niles, have consistently high poverty rates, affecting economic growth and stability.
- **Limited Economic Opportunities**: Persistent poverty is linked to limited economic opportunities, with few high-quality jobs available, particularly in rural areas.
- **Education and Skills Gap**: There is a notable gap in educational attainment and workforce skills, which hampers economic development and reduces employability in emerging sectors.

Data made available from the Appalachian Regional Commission regarding Economic Distress in Appalachian counties indicates that:

- **Economic Decline**: Trumbull County has experienced economic decline due to the reduction in population and manufacturing jobs, historically a significant economic driver.
- **Unemployment and Underemployment**: High rates of unemployment and underemployment persist, with many residents working in low-wage or part-time jobs.
- **Infrastructure Deficits**: Deficiencies in infrastructure, including transportation and digital connectivity, limit economic growth and access to opportunities.

[1] https://www.census.gov/library/stories/2023/05/persistent-poverty-areas-with-long-term-high-poverty.html
[2] https://www.arc.gov/classifying-economic-distress-in-appalachian-counties/

References

●U.S. Census Bureau: Persistent Poverty in the United States U.S. Census
● Appalachian Regional Commission: Economic Distress in Appalachian Counties ARC
● Federal Reserve Bank of Dallas: Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements Dallas Fed

B. State Data

Previous Broadband Studies

Broadband Plan/Study Name	***Date Completed***	***Relation to [Community Name]'s Proposed Project***
Trumbull County Broadband Preliminary Engineering Study	November 2023	Engineering analysis for 4 communities within Trumbull County to complete a loop and middle mile to connect to the backbone network
Regional Middle Mile Backbone Network	July 2023	Feasibility and Engineering Study for a middle mile network in eastern Ohio
Eastgate Broadband Feasibility Study	June 2021	Broadband Study in 3 Counties in Ohio, including Trumbull.

Identify and Document State Priorities

According to the State of Ohio's BEAD Five-Year Action Plan, the following priorities are being implemented:

Priority	Description
Invest in deploying last-mile broadband infrastructure	Bring reliable, affordable, high-speed internet to all via a competitive grant process.
Expand middle-mile network to facilitate last-mile deployment	Extend the reach of Ohio's network through unserved areas of the state to facilitate last-mile deployment, increase competition, and improve affordability.
Connect community anchor institutions to serve as digital hubs	Empower Community Anchor Institutions (CAIs) as local hubs for connectivity, digital inclusion, and innovation through access to gigabit symmetrical service.
Improve broadband affordability	Provide a low-cost broadband service option and a middle-class affordability plan to improve broadband affordability across the state.
Ensure universal coverage	Prioritize broadband deployment in unserved and underserved locations, followed by community anchor institutions, ensuring universal coverage across the state by the end of the BEAD process, funding allocations permitting.
Prioritize fiber projects	Prioritize end-to-end fiber projects while selectively using non-fiber options where the cost of fiber deployment is extremely high.

Workforce readiness and labor standards	Implement workforce readiness initiatives and adhere to labor standards and protections to ensure a skilled workforce for broadband deployment projects.
Local coordination and stakeholder engagement	Engage local governments, community organizations, and other stakeholders in the planning and implementation of broadband projects to ensure local needs and priorities are met.

These priorities align with the strategic objectives outlined in the BEAD program's requirements and aim to address the digital divide, promote digital inclusion, and enhance economic opportunities through improved broadband infrastructure and services.

For further details and specific examples, refer to the sources provided:

- Ohio BEAD Initial Proposal Volume I
- Ohio BEAD Initial Proposal Volume II

Additionally, the State's BEAD Five-Year Action Plan further describes how broadband connectivity impacts the following:

Workforce Development	Ohio's BEAD Plan emphasizes enhancing workforce development by providing access to online training, job resources, and remote work opportunities. The plan highlights initiatives such as job training centers and partnerships with educational institutions to equip the workforce with necessary digital skills. Workforce readiness initiatives include collaboration with qualified apprenticeship programs and the 5G and Broadband Sector Partnership to ensure a skilled workforce for broadband projects.
Economic Development	Broadband connectivity is a cornerstone of Ohio's economic development strategy. The BEAD Plan underscores the importance of high-speed internet in attracting businesses, fostering innovation, and supporting SMEs. By expanding broadband infrastructure in unserved and underserved areas, Ohio aims to create economic opportunities, improve competitiveness, and support local economies through increased digital engagement and entrepreneurship.

Aging in Place	The BEAD Plan addresses the needs of aging populations by promoting telehealth services and digital inclusion programs tailored for seniors. Access to reliable broadband enables older adults to receive medical care remotely, participate in online communities, and maintain social connections, which are crucial for their well-being. The plan includes initiatives to connect senior centers and provide digital literacy training to enhance the quality of life for elderly residents.
Educational Attainment	Educational attainment is significantly impacted by broadband access, as outlined in Ohio's BEAD Plan. The plan supports connecting K-12 schools, libraries, and higher education institutions with high-speed internet to facilitate e-learning and digital resources. It also focuses on ensuring that all students, regardless of their location, have equitable access to educational opportunities through robust broadband infrastructure and support for digital literacy programs.

Method for Determining Eligibility

The State of Ohio's BEAD Initial Proposal Volume 1 describes the process being undertaken to identify eligible locations for funding, as shown below:

1. **Identification of Existing Broadband Funding (Requirement 3)**

   The State identified the existing broadband funding allocated within Ohio, including sources of funding, description of the funded activities, total funding, amount expended, and remaining funding available. This step ensures that locations with existing broadband funding are not eligible to receive BEAD funding.

2. **Identification of Unserved and Underserved Locations (Requirement 5)**

   The State defined unserved locations as those with service below 25 Megabits per second (Mbps) download and 3 Mbps upload speeds. Underserved locations are defined as those with service below 100 Mbps download and 20 Mbps upload speeds. This identification utilized FCC National Broadband Map data collected through the Broadband Data Collection process, with data as of December 31, 2022.

3. **Identification of Community Anchor Institutions (Requirement 6)**

   The State identified the types of Community Anchor Institutions (CAIs) eligible to receive BEAD funding, including schools, libraries, public safety entities, public

housing, health clinics, higher education institutions, and community support organizations.

4. **Adoption of the BEAD Model Challenge Process (Requirement 7)**

   The State confirmed that it would adopt the NTIA's BEAD Model Challenge process. This process allows for all identified eligible locations to be reviewed and challenged ahead of the BEAD Subgrantee selection process. Following the completion of the BEAD Challenge process, the State may modify the eligibility of certain locations based on enforceable commitments, planned service deployments, and allow for a rebuttal phase before making its final determination.

Summary of the State Digital Equity Priorities

According to the State of Ohio's BEAD Five-Year Action Plan and Digital Equity Plan, the following priorities are being implemented across both the BEAD and Digital Equity Act programs:

Priority	Description	Mitigation Approach
Bring reliable, affordable, high-speed internet to all, in their homes and communities	**The aim is to ensure that all residents have access to affordable and high-speed internet, regardless of their location.**	Utilize a competitive grant process to fund infrastructure projects in unserved and underserved areas, improve affordability through low-cost service options, and develop middle-class affordability plans.
Promote the creation of world-class broadband networks throughout the state via the use of best-in-class technologies	**Deploy end-to-end fiber projects and selectively use non-fiber technologies where fiber deployment costs are prohibitively high.**	Prioritize projects designed to provide fiber connectivity directly to the end-user, ensuring the deployment of future-proof broadband infrastructure.

