Guilford County Broadband Strategy

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High-speed internet is integral to daily activities, but access to adequate, reliable broadband is not equally distributed across Guilford County

COVID-19 disrupted every aspect of life for residents. As daily activities migrated to a virtual environment, those with inadequate or no access were excluded from essential connections, potentially exacerbating inequities.

Even those with access to internet often experience disruptions or struggle with insufficient bandwidth when multiple household members need to use the internet for different activities including:

Education

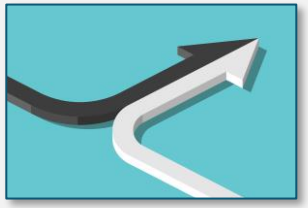
- Remote learning and homework assignments
- Extracurricular programs
- Parent teacher engagement

Healthcare & Emergency services

- Remote patient monitoring
- Virtual appointments
- Interpreter services
- Emergency response operations, e.g., dispatching first responders

Work & workforce development

- Remote work
- Online training
- Online job application and coaching, e.g., Guilford Works mobile resource bus



Economic development

- Enabler for small businesses
- Infrastructure for 'Smart City' efforts, e.g., Greensboro Innovation District

Connectivity, social services & civic engagement

- Connecting with friends / family virtually
- Accessing account info and applying for assistance
- Organizing and participating in virtual events

Investment considerations for not only current needs but also future needs for more connected devices, more data, and faster transmission speeds are important as demand for high-speed internet continues to grow and technology advances.

Stakeholder and public engagement provided color and context to the lived experiences reflected in the research and data analysis

Key themes from Stakeholder Engagement

- Access to **high-speed internet is viewed as an essential service** with education and remote work opportunities as some of the top priorities
- The **majority of the County has some level of access, although not always adequate; there are communities who face barriers** related to geographic and socio-economic disparities
- **For those who struggle with reliable internet access**, there are **barriers to daily activities that increasingly require bandwidth levels that support both video and audio**, such as remote work meetings, remote learning, and virtual doctor's appointments

> It is vital. Working from home, online classes, etc. are a part of my daily life. I get poor internet service in my area so it can be pretty frustrating.
>
> Survey respondent

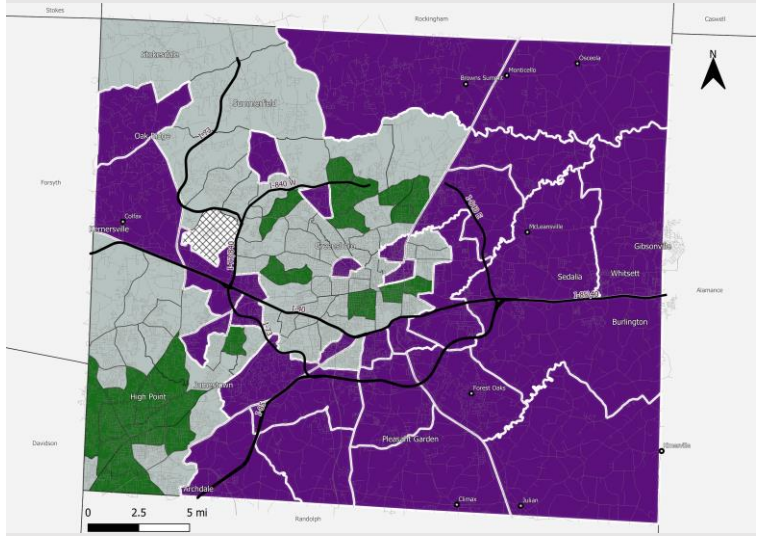
> Thank goodness for the internet bill assistance out now cuz [sic] without it my internet would have been the first one cut off. I was on unemployment till September and since then we have struggled so bad. I'm trying to work what I can but I have 2 disabled adults to care for and 2 minor kids.
>
> Survey respondent

> Frustrating that home internet is so slow or goes out frequently. That's ok if it only impacts entertainment, but definitely NOT ok when it comes to remote learning
>
> Survey respondent

A model developed to analyze broadband gaps revealed that 49% of the population have needs related to availability, affordability, or adoption

Availability

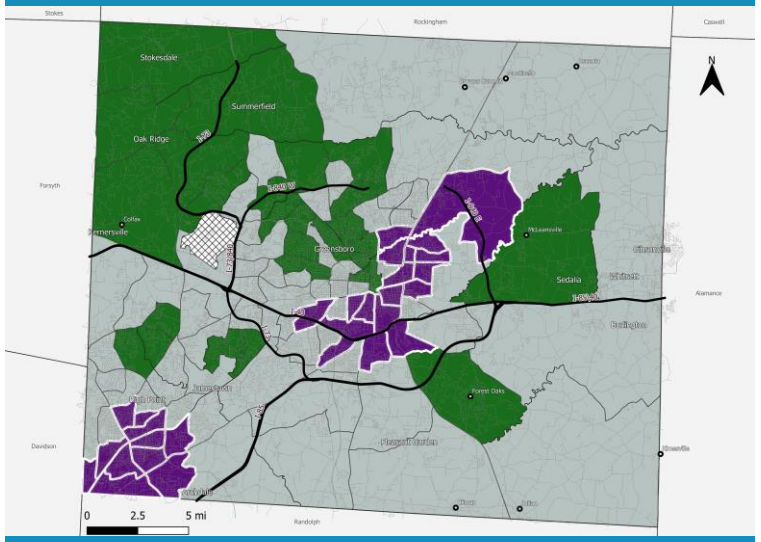
Is broadband available at an adequate speed necessary for work, school, etc.?



30% of the population in Guilford County resides in a census tract with low availability

Affordability

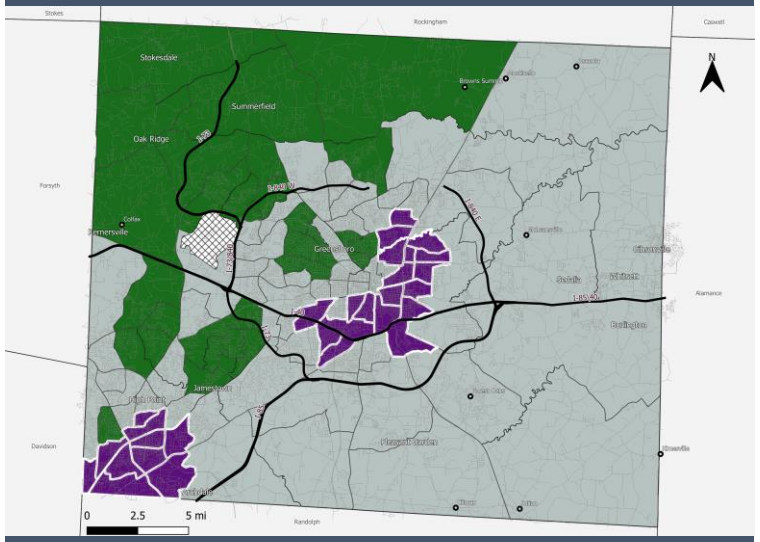
Are the available broadband speeds at an affordable price point?



22% of the population in Guilford County resides in a census tract with low affordability

Adoption

Could households successfully use broadband if available and affordable?



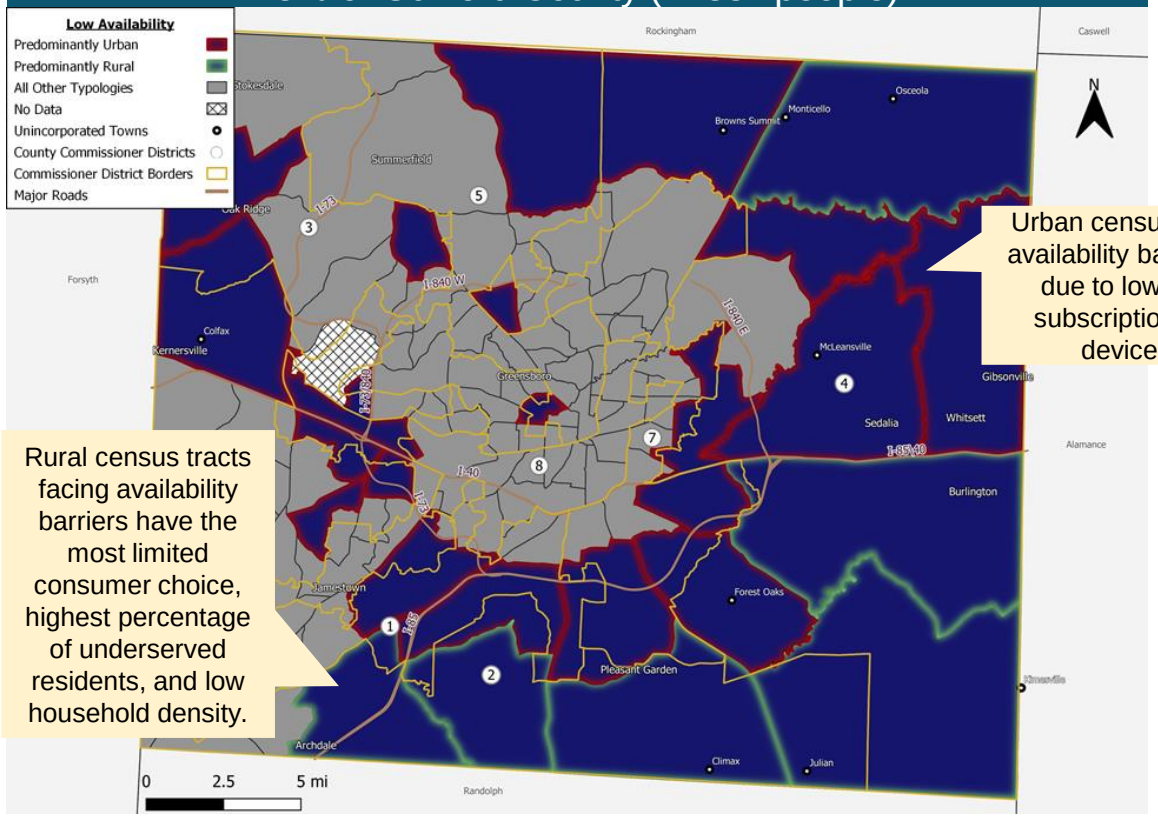
21% of the population in Guilford County resides in a census tract with low adoption

Key: = Low scoring census tracts (<25th lowest percentile) = Medium scoring census tracts (25th–75th percentile) = High scoring census tracts (> 75th percentile) = major road

Analysis highlighted the need to deploy targeted solutions to address the various broadband-related needs across the County with context-aware investments.