Enable participation in the modern economy	**Facilitate online job training, remote work opportunities, and access to digital resources to support economic growth and workforce development.**	Implement workforce readiness initiatives in collaboration with apprenticeship programs and local economic development organizations, ensuring residents have the digital skills needed for the modern economy.
Empower Ohio through training, device access, and digital skills	**Provide training, devices, and digital skills education to bridge the digital divide and promote digital inclusion.**	Partner with educational institutions, libraries, and community organizations to offer digital literacy programs and ensure access to devices and high-speed internet for all residents.
Connect Community Anchor Institutions (CAIs) as digital hubs	**Enable CAIs to serve as local hubs for connectivity, digital inclusion, and innovation.**	Ensure CAIs have access to gigabit symmetrical service and support their role in providing digital literacy training and access to digital resources for the community.

C. Applicant Grant Readiness

Trumbull County has obtained the following federal registrations and information, as required to apply federal funding programs:

- Assigned and active Federal Tax ID: ***COMPLETED***
- Assigned and active Unique Entity Identification (UEI) number: ***COMPLETED***
- Completed entity registration in SAM.gov: ***COMPLETED***

D. Current Internet Adoption and Use

This section aims to provide Trumbull County with a diagnosis of the current health of broadband infrastructure and services in the community. The results of this Connectivity Plan

will enable Trumbull County to strategically target and prioritize areas in order to bridge the digital divide and offer equitable broadband opportunities to all residents and businesses, while minimizing risk and amplifying the likelihood of success.

Data analyzed by the Trumbull County include, but were not limited to:

- Availability
    - **FCC Broadband Data Collection**: Internet availability data obtained from the FCC's Broadband Data Collection files provide a comprehensive view of broadband service availability across the county.
    - **State/Local Mapping Initiatives**: Trumbull County utilized state and local mapping projects that detail the geographic distribution of internet services, identifying areas with limited or no broadband access.
- Affordability
    - **NDIA Free & Low-Cost Plans List**: Data from the National Digital Inclusion Alliance (NDIA) on available free and low-cost internet plans, which helps identify affordable options for residents.
- Adoption
    - **American Community Survey (ACS)**: Internet adoption data derived from the 1-year and 5-year estimates provided by the U.S. Census Bureau's American Community Survey, which includes detailed statistics on household internet usage.
    - **FCC Internet Access Services Reports**: Reports from the FCC that provide insights into the adoption rates of various internet services across different demographics and geographies.
    - **EBB/ACP Enrollment Data**: Enrollment figures from the Emergency Broadband Benefit (EBB) and Affordable Connectivity Program (ACP), which indicate the number of households participating in these subsidy programs.
    - **State/Local Surveys**: Additional data from surveys conducted by the state or local authorities to measure internet adoption rates among residents.

Currently Available Internet Services

The inventory of existing fiber networks in Trumbull County includes networks owned by various entities, including private ISPs and public initiatives. Key sources for this data include:

- **Eastgate Lake to River Broadband Implementation Plan**: This document details the existing fiber infrastructure along the SR-11 corridor, noting that the network is owned by

a combination of local governments and private ISPs. The plan highlights key fiber routes and their potential availability for use by other providers.

- **Warren/Niles/Howland Engineering Analysis:** Three communities partnered to look at extending existing fiber to close a loop started by Niles and connect to smaller ISPs in Warren and reach back to SR-11 and potentially connect to the planned Lake to River above.
- **Local ISPs**: Major providers such as Spectrum, AT&T, and Armstrong have significant fiber networks in the area, with AT&T and Spectrum often allowing for leased access to their fiber lines under specific conditions.

Overview of Current Broadband Providers' Services, Pricing Strategies, and Coverage Areas

The main broadband providers in Trumbull County include Spectrum, AT&T, Armstrong, and various smaller regional providers. Their services, pricing strategies, and coverage areas are as follows:

- **Spectrum:** Offers cable internet services with speeds up to 1 Gbps. Pricing ranges from $49.99 to $109.99 per month, depending on the speed tier and bundled services. Spectrum offers speeds up to 1 Gbps for residential customers, with business plans

Offering similar speeds

- **AT&T:** Provides DSL and fiber services. Fiber plans offer speeds up to 1 Gbps, with pricing starting at $35 per month for the first year, increasing thereafter. DSL services offer lower speeds and are more widely available in rural areas. Fiber services offer speeds up to 1 Gbps, while DSL services range from 25 to 100 Mbps depending on the location.

- **Armstrong:** Offers cable internet with speeds up to 500 Mbps, with pricing from $44.95 to $119.95 per month. Armstrong also provides a range of bundled services. Provides speeds up to 500 Mbps, with higher speeds available for business customers.

- **Smaller Providers**: Include regional companies like Comcast Business and various wireless ISPs that offer niche services in less densely populated areas. Smaller ISPs and wireless providers offer a range of speeds, typically from 10 Mbps to 100 Mbps, catering to more rural or specific customer needs.

    - **Windstream**: Offers DSL and fiber services with speeds up to 1 Gbps. Pricing starts around $44.99/month for DSL and $39.99/month for fiber. Windstream also provides bundled services including internet, phone, and TV.

    - **HughesNet:** Offers satellite internet with speeds up to 25 Mbps. Pricing starts at $59.99/month. HughesNet is available in 100% of adjacent Mahoning County and portions of Trumbull County.

- **Agile Networks:** Provides fixed wireless internet with speeds up to 25 Mbps. Pricing varies. Agile Networks has limited availability, covering around 7.5% of the area.

- **T-Mobile 5G Home Internet:** Provides 5G internet with speeds between 33 and 245 Mbps. Pricing starts at $50/month with AutoPay. T-Mobile covers around 37.1% of the area.

Investment and Deployment Plans of Incumbent Providers

Investment and deployment plans for the major ISPs include:

- **Spectrum**: Ongoing investments in expanding their fiber network and upgrading existing infrastructure to DOCSIS 3.1, enabling higher speeds and better service reliability.

- **AT&T**: Focused on expanding their fiber footprint, particularly in suburban and urban areas of Trumbull County. They also plan to phase out older DSL services in favor of fiber.

- **Armstrong**: Investing in network upgrades to increase capacity and improve service quality. Plans include expanding coverage in underserved areas through public-private partnerships.

Locations of Existing Fiber and Broadband-Related Electronics

The locations of existing fiber and broadband-related electronics include:

- **Eastgate Implementation Plan**: Identifies key fiber routes along SR-11, detailing connection points, meet-me locations, and other critical infrastructure. This includes fiber running through major commercial corridors and connecting community anchor institutions.

- **Local Government Data**: Mapping data from local government sources show fiber routes owned by the county and municipalities, which often align with major roads and public facilities like schools and libraries.

- **ISP Network Maps**: Provider-specific maps from companies like Spectrum and AT&T highlight their fiber routes, central offices, and major nodes.

- **Private Database**: Geotel database providing detailed fiber maps, cell towers, lit buildings and network nodes

Data Sources and Purpose:				
Source Name	**Source Type**	**Source Description**	**Data Collected & Analyzed**	**Purpose**
Federal Communications Commission (FCC)	Public	Federal Agency responsible for implementing and enforcing America's communications law and regulations (Federal Communications Commission (2022). About the FCC. Available at: https://bdc.fcc.gov)	BDC Reporting System	Determine broadband incumbents and technology penetration
BroadbandNow & BroadbandSearch	Private	Online databases of internet service options available in a given area (BroadbandNow (2022). About BroadbandNow's Team. Available at: https://broadbandnow.com/about; Broadbandsearch (2022). About. Available at: https://www.broadbandsearch.net/about)	Advertised internet service offerings including providers, speed, price and technologies	Determine broadband speed and corresponding price
FiberLocator	Private	Online telecommunications database of fiber infrastructure (FiberLocator (2022). Resources: Available at: https://www.fiberlocator.com/	Existing fiber infrastructure in the County	Define metro fiber networks (regional level - middle mile; local level - last mile) to evaluate network redundancy. Define long haul fiber networks (national level) to be leveraged by the County to connect middle mile

Truth on the Ground

The FCC Broadband Deployment Data identifies the following ISPs in Trumbull County with the corresponding broadband technology and speeds they are currently providing.

According to this data, there are currently several broadband technologies deployed in Trumbull County for both residential and business purposes. These technologies can be categorized as follows:

1. **Wired Broadband**: Asymmetric DSL, Cable, and Fiber
   Spectrum: Cable with speeds up to 1 Gbps
   - **AT&T**: Fiber with speeds up to 5 Gbps, DSL with speeds varying by location and plan
   - **Armstrong**: Cable with speeds up to 500 Mbps
2. **Satellite Broadband**:
   - **HughesNet**: Satellite with speeds up to 25 Mbps
   - **Viasat**: Satellite with speeds up to 150 Mbps

3. **Fixed Wireless Broadband**:
    - **Various smaller ISPs**: Fixed Wireless with speeds typically up to 50 Mbps

ISP Name	Technology Available	Cost
Spectrum	Cable	$49.99 - $109.99 per month
AT&T	Fiber, DSL	Fbier $35+ per Month, DSL Varies by plan
Armstrong	Cable	$44.95 - $119.95 per month
Verizon	Fixed Wireless, 5G Home	Fixed: $40 - $100 per month, 5G Home: $50 per month
HughesNet	Satellite	$59.99 - $150 per month
Viasat	Satellite	$70 - $200 per month
Various small ISPs	Fixed Wireless	$40 - $120 per month

All providers offer broadband speeds equal to or higher than 100 Mbps download and equal to or higher than 20 Mbps upload in the county.

Internet Affordability

Trumbull County also collected broadband usage data from the ACS 5 Year Estimates specific to the community, which illustrates the overall profile of internet affordability and adoption percentages:

Internet/Usage Statistic	Number/Percentage per Household
Number of Total Households	87,955
Percentage of Households with Broadband of Any Kind	88%
Percentage of Households without a Device	13%
Percentage of Households with a Desktop or Laptop Computer	92%

Observations

Based on the internet usage and median household income information of Trumbull County, the following observations can be made:

- **Device Usage**: A high percentage of households (92%) own a desktop or laptop computer, and only 13% of household void of any devices. This suggests strong digital device penetration in the community. However, this warrants additional consideration of any commonalities amongst the groups represented in the 13% of households without devices.

- **Significant Broadband Access**: A strong majority of households (88%) report having access to Broadband, which means that the possibility of Trumbull County completing the concerns around access is reachable, if not easily achieved.

Statement of Connectivity Need

The following broadband speed map is based on the FCC Broadband Deployment data representing the highest ISP-reported speed by carrier and the top technology.

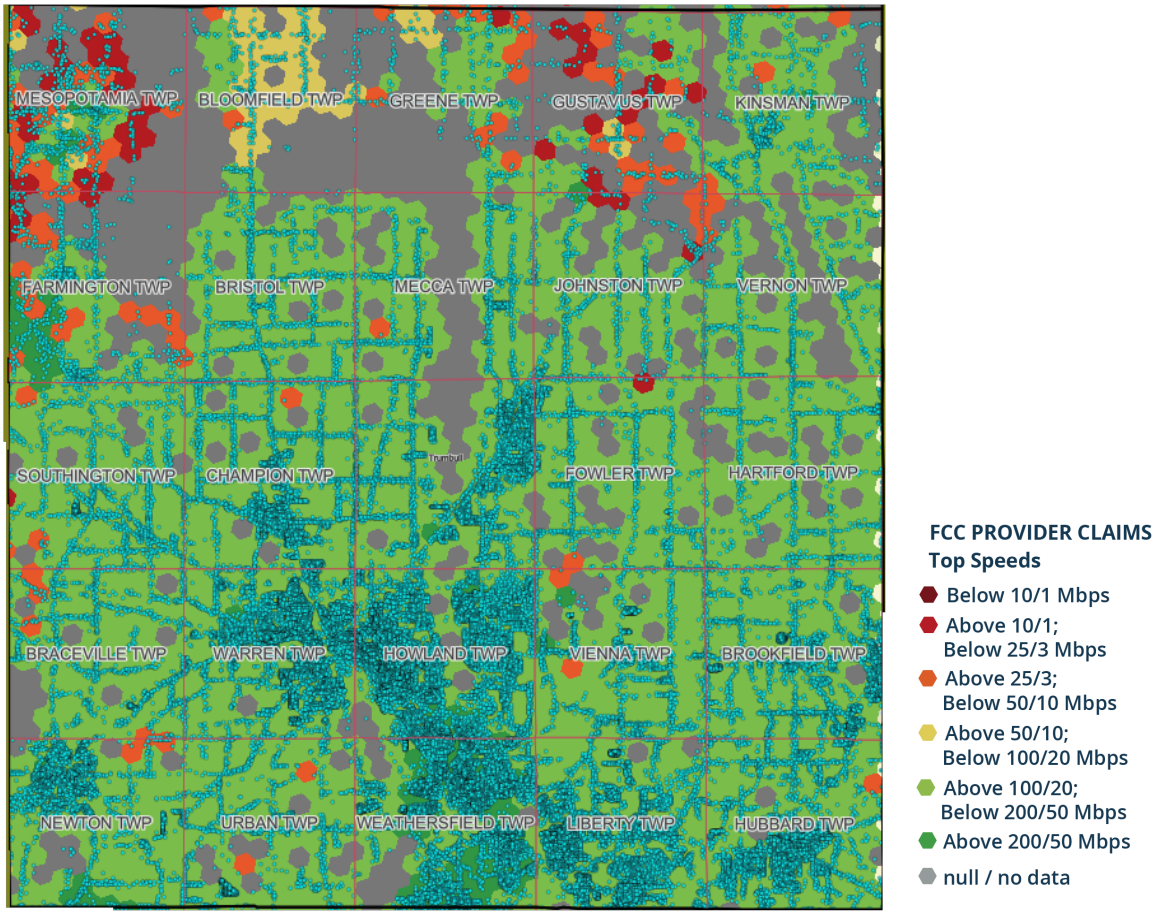


Figure 1: FCC Provider Claimed speeds based on version 3.1 of the Fabric (7/21/23)

Carrier overstatements of coverage remain a significant issue across America. In Trumbull County, for example, FCC maps show 88,816 locations claimed as “served” based on version 3.1 of the fabric which was released in July of 2023 making them ineligible for some federal funding programs (Figure 1).

According to carrier reports, the predominant technology delivering the highest speed in Trumbull County is cable/modem, with fiber being prevalent only in high-density urban centers (Figure 2). Cable TV-based internet services have good download capacity, with many providers offering 1 Gbps and 2 Gbps packages; however, upload capacity can be a problem. Even the fastest cable download packages can struggle to exceed 10 Mbps upload. Thus, areas with existing cable infrastructure may meet current download demand, but the technology will increasingly show its limitations as video conferencing and virtual reality sessions become more common this technology will no longer meet the demands of a digital society.