Most of the population in an area of significant need* face technical and geographic barriers in rural areas, or socio-economic barriers in urban areas

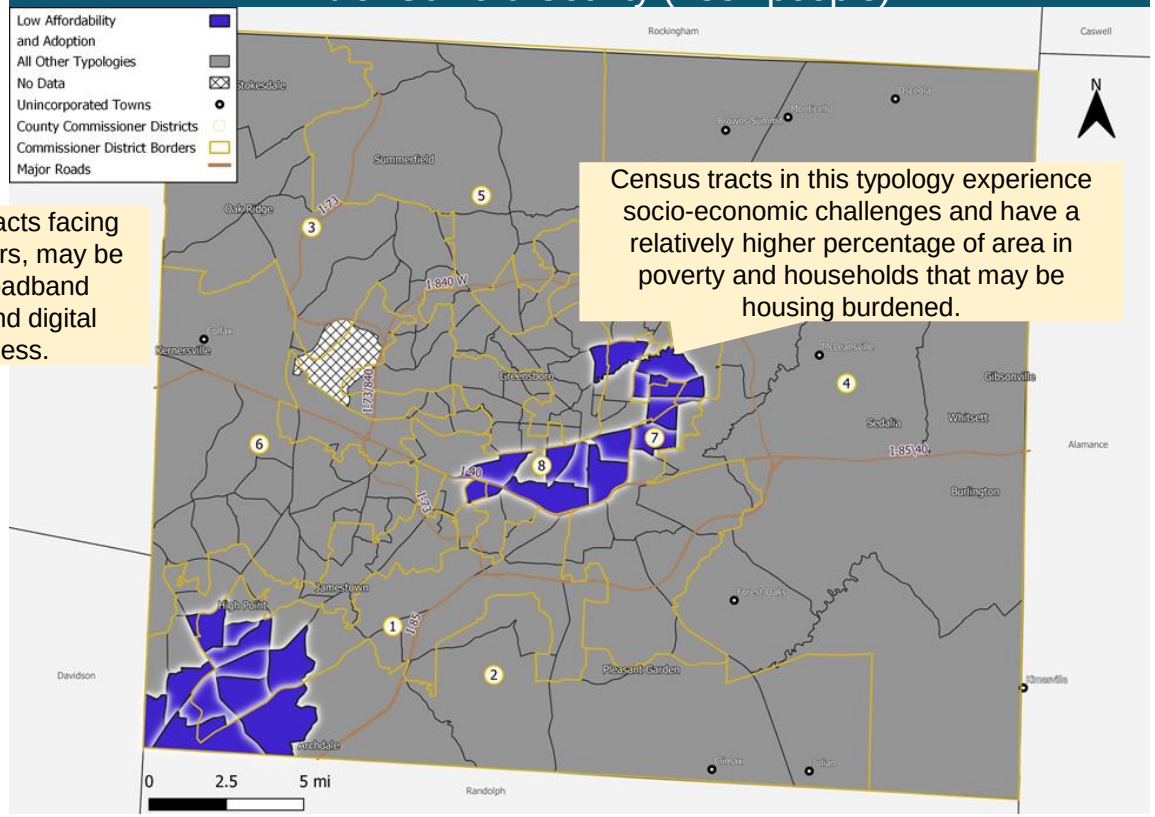
Census Tracts with Low Availability Only**
25% of Guilford County (~133k people)



Urban census tracts facing availability barriers, may be due to low broadband subscription and digital device access.

Rural census tracts facing availability barriers have the most limited consumer choice, highest percentage of underserved residents, and low household density.

Census Tracts with Low Affordability and Low Adoption
17% of Guilford County (~88k people)



Census tracts in this typology experience socio-economic challenges and have a relatively higher percentage of area in poverty and households that may be housing burdened.

Analyzing common attributes in census tract typologies with significant need* has allowed stakeholders in Guilford to develop targeted solutions to address broadband availability, affordability, and adoption barriers.

- A Census tract was defined as having significant need if its broadband index score fell below the 25th percentile in a given category (e.g., availability, affordability, adoption).

** Census tracts that only have high need related to availability are included in this map and statistic.

Gaps and needs analysis revealed that strategic approaches must target a variety of different factors that contribute to digital inequity

Legislation & Policy	Restrictive state laws on municipal broadband significantly restrict public ability to invest in broadband infrastructure. The County and municipal governments can build on the state's Dig Once policy for broadband and consider other policy changes to improve coordination and efficiency of construction processes.
Market Structure	A lack of market competition among ISPs has led to less consumer choice in terms of number of provider options. 25% of residents only have 1 provider choice offering a minimum of 25/3 Mbps.* An estimated 29% of County residents do not have access to high-speed broadband connections (100/100 Mbps) necessary to meet essential needs (e.g., remote learning, telework, telehealth services)
Infrastructure	Rural, unincorporated areas in the eastern part of the County have limited access to high-speed access technologies. Urban areas in High Point and Greensboro face the greatest barriers related broadband adoption and access to digital devices.
Socio-economic Factors & Needs	Disparities in broadband access and adoption are greatest in areas identified as facing barriers based on income level, educational attainment, and race. Digital literacy levels and access needs vary by factors related to household composition such as the presence of elderly individuals and students.

*Source: FCC Form 477 Fixed Deployment data. This data likely overestimates speeds offered and service coverage to residents in Guilford County. Fixed providers file lists of census blocks in which they can or do offer service to at least one location, so may not accurately reflect what service provider and speed options are available to the entire census block. Excludes satellite.

Guilford County should act holistically and multilaterally to address digital inequity and increase broadband critical for education, work, EMS, etc.

POTENTIAL PARTNERS

- Regional & Municipal Governments
- North Carolina Broadband Infrastructure Office
- Guilford County Libraries and Schools
- Community Anchor Institutions
- Local, State and/or National Nonprofits
- Internet Service Providers
- Private Institutions & Corporations

OVERARCHING STRATEGIES

- Dedicate a centralized broadband resource to lead efforts
- Incentivize ISP expansion to increase consumer choice
- Launch pilot programs and iterate on successful program designs
- Collaborate with other local governments on advocacy efforts
- Explore developing public-provided middle-mile fiber [depending on advocacy success]

SUPPORT

TARGETED STRATEGIES

AVAILABILITY STRATEGIES

- Middle Mile Fiber
- Last mile connection: Fiber to the premises
- Last mile connection: Extend urban 5G mesh network
- Last mile connection: Pole replacements

AFFORDABILITY & ADOPTION STRATEGIES

- Expand on Digital Navigators Programs
- Leverage Libraries / Schools as digital inclusion nodes
- Offer Device Refurbishment and Donation Hub
- "Gap" grants and "one stop" application assistance

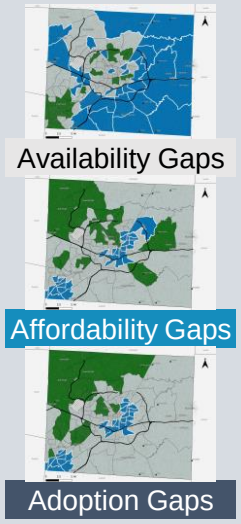
Special Considerations: Public Safety

- Evaluate resiliency of public safety mobile network

Special Considerations: Public Housing

- Last mile connection: Fiber / 5G mesh to public housing
- Free / Discounted internet for public housing authorities

IMPROVE DIGITAL EQUITY



Funding Options include:

- **General Fund and Reserves**
- **Federal and State Grants**
- **Tax Revenue** (e.g., general taxes, etc.)
- **Bond Financing**
- **Available Federal Loans**
- **Matching Funds from Public-Private Partnerships**
- **Nonprofit or Philanthropic Funding**

ADDRESSING BROADBAND GAPS IMPROVES ACCESSIBILITY TO MANY DAILY ACTIVITIES AND CRITICAL SERVICES

- **Education** — *Close the homework gap and improve learning for untraditional students*
- **Work & Workforce Development** — *Build a resilient, skilled, and flexible workforce*
- **Health** — *Bolster the reach of the Cone Health and others with telemedicine*
- **Emergency Services** — *Ensure access to rapid emergency response*
- **Social Services** — *Enhance the provision of government services with future-proof technologies*
- **Connectivity & Civic Engagement** — *Equip public with internet so they can participate in engagement efforts*
- **Economic Development** — *Accelerate job growth and attract new business*

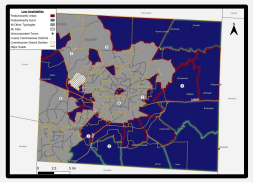
The following strategic moves are recommended to target the factors that contribute to digital inequity and increase accessibility county-wide

Overarching Strategy	Intended Impact	
1. Dedicate a centralized broadband resource to lead and coordinate efforts	• Centralize oversight for strategy execution • Provide hub for partnerships, data-sharing, communication, and community engagement	Legislation & Policy; Market Structure; Infrastructure; Socio-economic
2. Encourage ISP expansion to improve internet access	• Reduce barriers to broadband infrastructure buildout in areas that lack adequate internet access • Increase consumer choice, market competition, and network resilience	Market Structure; Infrastructure
3. Launch pilot programs and iterate on successful program designs	• Validate gaps and needs • Provide proof-of-concepts for future grant applications that can be replicated elsewhere	Market Structure; Infrastructure; Socio-economic
4. Collaborate with other local governments on advocacy efforts	• Collective action to provide greater flexibility for local governments in meeting constituents' connectivity needs	Legislation & Policy
5. Explore developing public-provided, open access middle-mile fiber infrastructure [dependent on advocacy success]	• Provides an avenue to jump-start public and private investment to parts of the county where ISP investment has fallen short	Infrastructure; Socio-economic

These overarching strategies are complemented by a suite of geographically-targeted recommendations to address location-specific broadband gaps and needs as identified through the broadband index model.