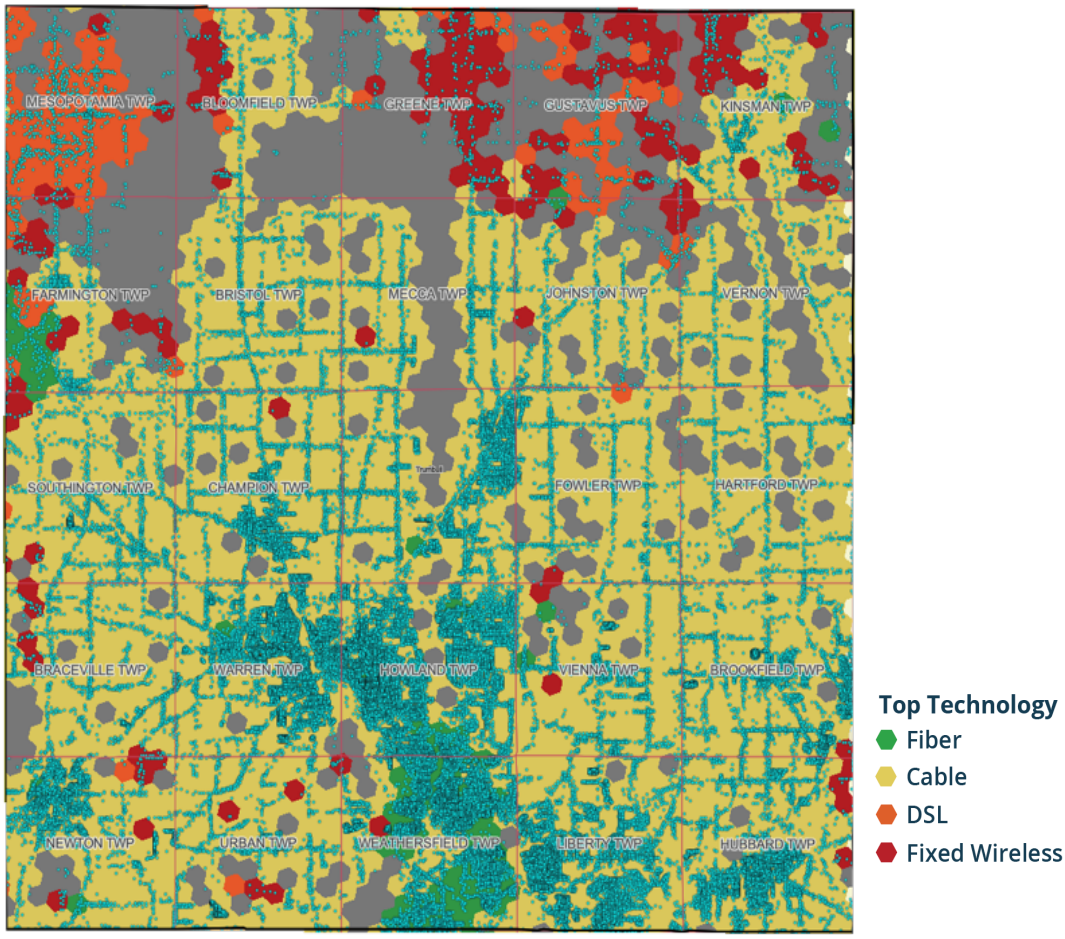


Figure 2: Top Technology based on FCC provider claims

Fiber optic cabling is the only technology available today that is capable of meeting the 100 Gbps speed threshold predicted for 2055. In fact, 10 Gbps fiber-to-the-home deployments are becoming increasingly common in affluent communities. Fiber does have significant up-front

capital costs, but those costs are balanced by low ongoing maintenance and excellent longevity. Researchers have yet to discover an upper speed limit for fiber, meaning that high-quality fiber installed today can support ever-increasing speeds simply by replacing the electronics on each end of that cable.

Fiber optic cable currently is one of the longest lasting solutions for broadband delivery. The cable itself can be expected to last upwards of 30 to 40 years, and its speed is limited only by the electronics attached at each end. As electronics improve, an existing fiber network can be repeatedly upgraded simply by replacing those electronics. This is significantly less expensive than replacing or upgrading other forms of cable infrastructure.

Soybean Farm | Mesopotamia, Ohio

Section 2

Digital Equity

Section 2. Digital Equity

A. Introduction and Vision for Digital Equity

In Trumbull County, Ohio, the pursuit of digital equity is vital for fostering inclusive growth and ensuring that all residents have access to the opportunities afforded by high-speed internet. In the last 3 years, several agencies—including the Eastgate Regional Council of Governments—have conducted assessments to evaluate the state of broadband access in the region. These assessments have revealed critical gaps in connectivity, with the Eastgate Study indicating that 19% of homes in Trumbull County lack internet access. This statistic underscores the urgent need for targeted interventions to address these disparities and ensure that all residents can participate fully in an increasingly digital world.
The region faces significant challenges regarding broadband availability, affordability, and infrastructure development. This study, along with the 2022 Community Health Report and on the ground efforts by the Trumbull County Planning Commission, highlight the urgent need for a comprehensive approach to expand broadband access—especially in low-population and low-income areas—to bridge the digital divide.

We see the need for a comprehensive approach in three separate but expansive steps. The very first, of course, is addressing the basic need for access. It is difficult to have a conversation about digital equity in a region that doesn't first address the need for access. However, while much of this plan focuses on equitable access to all Trumbull County residents, we recognized the benefit of designing a digital equity infrastructure from the ground up.

When access is being addressed through cooperative builds with ISP partners, our county team can focus on the second step – working with schools and libraries to ensure that the digital navigation facilitators and tools are in place to support a county-wide community that is ready to engage with the technological access that is being provided. This will rely heavily on our robust public library system, where the original community digital navigators can be found, to help assess needs and capabilities. A SWOT analysis of stakeholders within the county could be informed by surveys, listening sessions, and workshops.

Finally, as access and digital literacy are addressed, a shift to concentrating on affordability and device access logically follows. Assessing the needs and capabilities of each household will help to diagnose what devices are appropriate and affordable to everyone. The importance of assessing the type of device best suited to a household takes into consideration the digital literacy of the inhabitants, their intended usage, futureproofing for the expanded use that may come through access, the cost outlay – both initial and overtime – and the potential return on investment. The needs of a home where on-line education, telemedicine, and/or telecommuting takes place are very different – but no less important – from those where the primary function of access is for recreational uses such as streaming television, online gaming and video chats. Understanding the needs of our communities, paired with the socioeconomic capacity, will inform how the county as a whole can best support citizen's lived experience with Digital Equity.

Areas with lower population density, experience notably lower broadband availability and a lack of choice among providers. This limited competition not only restricts access to high-speed internet but also drives up costs, making it difficult for residents to afford reliable service. By prioritizing a focus on “access” now as we prepare for the availability of BEAD funds, Trumbull County can empower its communities, enhance educational and economic opportunities, and improve overall quality of life for its residents. Addressing these challenges is not just about technology; it is about creating a more equitable future for all.

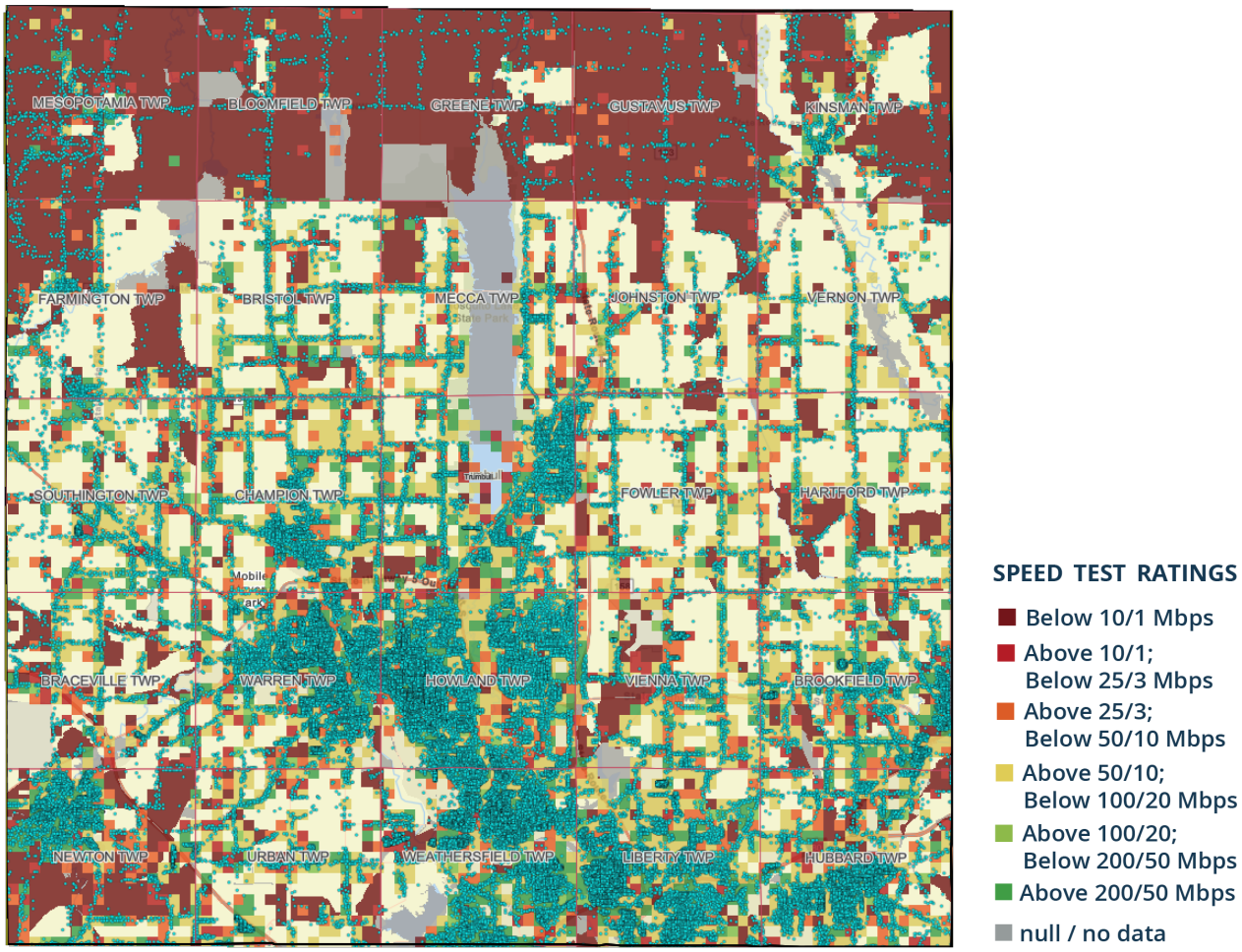


Figure 3: On the Ground reality based on Speedtest Data in Trumbull County

Additionally, Trumbull County’s goals are also aligned with the State of Ohio’s Digital Equity priorities and goals in the following ways:

Expanding Broadband Infrastructure- The lack of infrastructure is the primary concern in rural areas of Ohio, with 88% of respondents to the state's Internet Access Survey advocating for expanded internet access. Geographic challenges, particularly in the Appalachian region, along with low population density, make these areas less appealing for internet service providers, resulting in high costs for infrastructure development.

Additionally, where infrastructure exists, the expenses associated with line extensions and connection fees often prohibit households from accessing services. Trumbull county is 72% rural contributing to the high cost of infrastructure expansion in large parts of the county. **Increasing Access to Affordable Broadband**- Access to affordable broadband is a critical issue for individuals earning at or below 150% of the poverty line. High costs and insufficient infrastructure significantly limit internet adoption among this demographic. In a recent state access survey, the majority of low-income respondents identified price as the primary barrier to home internet access.
(Broadband Ohio-Digital Opportunity Plan, 2024)

To address the barriers posed by the high costs of broadband line extensions and connection fees, a potential solution could be to implement a subsidy or cost-sharing program for households in underserved areas. This program could be funded by a combination of federal, state, and local resources, alongside private sector partnerships with broadband providers. Key components of the solution could include:

1. **Subsidized Line Extensions**: The county or a public-private partnership could offer financial assistance to cover or reduce the costs of line extensions, making it more affordable for broadband providers to expand service into unserved or underserved areas.
2. **Connection Fee Reductions**: Reducing or waiving connection fees for low-income households or those in rural areas could help mitigate the upfront financial burden of accessing broadband.
3. **Partnership with ISPs**: The county could negotiate with Internet Service Providers (ISPs) to incentivize service expansion through tax incentives, infrastructure grants, or other forms of partnership. In return, ISPs could be encouraged to offer lower-cost, community-focused broadband plans for local residents.
4. **Long-Term Investment Strategy**: Invest in long-term infrastructure projects with a focus on sustainable broadband expansion that ensures future cost reductions as the network expands and the market grows.

By combining financial support, collaboration with service providers, and long-term infrastructure planning, this approach could create a pathway for more equitable access to broadband services, particularly in rural or economically disadvantaged areas.

Section 3

Broadband Infrastructure

Section 3. Broadband Infrastructure

Trumbull County intends to partner with existing Internet Service Providers (ISPs) in the region to address the broadband infrastructure needs of our citizens. To be clear, the intent is to deliver Fiber-to-the-Home (FTTH) connectivity to every household, as well as all Community Anchor Institutions and businesses. The FTTH builds will ideally also address backhaul needs for mobile connectivity through access to fiber connectivity to towers. The financial lift will be addressed by the ISPs with support from relevant grant programs. Trumbull County recognizes that investment in identified areas to date have not been feasible due to the low population densities, thus the importance of the grant funding.

With the assistance of the Eastgate Council of Governments, Trumbull County has and will continue pursuing local, state, regional, and federal grant funding to help offset the cost of partnerships with capable ISPs to address our citizens' needs.

As discussed in Section 2, with the assistance of Reid Consulting Group, a gap analysis was conducted for Trumbull County. This analysis resulted in the identification of five areas of the county where a noticeable need for fiber-to-the-home investment exists. This gap analysis identified the geographic areas in need of fiber to the home as well as the infrastructure assets included within those areas. These include residences, small businesses, and other community anchor institutions. Along with the identification of the infrastructure assets, the gap analysis included a financial pro forma estimating the fiber build necessary to pass and to serve these locations. Cost to pass and cost to serve were based on a blend of both aerial and underground cost projections. The investment estimates include consideration of the number of households and small businesses per fiber mile, the anticipated rate of subscription (take-rate) and an estimation of the ISP investment thus providing the gap we need to fill with grant funding.

The financial assumptions of the gap analysis are detailed in the next section as well as included in the appendices as part of the full gap analysis period.