Targeted strategies are recommended to address geographic-specific challenges related to broadband availability, affordability, and adoption

Low Availability and the Low Affordability & Low Adoption typologies comprise 42% of the County's population and the majority of areas facing digital inequity. Targeted strategies aimed at addressing needs should track to overall county goals



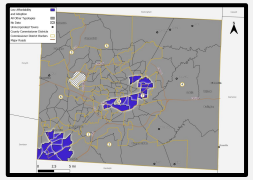
Low Availability

Greensboro's fringe, Pleasant Garden, Whitsett, Brown's Summit, Julian

Characteristics: Low housing density. Less consumer choice and a higher population of residents age 65+ in rural areas. Limited access to fiber in urban areas.

- 1.1 Last Mile: Pole Replacements
- 1.2 Middle mile: Fiber network into urban areas
- 1.3 Last mile: Fiber to the premise in unserved urban areas
- 1.4 Last mile: Urban 5G mesh network
- 1.5 Middle Mile: Fiber network into rural areas
- 1.6 Last Mile: Fiber to the premise in unserved rural areas
- 1.7 Evaluate resiliency of public safety services reliant on mobile broadband

Infrastructure-related strategies are recommendations based on the gaps assessment and will need to be validated by engineers



Low Affordability & Low Adoption

Central and south High Point and south and east Greensboro

Characteristics: Primarily in urban areas facing socio-economic barriers with special consideration for public housing authorities

- 2.1 Partner with Kramden Institute for digital device refurbishing / donations
- 2.2 "Gap" grant program and "one stop" application assistance
- 2.3 Digital Navigators
- 2.4 Digital Inclusion Nodes
- 3.1 Free / Discounted internet for public housing authorities (PHAs)
- 3.1a 5G campus network for PHAs
- 3.1b Fiber internet access for PHAs*

*3.1a and 3.1b targeted recommendations pertain to options for accomplishing recommendation 3.1

Potential KPIs

The state has set forward several goals to address the digital divide. While Guilford County already has achieved or is close to some of the state goals**, county stakeholders should consider measuring progress towards the following:

85% Raising the percentage of households with high-speed internet subscriptions from ~76%† to 85% by 2025

95% Raising the percentage of households with a connected computing device from 88%† to 95% by 2025

85% Percentage of eligible households enrolled in Affordable Connectivity Program (ACP) and successfully receiving service (currently ~31%‡) by 2025

Note: The task force can develop additional KPIs for projects as part of strategy implementation

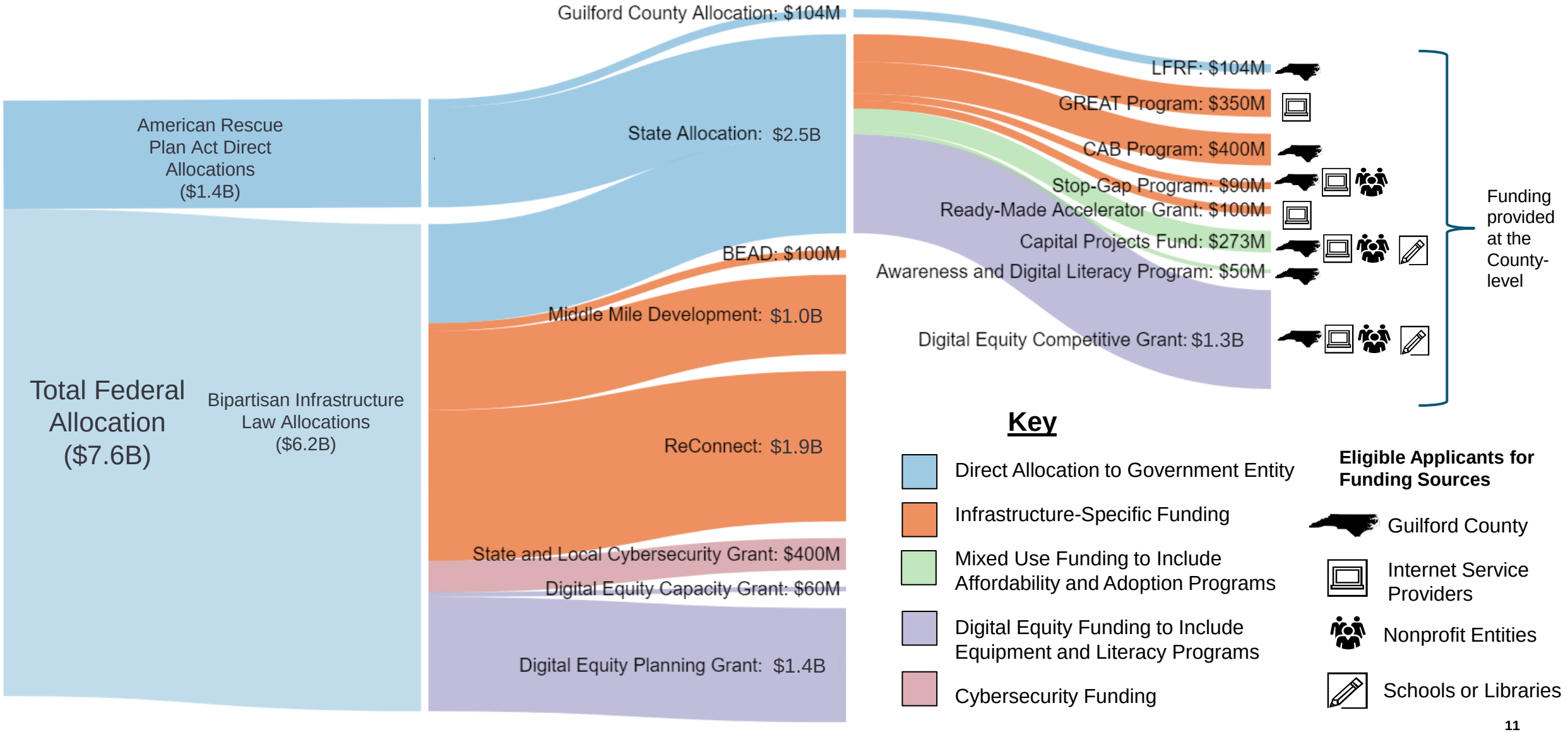
**See p.20

†Source: ACS 5-yr 2019 data

‡Estimated using Emergency Broadband Benefit enrollment data from Nov. 2021 and estimate of eligible population based on Medicaid enrollment divided by average household size

Federal Funding Breakdown

Between state investments and direct allocations, there is roughly **$7.6B** available from ARPA and BIL for broadband projects. All dollar amounts are represented at the full allocation amount unless specified.



Key

- Direct Allocation to Government Entity
- Infrastructure-Specific Funding
- Mixed Use Funding to Include Affordability and Adoption Programs
- Digital Equity Funding to Include Equipment and Literacy Programs
- Cybersecurity Funding

Eligible Applicants for Funding Sources

- Guilford County
- Internet Service Providers
- Nonprofit Entities
- Schools or Libraries