A. Areas of Potential Investment

The gap analysis, conducted in May of 2024 has identified the following areas (figure 4) where further investment and build is necessary to address current FTTH gaps:

1. Mesopotamia West
2. Mesopotamia South
3. North Bloomfield
4. Kinsman West
5. Kinsman East

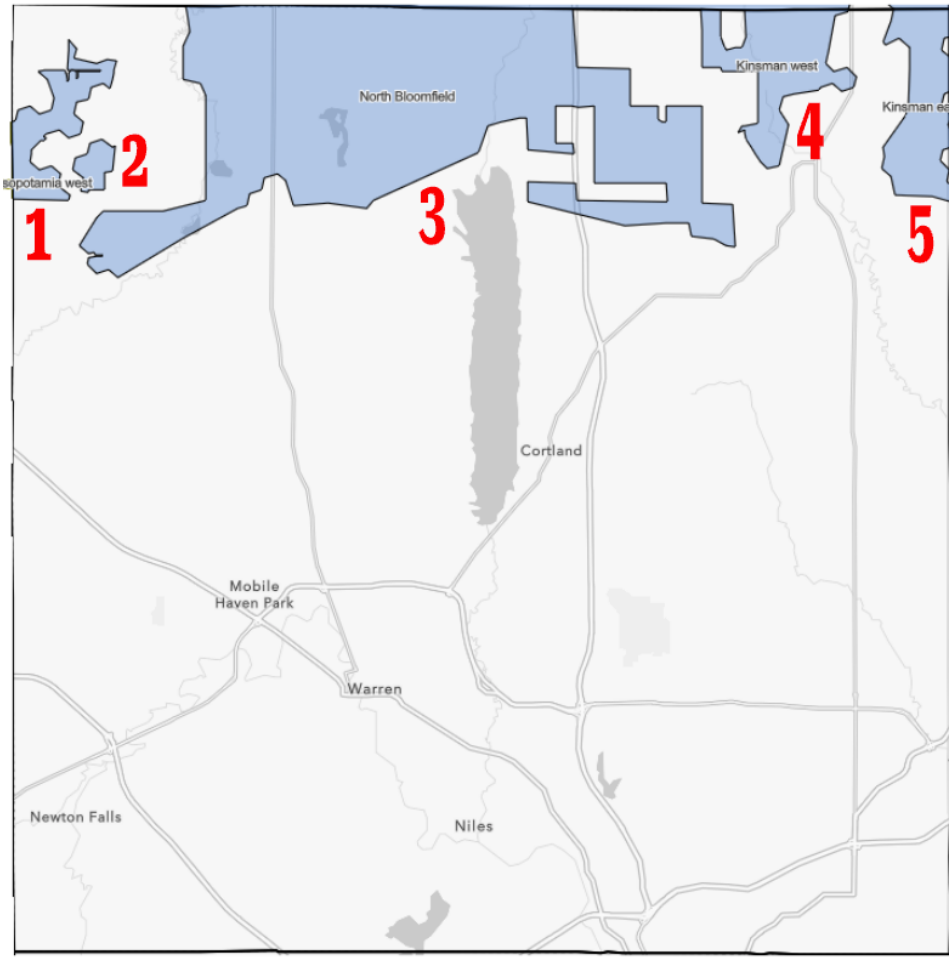
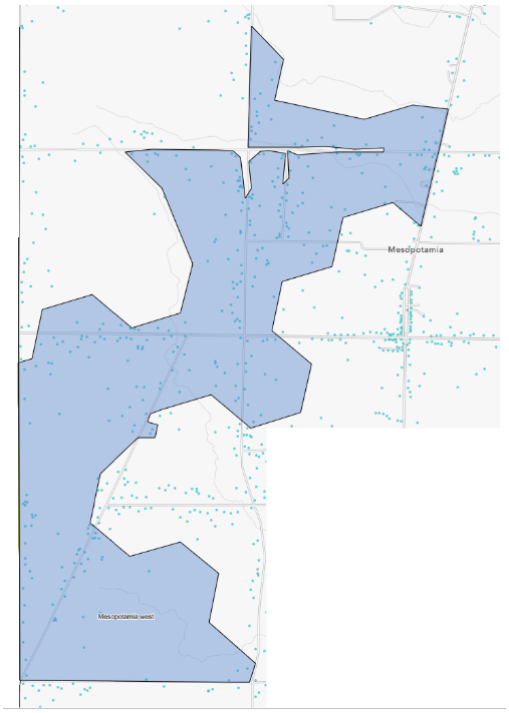


Figure 4: Overview of Areas of Potential Investment in northern Trumbull County

Addressing these areas would means providing access 888 unserved locations and 568 underserved locations.

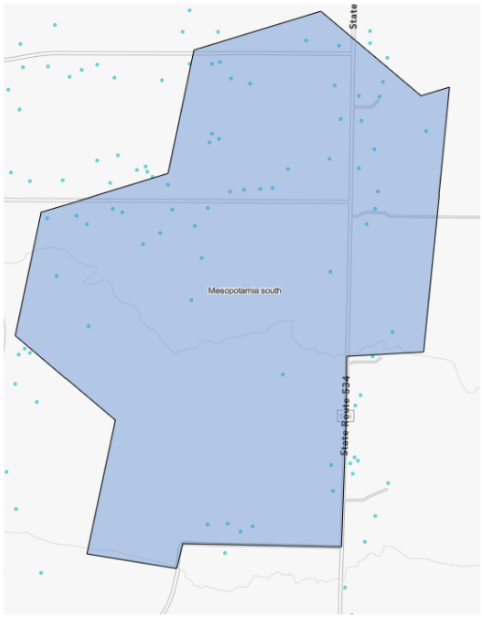
1. MESOPOTAMIA WEST



	Aerial	Underground
Fiber Cost	$104,000	$156,000
Cost to Pass	$728,000	$1,092,000
Cost per Location	$2,485	$3,727
ISP Investment per location	$2,000	$2,000
TOTAL ISP investment	$586,000	$586,000
ISP Percentage	80%	54%
Gap	$142,000	$506,000

293	252	6	7	5	42
Locations	Unserved	Underserved	Fiber Miles	Area (Sq Mi)	Locations per Mile

2. MESOPOTAMIA SOUTH

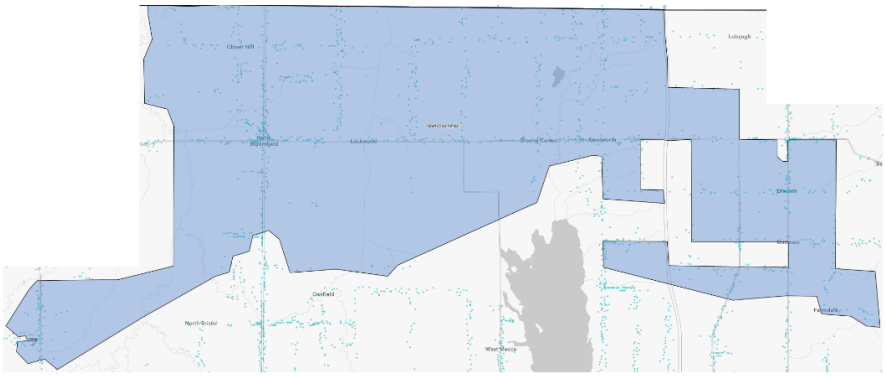


	Aerial	Underground
Fiber Cost	$104,000	$156,000
Cost to Pass	$208,000	$312,000
Cost per Location	$4,078	$6,118
ISP Investment per location	$2,000	$2,000
TOTAL ISP investment	$102,000	$102,000
ISP Percentage	49%	33%
Gap	$106,000	$210,000

51	45	1	2	1	26
Locations	Unserved	Underserved	Fiber Miles	Area (Sq Mi)	Locations per Mile

3. NORTH BLOOMFIELD

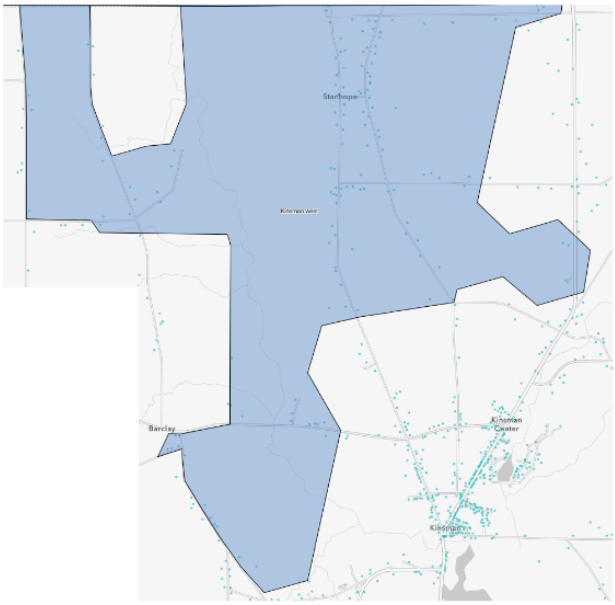
	Aerial	Underground
Fiber Cost	$104,000	$156,000
Cost to Pass	$10,608,000	$15,912,000
Cost per Location	$9,289	$13,933
ISP Investment per location	$2,000	$2,000
TOTAL ISP investment	$2,284,000	$2,284,000
ISP Percentage	22%	14%
Gap	$8,324,000	$13,628,000



1142	479	482	102	61	11
Locations	Unserved	Underserved	Fiber Miles	Area (Sq Mi)	Locations per Mile

4. KINSMAN WEST

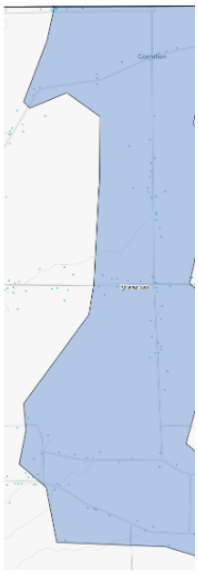
	Aerial	Underground
Fiber Cost	$104,000	$156,000
Cost to Pass	$1,352,000	$2,028,000
Cost per Location	$9,797	$14,696
ISP Investment per location	$2,000	$2,000
TOTAL ISP investment	$276,000	$276,000
ISP Percentage	20%	14%
Gap	$1,076,000	$1,752,000



138	39	70	13	8	11
Locations	Unserved	Underserved	Fiber Miles	Area (Sq Mi)	Locations per Mile

5. KINSMAN EAST

	Aerial	Underground
Fiber Cost	$104,000	$156,000
Cost to Pass	$1,352,000	$2,028,000
Cost per Location	$12,180	$18,270
ISP Investment per location	$2,000	$2,000
TOTAL ISP investment	$222,000	$222,000
ISP Percentage	16%	11%
Gap	$1,130,000	$1,806,000



Locations	Unserved	Underserved	Fiber Miles	Area (Sq Mi)	Locations per Mile
111	73	9	13	7	9

To address the FTTH need in these areas, Trumbull County proposes to issue RFP/RFQ documents in search of an ISP partner. To best ensure that we are partnering with the right ISP for the county's needs, we have established the following baseline of questions for response. We strongly believe that the below qualifications, network requirements and design, and pricing information will allow the Trumbull County team to efficiently and effectively evaluation potential ISP partners and match areas of need within the county to the professionals who are best capable of meeting those needs.

B. Topics for Response by Internet Service Providers

1. Business Profile

- Ownership Structure: Please recap the current ownership structure of your company and any substantive changes currently in progress.
- Credentials: Please include a resume for the team members who would lead the Trumbull County project.
- History: How long has your company been providing broadband services?
- References: Please provide three references highlighting your company's ability to successfully partner and deploy broadband networks.

2. Existing Network Facilities and Operations

Existing Facilities (including fiber infrastructure, POPs, offices, etc.) including the number of existing employees:

- Nationwide
- In Ohio
- In Trumbull County

Current Customer Counts in Ohio:

- Residential Broadband
- Business Broadband
- Other

3. Proposed Network Design

Network Design and Implementation: In this section, Trumbull County seeks information regarding the overarching principles you would use in designing the proposed fiber-to-the-premise network.

The physical network design should take into consideration the following observations and expectations:

- Electric utilities. Most of the electrical plant is above ground in Trumbull County.
- Aerial construction. If the ISP proposes aerial construction, then we anticipate strand-and- lash construction in compliance with all relevant industry standards, the Rural Utility Services (RUS) standards, and the National Electric Safety Code (NESC). Please explain your implementation methodology and standards if different from RUS specifications.
- Underground construction. If the ISP proposes underground construction, then we anticipate installation in conduit in compliance with all relevant industry standards and the Rural Utility Services (RUS). Please explain your implementation methodology and standards if different from RUS specifications.
- The County requires that respondents design the fiber network:
    - To pass every home and business in the service area with distribution fiber, built close enough to the premises to enable implementation within ten days of an order being placed for service.
    - With sufficient fiber capacity to accommodate growth in the number of households and businesses as well as increased data usage.
- The County prefers that strand-counts and deployment architecture support a variety of Layer 2 technologies, e.g. PON and ActiveE.
- For the network architecture, please explain the design your company would deploy in the Trumbull County areas including:
    - Backbone,
    - Initial technology(ies) for serving homes and small businesses,
    - Capacity for growth in bandwidth and/or network performance requirements, and
    - Connectivity to the Internet.
- Please illustrate your network architecture in simple terms such as the examples in Figure 5 and Figure 6.

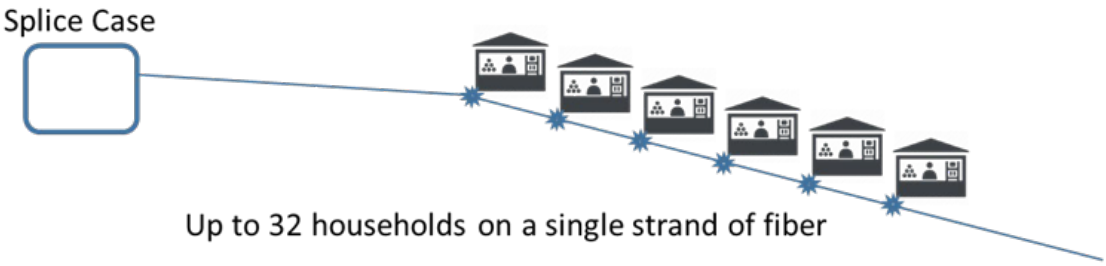


Figure 5: Distributed Tap Fiber to-the-Premise

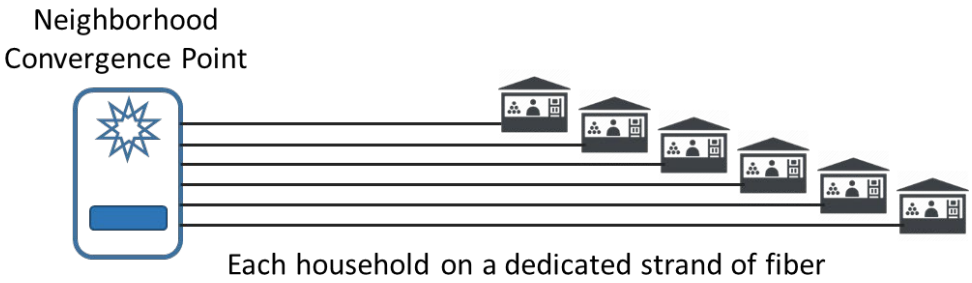


Figure 6: Centralized Split Fiber-to-the-Premise

4. Residential and Small Business Packages

In this section, Trumbull County requests information regarding the services your company would offer and at what costs. Both short-term and long-term affordability are critical considerations.