Action plan and recommended steps for overarching strategies

Overarching strategies *(Note: subject to Board approval*)*

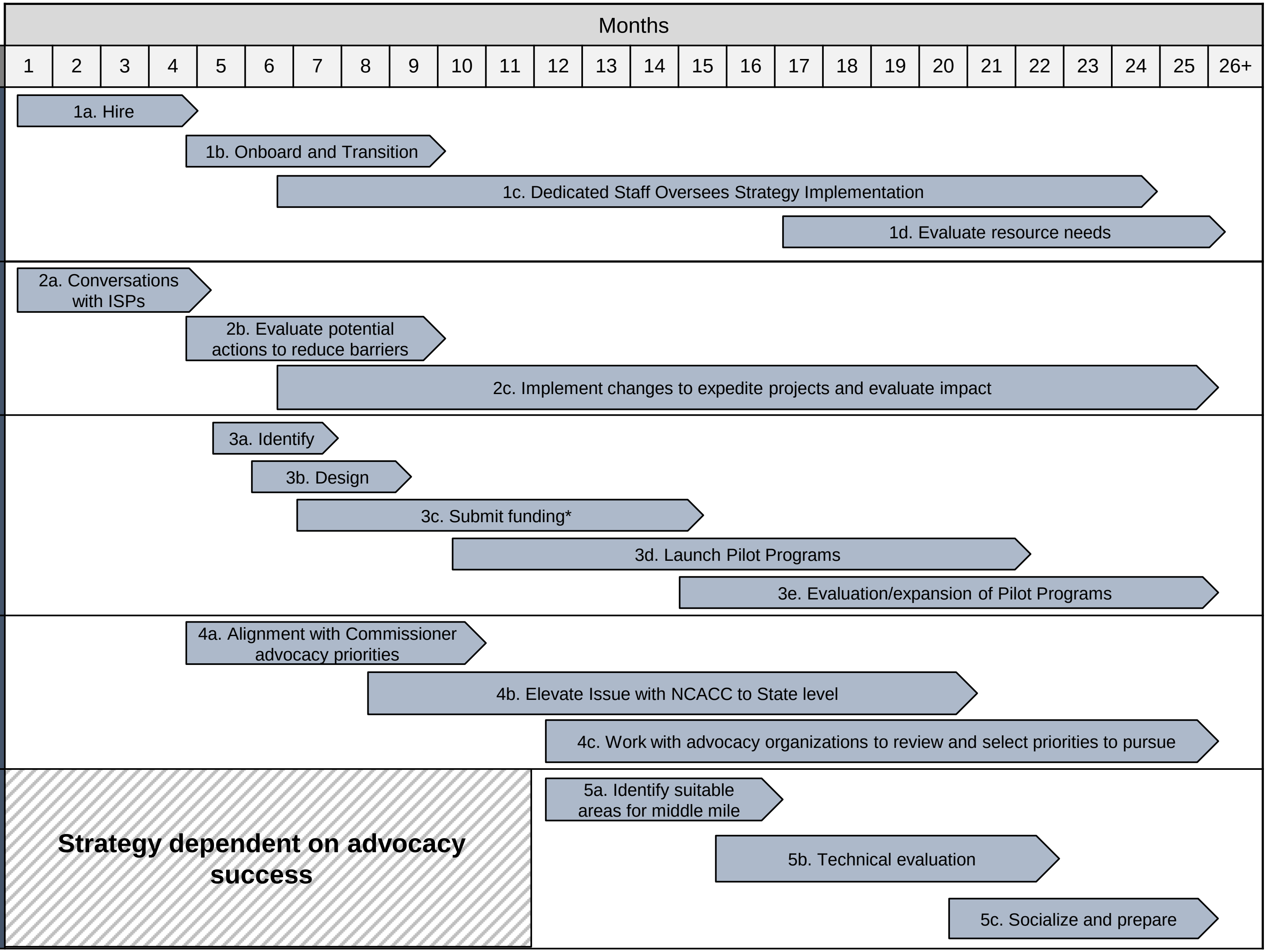
1) *Dedicate a centralized broadband resource to lead efforts*
- 1a. Identify available resource or hire new dedicated FTE(s)
- 1b. Transition resource to lead Broadband Taskforce and oversee strategy implementation
- 1c. Resource serves as central hub for strategy implementation
- 1d. Evaluate additional broadband resources necessary to support implementation

2) *Encourage ISP expansion to improve internet access*
- 2a. Initiate conversations with ISPs to identify key barriers to broadband deployment and infrastructure investment
- 2b. Evaluate ability of stakeholders in the county to alleviate identified barriers
- 2c. Implement policy/process changes to help expedite projects of interest to ISPs where feasible and evaluate impact

3) *Launch pilot program(s) and iterate on successful program designs (timelines may vary depending on funding / projects)*
- 3a. Identify which targeted strategies to pursue as pilot projects (location, partners, scope, KPIs)
- 3b. Design project(s), validate needs, determine funding**
- 3c. Determine which funding sources to pursue and apply
- 3d. Launch pilot(s) once funding is secured
- 3e. Evaluate pilot project(s) and validate identified needs

4) *Collaborate with other local governments on advocacy efforts*
- 4a. Seek alignment amongst Commissioners that this is a priority for the County
- 4b. Work with NCACC and other partners to elevate this issue on the State advocacy agenda
- 4c. Work with advocacy organizations and/or other legislative groups to review and prioritize advocacy efforts to pursue

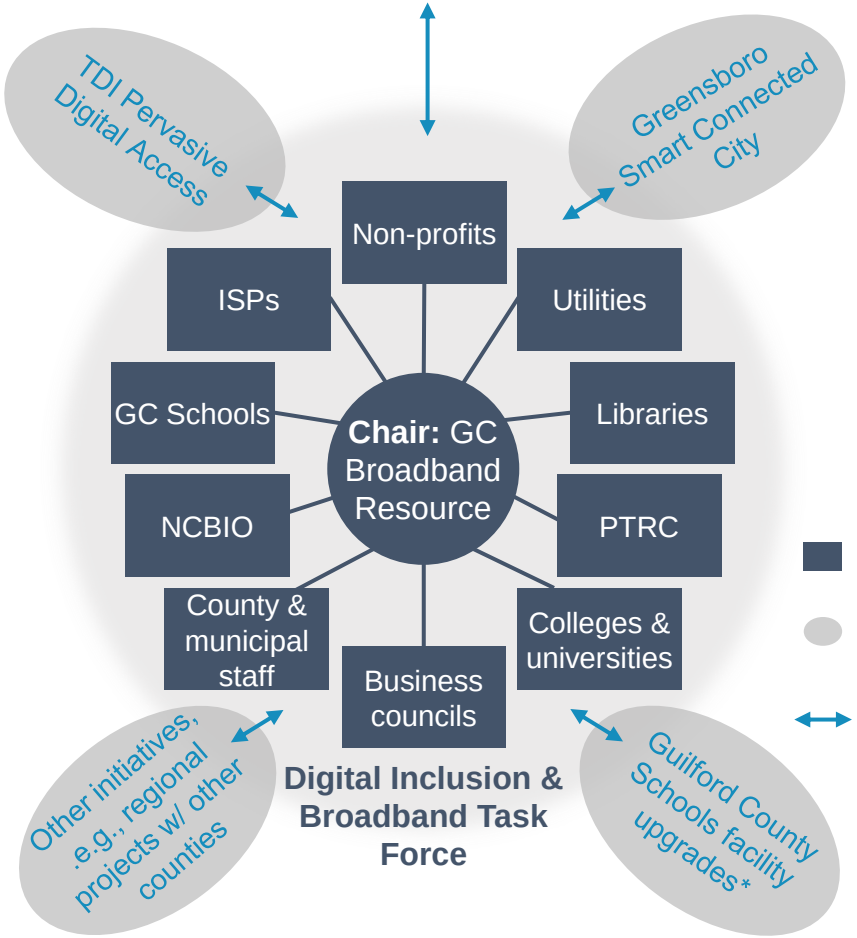
5) Explore developing public-provided, open access middle-mile fiber infrastructure
- 5a. Identify suitable areas where middle mile fiber could be built out
- 5b. Work with engineers, construction managers, finance teams and other partners to develop plan for buildout and conduct technical evaluation
- 5c. If technical evaluation is favorable, work with relevant stakeholders to socialize plan with and prepare for buildout



*Timelines may vary
**GREAT Grant closes April 4, 2022; BIL Funding Opens Fall 2022

Guilford County's efforts to adopt and execute on the Broadband Strategy will be advised by the Digital Inclusion & Broadband Task Force

Decision-making authorities, e.g., City councils, Board of Commissioners, State representatives, School/college boards



Key

- Task Force members
- Selective example of broadband-relevant initiatives
- Information flow

Digital Inclusion & Broadband Task Force

Purpose:

- Advises and provides guidance to decision-makers,
- Promotes knowledge-sharing, and
- Coordinates efforts for implementing different elements of the Broadband Strategy and additional broadband initiatives that may be external to the strategy

Roles:

- Chaired by dedicated Guilford County broadband resource who acts as the main liaison with other initiatives, administrates, and performs other coordinating requirements including with broader region
- Individual members may become functional leads depending on strategic objective, e.g., technical vs education or training focused-projects

Key responsibilities:

- Sharing priorities and perspectives from respective organizations,
- Sharing data and knowledge exchange,
- Championing broadband investment,
- Gaining buy-in from key stakeholders,
- Elevating important and time sensitive information to decision-making authorities

Note: Additional details on the Task Force can be found on p. 84-85

*Pending school bond referendum

Action Plan Detail: Checklist for Strategy Implementation

Guilford County can take immediate action to begin implementation of Overarching and Targeted Strategies in the following ways

Strategy Support

- ❑ Determine resource allocation and/or hire for dedicated FTE(s) to oversee strategy execution and lead Task Force
- ❑ Stand up Digital Inclusion & Broadband Task Force

Strategy Evaluation

- ❑ Begin initial introductions and conversations with ISPs and nonprofits on partnerships
- ❑ Begin conversations with municipalities and other partners on potential project service areas
- ❑ Evaluate and select preferred Targeted Strategies to implement as pilot programs

Funding

- ❑ Identify currently available funding sources that the County would like to pursue for each chosen strategy
- ❑ Begin gathering information on potential service areas using the GREAT Grant requirements as a model

1 Executive Summary

2 Introduction

3 Problem Statement

4 Overarching Recommendations

5 Typologies & Targeted Recommendations

6 Funding Overview

7 Action Plan

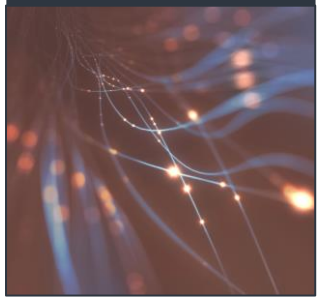
8 Digital Inclusion & Broadband Task Force

What is the Guilford County Broadband Strategy?

Identify high-speed internet gaps and opportunities in Guilford County and develop a plan to optimally identify and allocate Federal funds (e.g., American Rescue Plan, Infrastructure Bill) to plug the gaps

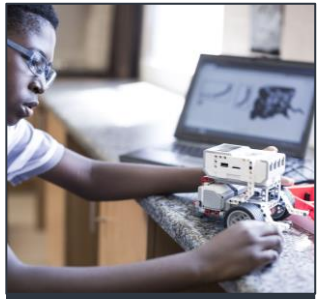
Legislation & policy

Physical infrastructure



ISP market structure and incentives

Equity & digital inclusion



Educational, health, and business needs

Impacts of COVID-19

Through this engagement, Guilford County sought to understand the answers to the following questions

What are the **gaps and opportunities** for Guilford County? What are the broadband needs for **education, healthcare, and business, etc.**?

How can we **validate self-reported data (e.g., ISPs)** to ensure our strategy is informed by the most reliable information?

How can Guilford County **counteract historical inequities** and ensure equal access to affordable broadband?

How do we **optimally allocate ARPA and other Federal funds** to address our areas of strategic need?

How can the County **partner** with ISPs, utilities, etc. to increase access and availability of broadband?

The strategy development process took place over the course of four months and was rooted in stakeholder engagement and data analysis

	1 Gather data and prepare for stakeholder engagement	2 Conduct gaps and needs assessment	3 Develop, draft and iterate on the Broadband Strategy
	October 2021 – November 2021	*November 2021 – January 2022*	*January 2022 – February 2022*
Objectives	• Understand the **availability of public and private datasets** related to broadband • Prepare for **stakeholder engagement**	• Identify and evaluate **current state gaps and needs** via assessment, which will provide the basis for the final Broadband Strategy	• Develop **Broadband Strategy that incorporates gaps and opportunities assessment** • Set up stakeholder groups to continue as the **Digital Inclusion & Broadband Task Force**
Activities	• Develop **Internet and Digital Devices Access Survey** • Research and **gather relevant data and documentation** related to broadband	• Conduct **Internet and Digital Devices Access Survey** and **publicize State Broadband Survey** • Develop **broadband master map and index** that synthesizes the datasets gathered in phase 1 into geographically-specific broadband need typologies • Conduct **leading practice research** to identify lessons learned from other counties with comparable contexts	• Develop **solutions universe** and **prioritization methodology** • Draft **recommendation scorecards** that include impact, funding / resourcing, and critical dependencies • Draft **broadband strategy details**
Stakeholder Engagement	• Stand up **working group, steering committee, and advisory group structures and cadence** to provide input into the strategy • Conduct **stakeholder mapping and interviews**	• Hear from Guilford Countians through **gaps and needs community meetings and lived experience focus groups** • **Continue interviews**	• Conduct **strategic approach workshops** with stakeholders and the community • Work with stakeholders to **validate prioritization methodology and recommendation scorecards**

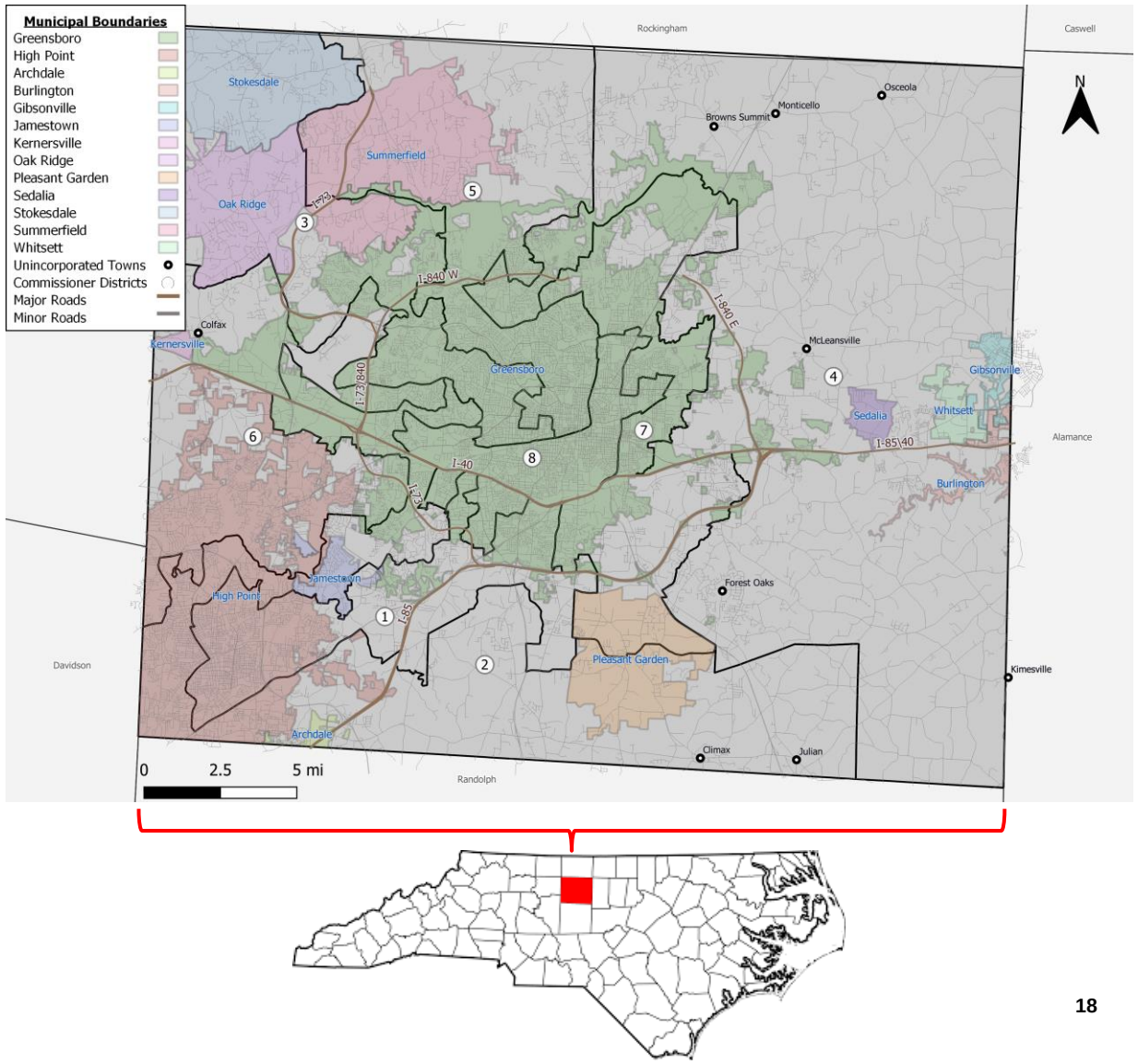
The Broadband Strategy presents approaches to address the gaps and needs identified through an in-depth assessment* (see Problem Statement Section for summary of key findings)

* The Guilford County Broadband Gaps and Needs Assessment is a separate report

Guilford County faces different challenges in different parts of the county when it comes to broadband accessibility and digital equity

Key Statistics**	
Population (2020)*	**541,299** (3rd most populous county in the state out of 100 counties)
GDP (2020)	**$34.5 B** (~6.9% of state GDP)
Median household income (2020)*	**$55,577** (Compared to $59,616 state median)
Households w/ broadband subscription (2019)	**76%** (Compared to 91% in Wake County which has the highest rate in the state)
Top 5 industries by employment (2021)	1) Trade, transportation, & utilities, 2) Education & health services, 3) Professional & business services, 4) Manufacturing, 5) Leisure & hospitality
Educational attainment (2019)	**36%** (County ranks 10th in the state for population over 25 with a Bachelor's Degree or higher)

*These figures differ slightly from the 2019 ACS 5-year data used for mapping and other analyses
** Guilford County is designated as a Tier 2 County in the state economic development ranking system. Overall, it's rank is 22 out of 100 counties (NC Dept. of Commerce, 2022)



Sources: US Census Bureau, 2020 Census; US Census Bureau, SAIPE Estimate, 2020, US Census Bureau ACS 5-Year data, 2019; Bureau of Labor Statistics, QCEW, Q2 2021

Guilford County has a history of collaborative initiatives to increase access to high-speed broadband internet

Based on 2019 ACS 5-year data (2019) ***~76% of Guilford County residents have a broadband internet subscription***. ***However, there are significant disparities in un(der)served areas***, where there is either 1) a high adoption rate but low speeds or 2) where internet is available, but adoption rates are low.

Selective initiatives to address digital exclusion and increase broadband access in the County

2016

PTRC Tri-Gig

A primary goal of the Tri-Gig initiative was to leverage existing assets and create additional assets to assist ISPs with building and deploying high-speed broadband networks across the Piedmont Triad region. Although not all aims of the initiative were achieved, it helped catalyze later collaborative efforts.

2017 – *ongoing*

Greensboro Smart Connected City

Building off the Tri-Gig initiative, collaborative effort between Greensboro, private companies, nonprofits and other governments to extend direct network connections to other cities and to find ways to link individuals to high-speed, high efficiency internet services and bolster innovation and technology-based entrepreneurship

2021 – *ongoing*

TDI Pervasive Digital Access

Project focused on creating a sustainable model for the design, build, and operation of the technology infrastructure and services required to deliver high-quality and easy-to-use internet access for all pre-K through post-doctoral students in the 12-county Piedmont region of North Carolina

Key Insight: Investment in broadband and the need to address digital inequities is a priority for many counties and municipalities with several previous and ongoing initiatives that the County can leverage as part of its strategy.

This strategy builds on and complements previous/planned broadband initiatives and aligns with broader state priorities

State priorities

Close the digital divide by addressing:
- Infrastructure and access
- Digital literacy
- Affordability

Goals and metrics:
- Raising percentage of NC households with high-speed internet subscriptions from 73% to 80%
- Raising percentage of NC households w/ children with high-speed internet subscriptions from 81% to 100%
- Increasing adoption rates to 80% across racial subgroups

Key

Planned | Implemented

Owner	Summarized Initiatives	Customer	Output	Strategy complement
Guilford County Schools	1:1 device access for all students in the County school system	Pre-K – 12 students	• 55,800 Chromebooks for 4th – 12th graders • 24,379 iPads for Pre-K – 3rd graders • 10,000 Moxee Mifis (hotspots)	Adoption: Expanding reach and complementing current initiatives in addition to operational support to increase access to digital devices, digital literacy programs, and successfully connect to the internet and reduce digital exclusion. ***There is a gap in previous/planned initiatives in relation to meeting affordability needs***
GuilfordWorks	NCWorks Mobile Career center with computer lab and Wi-Fi connectivity	Individuals & Businesses with workforce-related needs	• Mobile career center equipped with Wi-Fi, 12 computer stations, and printing capabilities	
Greensboro & High Point Libraries	Technology navigators	Individuals seeking digital literacy education and training	• Greensboro Library held over 3,030 sessions totaling 73,016 minutes of assistance for FY2020/2021 • High Point Library averaged, 3,800 interactions/year over several years	
Verizon	5G Ultra Wideband network deployment	City of Greensboro	• 5G Ultra Wideband can provide wireless home internet in select areas • Primarily in downtown area and near some landmarks	Availability: Expanding reach and developing additional strategies to increase coverage of broadband infrastructure and increase consumer options and service reliability
NorthState	Planned fiber network expansion to Greensboro, High Point, Oak Ridge, McLeansville, Sedalia, Whitsett, Gibsonville by 2023	Residents in these areas	• Fiber availability to 15,000+ residents in previously un(der)served areas • Additional ISP market competition in the County	
Randolph Communications	Planned fiber network expansion (4.98 miles) using RDOF in southeastern corner of Guilford County	Residents in these areas	• Fiber availability to previously un(der)served areas • Additional ISP market competition in the County	

High-speed internet is integral to daily activities, but access to adequate, reliable broadband is not equally distributed across Guilford County

COVID-19 disrupted every aspect of life for residents. As daily activities migrated to a virtual environment, those with inadequate or no access were excluded from essential connections, potentially exacerbating inequities.