- **Residential and Small Business Packages, Pricing and Terms**
  - Provide service offerings and costs including the proposed low-income package using the following format.
  - Note that we are particularly concerned about the Low-Income package in that it needs to provide sufficient bandwidth that subscribers are not “second-class” broadband citizens.
  - Symmetric or near-symmetric service offerings will be scored higher than highly asymmetric packages.

Residential/Small Business Package	Download/Upload in Mbps	Installation Charge	Monthly Cost	Term in Months
Low-Income				
Base				
Mid-Range				
Highest Speed				
Telephone				
Video				
[Add rows as needed]				

- For the services offered above, please explain:
  - Committed bandwidth capacity versus best-effort, i.e. the capacity guarantees you offer,
  - Additional quality of service specifications to which you will adhere,
  - Duration of pricing commitment,
  - Triggers for escalation/reduction of costs to customers,
  - Requirement for consumer credit checks and/or deposit,
  - Participation in federal, state and/or local broadband subsidies (e.g. similar to the FCC Affordable Connectivity Program).
  - Interval to install for new order to homes and businesses passed,
  - Interval to resolve outages due to causes other than fiber cuts or power outages,
  - Interval to resolve outages due to fiber cuts, and
  - Service credits for missing service level agreement thresholds.
- Turn-up process as network is being constructed.
- Duration of commitment to provide residential and small business service

5. Enterprise Service Offerings

In this section, we request information regarding higher capacity services you will make available in the service areas to enterprise customers such as larger businesses, K-12 schools, health care facilities, etc.

Enterprise Packages	Download/Upload in Mbps	Installation Charge	Monthly Cost	Term in Months
[Add rows as needed]				

For the services offered above, please explain:

- Committed bandwidth capacity versus best-effort, i.e. the capacity guarantees you offer,
- Additional quality of service specifications to which you will adhere,
- Duration of pricing commitment,
- Triggers for escalation/reduction of costs to customers,
- Interval to install for new order to businesses passed,
- Interval to resolve outages due to causes other than fiber cuts or power outages,
- Interval to resolve outages due to fiber cuts, and
- Service credits for missing service level agreement threshold

Aerial view of Niles, Ohio

Section 4

Financial Plan

Section 4. Financial Plan

Trumbull County is not planning to build or operate a municipal network; instead, we aim to partner with an Internet Service Provider (ISP) to identify key development areas and assist them in meeting the necessary requirements to deliver broadband service to all proposed project locations. Our future planning is centered on a fiber-to-the-home network designed with sufficient capacity to meet demand for the next 30 years. We recognize that expected investments and funding gaps will vary based on factors such as the area to be served, population density, the availability of existing services and distance to middle mile. These factors are changing as ISPs deploy in their markets

The budget projections for the areas of potential investment identified in section 3 were projected using the methodology outlined in this section.

A. Building for the Future

For planning purposes, broadband deployments must be treated like infrastructure projects. Much like water, sewer, and roads, broadband networks should be designed to last decades rather than years. Networks installed today should utilize technologies, materials, and design specifications that will deliver 30-to-40-year longevity. Networks also should have sufficient capacity to meet not only current needs but also those of 2055.

Given the capital costs and construction requirements for broadband, we recommend a planning window that starts in 2025 and continues through 2055. This timeline assumes a three-to-four-year deployment window which will vary based on project size, supply chain complexities and labor availability.

When home internet first became common, most households connected using landline modems that operated at 56 Kbps (0.056 Mbps). By 2000, speeds had increased to 1 Mbps. A decade later, a well-served household could expect 10 Mbps. The FCC's current 25/3 Mbps threshold was last relevant in 2012, when the average download speed reached 25 Mbps. Currently, someone living in a well-served area can expect at least 100 Mbps down/20 Mbps up.

With remote work and learning, telehealth, and virtual reality quickly becoming mainstream, it is not difficult to imagine the average speed reaching 1,000 Mbps (1 Gbps) ten years from now. In fact, many internet providers already offer 1 Gbps and 2 Gbps plans with business connections and some residential connections routinely operating at 10 Gbps. Some backbone and middle mile networks already operate on 100 Gbps and 400 Gbps connectivity.

B. Budget Considerations

Building a fiber network involves three basic expenses: preparing utility corridors to support fiber optic cables for aerial installation (make-ready), installing fiber along those corridors, whether

aerial or underground (cost-to- pass), and connecting individual homes and businesses to the new fiber (cost-to-serve).

1. **Make-Ready**

   As part of any broadband deployment, electric utilities must modify or replace at least some of their poles to accommodate increased cable weight, wind and ice loads, and limited clearance between power lines and aerial communications cabling. These costs vary based on electric provider and the kind of cable being installed. A heavier cable may require more make-ready than a lighter one.

   Make-ready costs can vary significantly from one utility provider to another. In this report, we assume a make-ready of $25K to $55K per mile to accommodate high strand count cables that require strand-and-lash support. This figure is approximately what it would cost to build an independent communications pole network as a last resort, should ISPs and local utilities be unable to reach an acceptable agreement.

2. **Cost-to-Pass**

   Fiber optic comes in a wide range of styles, from lightweight household drop lines to high-capacity, armored cable sheaths that bundle hundreds of fiber strands together to carry massive amounts of data. Household drop fiber is inexpensive and puts less strain on utility poles, but it has limited capacity. Broadband speeds have increased 10-fold every decade since 1990. To ensure that a fiber network built today remains useful 40 years from now, this report assumes the use of high strand count cables.

   While a provider could deliver rural broadband that meets current state and federal speed requirements using only low strand-count household drop cable, such a network would offer little flexibility to expand services or increase speeds as demand rises. Material and labor costs for high strand-count fiber are estimated at $60K to $65K per mile.

C. Cost Estimates

Cost estimates in the areas for potential development in section 3 were calculated using a variety of metrics to determine the investment needed to serve the homes in the project area.

- **Fiber Miles:** Fiber distance is based on the number of unserved state, county, local municipal and unincorporated road miles within the county.

- **Locations per Mile:** Total number of unserved households divided by the number of unserved state, county, township, and unincorporated road miles.

- **ISP Investment:** This is the total an internet provider can spend to install fiber and still make a profit, estimated between $1000 and $4000 per household. As population density goes down, costs go up while expected investment remains the same

  - Calculated: *Households in Service Area * Investment per household*

- **Investment Range:** The Project area Investment Range represents the lowest cost to the highest cost of to serve the total number of locations that are identified as below 100/20 Mbps the entire Project area. In most cases the lowest cost represents aerial fiber deployment and the highest cost represents underground fiber deployment. For the individual counties, it is the average of the lowest and cost of each project area.
    - The total cost for each project area is the sum of make-ready and cost-to-pass multiplied by the number of unserved state, county, township, and unincorporated road miles.
    - Calculated: *Unserved Miles * (Make-Ready + Cost-to-Pass) + (Number of locations * Network electronics)*
        - *Fiber Miles to Reach Target * Cost per Mile = Cost to Pass*

- **Funding Gap:** The funding gap is the difference between the total cost of the project and the available or anticipated private investment. For an internet service offering to be sustainable, grant or other public funding must be used to close this gap.
    - Calculated*: Funding Gap = Total Projected Cost - ISP Investment*

Dawn on Mosquito Lake, Cortland, Ohio

Section 5

Appendix

Section 5. Appendix

A. Eastgate Regional Broadband Study, June 4 2021

B. Trumbull County Community Health Report, 2022