Even those with access to internet often experience disruptions or struggle with insufficient bandwidth when multiple household members need to use the internet for different activities including:

Education

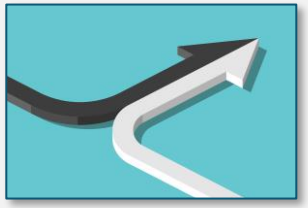
- Remote learning and homework assignments
- Extracurricular programs
- Parent teacher engagement

Healthcare & Emergency services

- Remote patient monitoring
- Virtual appointments
- Interpreter services
- Emergency response operations, e.g., dispatching first responders

Work & workforce development

- Remote work
- Online training
- Online job application and coaching, e.g., Guilford Works mobile resource bus



Economic development

- Enabler for small businesses
- Infrastructure for 'Smart City' efforts, e.g., Greensboro Innovation District

Connectivity, social services & civic engagement

- Connecting with friends / family virtually
- Accessing account info and applying for assistance
- Organizing and participating in virtual events

Investment considerations for not only current needs but also future needs for more connected devices, more data, and faster transmission speeds are important as demand for high-speed internet continues to grow and technology advances.

Stakeholder and public engagement provided color and context to the lived experiences reflected in the research and data analysis

Key themes from Stakeholder Engagement

- Access to **high-speed internet is viewed as an essential service** with education and remote work opportunities as some of the top priorities
- The **majority of the County has some level of access, although not always adequate; there are communities who face barriers** related to geographic and socio-economic disparities
- **For those who struggle with reliable internet access**, there are **barriers to daily activities that increasingly require bandwidth levels that support both video and audio**, such as remote work meetings, remote learning, and virtual doctor's appointments

It is vital. Working from home, online classes, etc. are a part of my daily life. I get poor internet service in my area so it can be pretty frustrating.

Survey respondent

Thank goodness for the internet bill assistance out now cuz [sic] without it my internet would have been the first one cut off. I was on unemployment till September and since then we have struggled so bad. I'm trying to work what I can but I have 2 disabled adults to care for and 2 minor kids.

Survey respondent

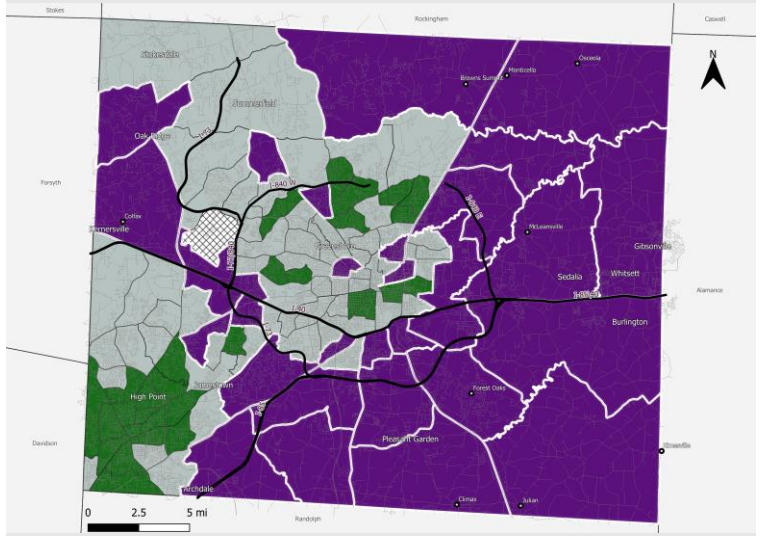
Frustrating that home internet is so slow or goes out frequently. That's ok if it only impacts entertainment, but definitely NOT ok when it comes to remote learning

Survey respondent

A model developed to analyze broadband gaps revealed that 49% of the population have needs related to availability, affordability, or adoption

Availability

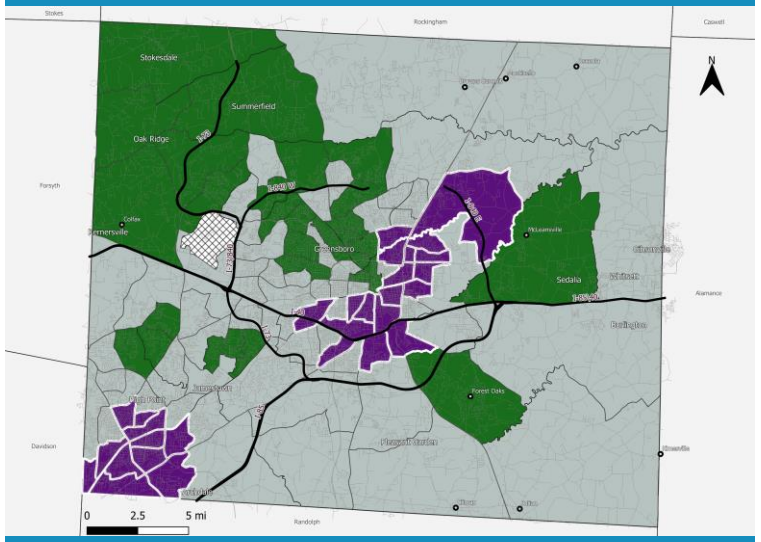
Is broadband available at an adequate speed necessary for work, school, etc.?



30% of the population in Guilford County resides in a census tract with low availability

Affordability

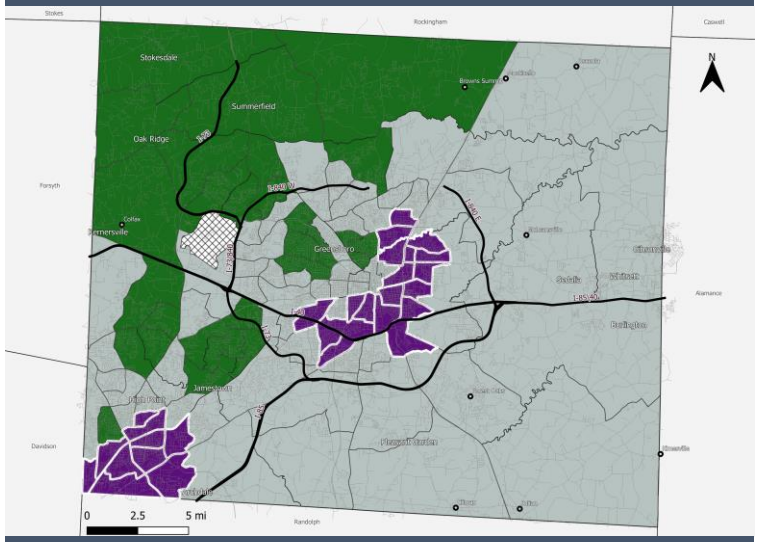
Are the available broadband speeds at an affordable price point?



22% of the population in Guilford County resides in a census tract with low affordability

Adoption

Could households successfully use broadband if available and affordable?



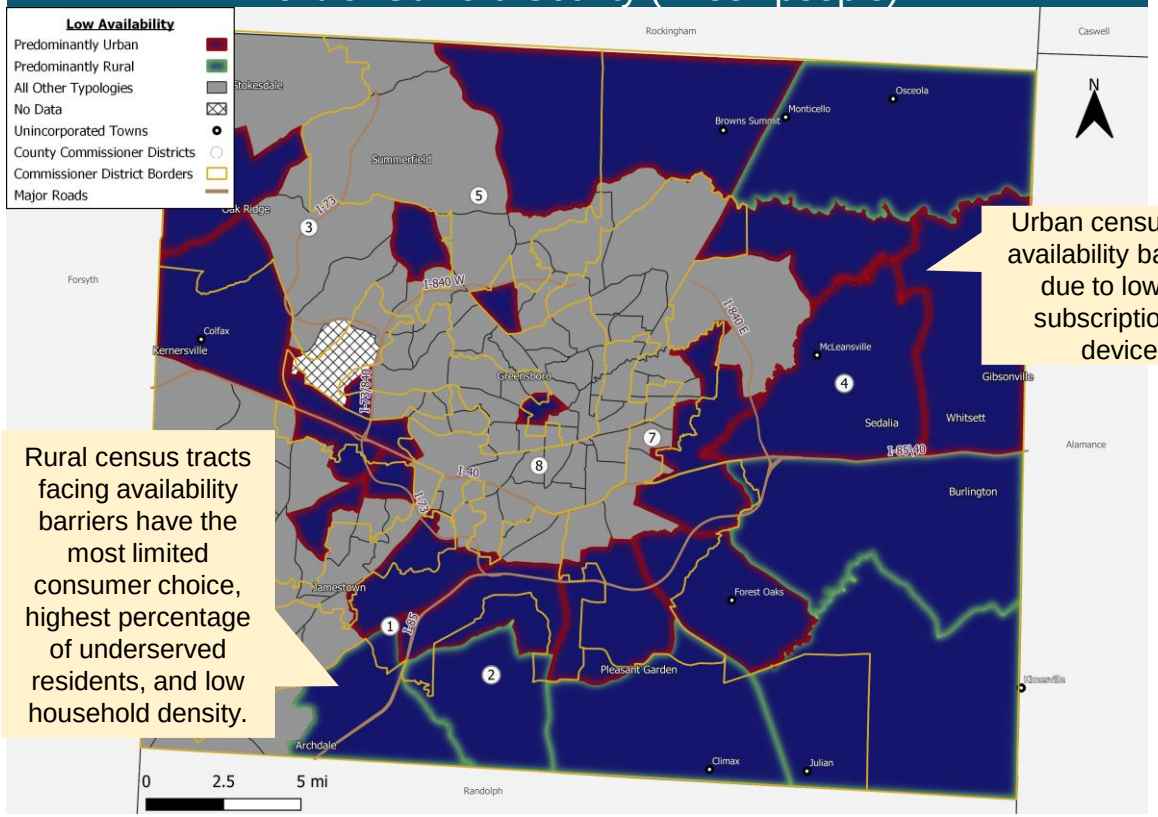
21% of the population in Guilford County resides in a census tract with low adoption

Key: = Low scoring census tracts (<25th lowest percentile) = Medium scoring census tracts (25th–75th percentile) = High scoring census tracts (> 75th percentile) = major road

Analysis highlighted the need to deploy targeted solutions to address the various broadband-related needs across the County with context-aware investments.

Most of the population in an area of significant need* face technical and geographic barriers in rural areas, or socio-economic barriers in urban areas

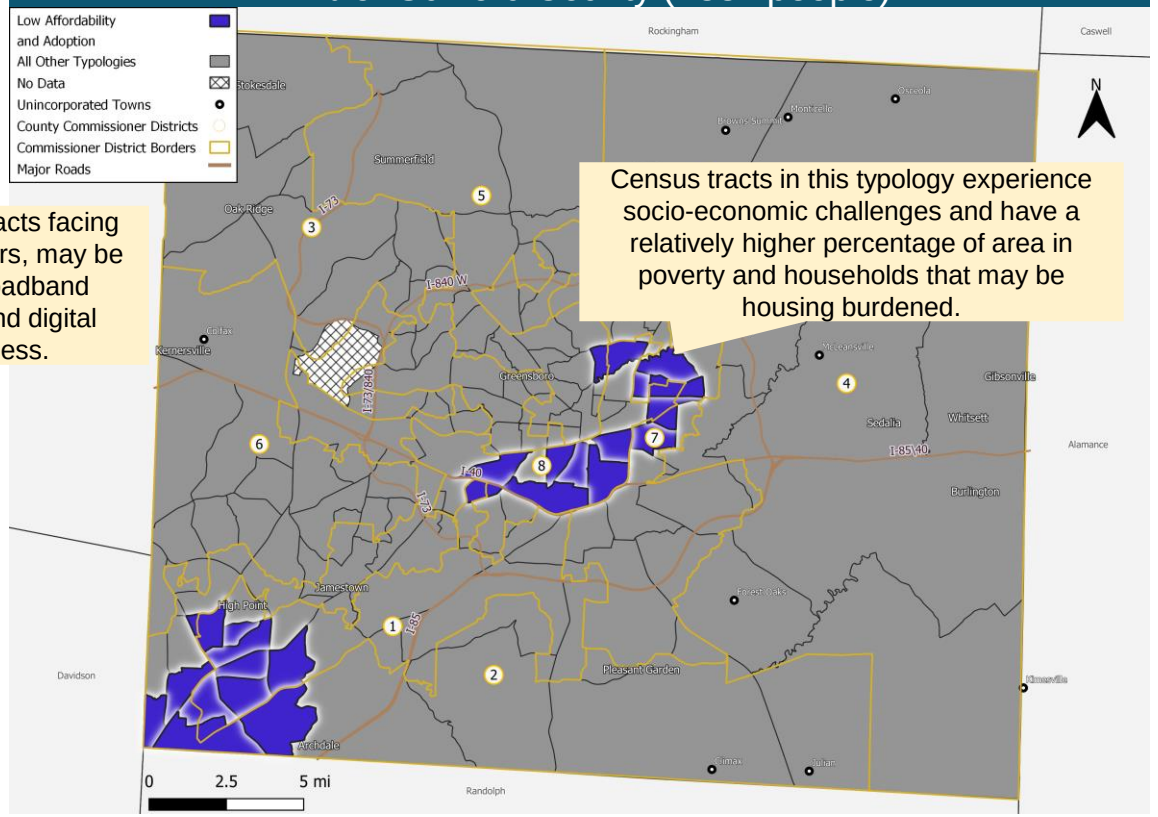
Census Tracts with Low Availability Only**
25% of Guilford County (~133k people)



Urban census tracts facing availability barriers, may be due to low broadband subscription and digital device access.

Rural census tracts facing availability barriers have the most limited consumer choice, highest percentage of underserved residents, and low household density.

Census Tracts with Low Affordability and Low Adoption
17% of Guilford County (~88k people)



Census tracts in this typology experience socio-economic challenges and have a relatively higher percentage of area in poverty and households that may be housing burdened.

Analyzing common attributes in census tract typologies with significant need* has allowed Guilford County to develop targeted solutions to address broadband availability, affordability, and adoption barriers.

- A Census tract was defined as having significant need if its broadband index score fell below the 25th percentile in a given category (e.g., availability, affordability, adoption).

** Census tracts that only have high need related to availability are included in this map and statistic.

Gaps and needs analysis revealed that the County's strategic approaches must target a variety of different factors that contribute to digital inequity

Legislation & Policy

Restrictive state laws on municipal broadband: H129, The Level Playing Field Act (2011), placed restrictions on municipal broadband that has significantly hindered the ability for counties, cities, and municipalities to finance infrastructure investments and offer broadband services to their constituents.

Dig Once Policy: The state has enacted a Dig Once policy for the State Transportation Improvement Program (STIP). However, local governments and the County can expand on this policy and/or enact other policies that encourage ISP investment (e.g., one-touch policies for pole attachments).

Market Structure

Market competition: There is a lack of competition, especially in Guilford County's residential market. For example, 25% of residents only have access to one provider.* This may be due to anti-competitive practices by large ISPs, such as lobbying efforts that have restricted public broadband options (H129).

Speeds and access technologies: An estimated 29% of residents across the County do not have access to fiber-to-the-home internet or speed packages greater than 100/100 Mbps, which can affect households' ability to telecommute, e-learn, use telehealth services, and conduct other economic activities.*

Infrastructure

Urban-centralized infrastructure: Most of the existing broadband infrastructure (wired and wireless) is concentrated in urban areas in Greensboro and High Point. Rural, unincorporated areas in the eastern part of the County have limited access to high-speed access technologies such as fiber.

Broadband internet subscriptions and digital devices: Lower levels of high-speed broadband adoption (<50% broadband subscription) and digital device ownership (<50% computing device ownership) in lower-income urban areas in East Greensboro may be the result of underlying socio-economic factors and historical lack of investment in those areas.

Socio-economic Factors & Needs

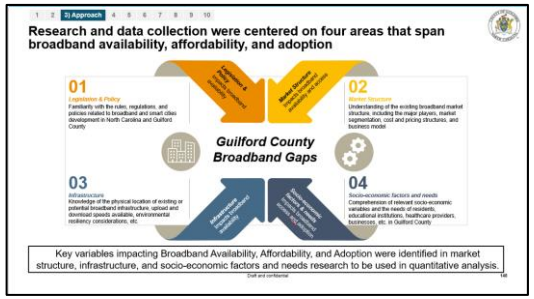
Income / Race / Educational attainment: Studies indicate income, race, and educational attainment can be determinants of broadband adoption and affordability. 31% of census tracts with higher than County average poverty rates also have higher % of non-white populations, lower levels of educational attainment, and lower broadband subscription rates

Age: Different age cohorts can have different needs/barriers to access, e.g., young adults (18-24 yrs.) may have access at college/university but not at home, while seniors (65+) can struggle with lower levels of digital literacy. Children in the home who are remote learning also need broadband access.

*Source: FCC Form 477 Fixed Deployment data. This data likely overestimates speeds offered and service coverage to residents in Guilford County. Fixed providers file lists of census blocks in which they can or do offer service to at least one location, so may not accurately reflect what service provider and speed options are available to the entire census block. Excludes satellite.

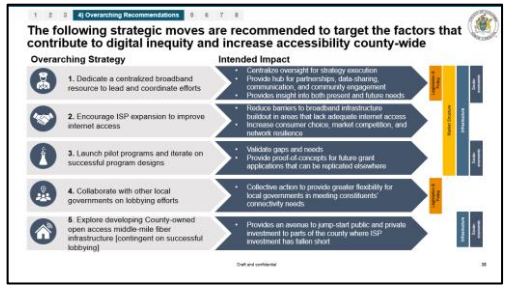
The Guilford County Broadband Strategy was developed to address the broadband challenges identified in the Gaps and Needs Assessment*

1 Analyzed the current state of broadband accessibility in Guilford County through the Gaps and Needs Assessment*



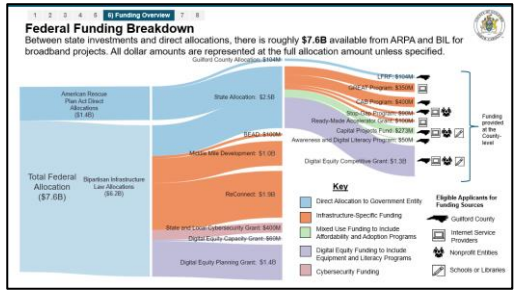
Researched and identified the broadband gaps and needs in Guilford County through the Broadband Index and public engagement to create census tract typologies

2 Identified and researched overarching and targeted strategies to address the gaps and needs identified



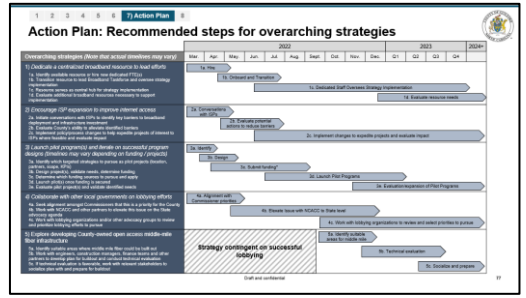
Developed list of potential targeted and overall strategic recommendations that were prioritized to align with County and community priorities through strategic approach focus groups

3 Researched available funding for broadband investment



Researched potential funding opportunities, eligibility requirements, applicable deadlines, and award amounts to match to overarching and targeted strategies identified in Step 2

4 Developed an action plan



Sequenced overall strategies and laid out the next steps for Guilford County and partners as they consider pursuing funding sources and evaluating targeted strategies

Both County-wide initiatives and targeted strategies are required to address the broadband challenges in Guilford County

*See Gaps and Needs Assessment report

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3 Problem Statement

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5 Typologies & Targeted Recommendations

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7 Action Plan

8 Digital Inclusion & Broadband Task Force

The following strategic moves are recommended to target the factors that contribute to digital inequity and increase accessibility county-wide

Overarching Strategy	Intended Impact	
1. Dedicate a centralized broadband resource to lead and coordinate efforts	• Centralize oversight for strategy execution • Provide hub for partnerships, data-sharing, communication, and community engagement	Legislation & Policy; Market Structure; Infrastructure; Socio-economic
2. Encourage ISP expansion to improve internet access	• Reduce barriers to broadband infrastructure buildout in areas that lack adequate internet access • Increase consumer choice, market competition, and network resilience	Market Structure; Infrastructure
3. Launch pilot programs and iterate on successful program designs	• Validate gaps and needs • Provide proof-of-concepts for future grant applications that can be replicated elsewhere	Infrastructure; Socio-economic
4. Collaborate with other local governments on advocacy efforts	• Collective action to provide greater flexibility for local governments in meeting constituents' connectivity needs	Legislation & Policy
5. Explore developing public open access middle-mile fiber infrastructure [contingent on advocacy success]	• Provides an avenue to jump-start public and private investment to parts of the county where ISP investment has fallen short	Infrastructure; Socio-economic

Strategy 1: Dedicate a centralized broadband resource to lead efforts

Dedicate a centralized broadband resource at the County level to **oversee strategy execution, tactical implementation, and/or coordination as needed and communication efforts** for broadband investment.

Description	A dedicated broadband resource will serve as the primary point of contact for broadband efforts in the County. This resource will be the County's analogue to the North Carolina Broadband Infrastructure Office and provide on-the-ground support for implementation of the Strategy as well as ongoing broadband investment efforts. Responsibilities include, but are not limited to: • Overseeing Strategy and tactical implementation / coordination • Managing the asset inventory and data sharing with ISPs and partners • Coordinating joint funding efforts with partners, compiling, and submitting County grant applications and compliance requirements for funding • Directing targeted community outreach to validate gaps and needs • Shepherding policy and process changes related to infrastructure permitting, approvals, etc. • Serving as the primary point of contact for ISPs and other potential partners • Identifying and forecasting present and future broadband needs • Chairing the Digital Inclusion & Broadband Task Force		
Justification	The County needs to centralize the management of broadband investment efforts to improve knowledge and data-sharing, provide a primary POC for potential partners, grant applications, and community members. A dedicated resource will ensure that projects gain traction and maintain momentum and that deadlines and follow-ups do not fall through the cracks.		
Anticipated Benefits and Impact	• Ownership of the broadband strategy and future broadband initiatives • Streamlined oversight, project management, and grant compliance • Centralized knowledge and data repository • Single point of contact for partners and community members		
Relative Priority	High	**General Timeline**	3 months to hire and onboard
Considerations	• If there are sufficient resources and demonstrated need, the County may consider increasing the number of dedicated or part-time staff as projects launch and workload increases. ○ Other grant eligible entities, especially smaller CBOs, may benefit from grant writing support, which County resources could offer • Ongoing community outreach is important to validate gaps and needs, particularly around affordability and adoption, and is recommended to be overseen by the dedicated resource. Recommendations for further outreach were made in the Guilford County Broadband Meeting Summary and should be consulted.		

Case Study Example

Orange County, North Carolina developed a centralized broadband task force that led development of strategic projects, implementation, and procurement, including rollout of short and long-term projects and vendor selection for construction. Members included county/municipal leadership, NCBIO staff, and implementation partners for projects.

Stakeholders	Municipalities and local government, ISPs, CBOs and other non-profits, NCDIT, Community Anchor Institutions, Guilford County residents at large
General Cost	Initially 1 full-time County staff member with an average salary of $75K–$85K + Fringe benefits. (Note: Additional personnel could be hired through staff augmentation service to oversee specific projects)
Potential Funding	• Broadband Equity, Access, and Deployment Grant • Digital Equity Act Programs
Next Steps	• Identification of available resource amongst current staff that could serve this role; otherwise obtain necessary approvals to hire new dedicated FTE • Transition resource to lead Digital Inclusion & Broadband Task Force and oversee strategy implementation

Strategy 2: Encourage ISP expansion to improve internet access

Encourage ISP service expansion to improve internet access

Description	Under the current regulatory environment, investment in broadband infrastructure requires the partnership of ISPs. However, private sector profit motives result in investment only occurring when there is good ROI. Guilford County can help decrease costs and incentivize ISP service expansion by: • Proactively reaching out to ISPs to discuss projects of potential interest and opportunities for partnership. • Identifying key barriers to ISP investment and evaluating the role of the County or municipalities to alleviate barriers • Establishing administrative efficiency in ISP partnerships by creating a single point of contact whom the ISP can work with (e.g., the dedicated broadband resource recommended in Strategy 1) • Streamlining the permitting and construction processes for broadband infrastructure where feasible • Adopting a "Dig Smart" policy that mandates installation of underground fiber conduit any time excavation occurs along public right-of-way or notifies ISPs so they may take advantage of the opportunity to install fiber conduit. This policy can be adopted through a County ordinance or modification to the County General Plan so that broadband considerations are included in capital project planning. • Developing a package of available market research and infrastructure data for ISP consideration when making investment decisions • Encouraging ISP network sharing by facilitating conversations on installation cost-sharing benefits. Engage with ISPs on available county resources and partners that can be shared cross-network		
Justification	While ISPs may be willing to expand service, economic considerations, operational risks, and burdensome local rules and regulations may prevent them from doing so. Guilford County can encourage ISP service expansion by decreasing the cost and resources required for investment by ISPs related to administration, permitting, identification of available resources, policy changes, etc.		
Anticipated Benefits and Impact	• Improve broadband availability and network resilience in areas of the county identified as un(der)served • Increased customer choice when it comes to service providers, access technologies, and speeds • Increased market competition and possible lower consumer costs • Reduce unnecessary construction and excavation through establishing a "Dig Smart" policy or guidance for capital construction projects such as new school facilities.		
Relative Priority	High	**General Timeline**	6 months – 1 year
Considerations	• Additional conversations with ISPs are needed to understand their financial and operational considerations, the role the County might play to help mitigate risks, and potential partnership opportunities • Any "Dig Smart" or other fiber / ISP friendly policies adopted at the county or municipal level should be evaluated for potential interactions with North Carolina's "Dig Once" policy		

Case Study Example

Durham County, NC: The Research Triangle was determined to be suitable for additional fiber deployment as a Google Fiber Hub.

Fiber investment partners are looking for minimal delays in project rollout. The selected Counties that "won" a Google Fiber bid offered administrative efficiency. This included a single master contract, a sole point of contact in government, streamlined procedures for permits to install equipment on city-owned property, and permission to dig up city streets to lay conduit.

Stakeholders	ISPs
General Cost	• Process optimization is largely related to personnel costs. If a designated broadband resource is hired, this would fall under that individual's responsibilities • Changes in policy should be have minimal cost unless a revenue generating policy is changed • Any sort of financial incentives offered for infrastructure investment will likely be through a partnership (see targeted strategy section for cost details)
Potential Funding	• County General Funding • Local Fiscal Recovery Funds through Revenue Loss conversion to Guilford County's general fund • ARPA Funding as a match to ISP investment (as applicable)
Next Steps	• Initiate conversations with ISPs to identify key barriers to broadband deployment (e.g., access to municipal infrastructure like poles, permitting and construction processes) and determine how the County and municipalities can quickly alleviate those barriers.

Strategy 3: Launch pilot programs and iterate on successful designs

Launch pilot programs to test the targeted strategies for typologies with significant barriers to access and expand on those proven successful

Description	Pilot targeted strategies in areas that fall into the low availability and low affordability & low adoption typologies. The following targeted strategies are recommended for piloting in the below typologies:
	• *Low Availability*
	  • Establish a low-cost 5G wireless network in select Greensboro and High Point public housing facilities that can provide residents with individual broadband connections. This pilot project can leverage Affordable Connectivity Program funds to subsidize connections and may be more feasible interim solution in settings not yet connected by fiber.
	• *Low Affordability/Adoption*
	  • Equipping digital inclusion nodes could start with a small number of anchor institutions, e.g., High Point Library and Greensboro Central Library, one of the Title I schools, and one mobile center to test how a device lending program could work and assess demand.		

Justification	Pilot programs provide a low-risk opportunity to test out the effectiveness of strategies to address availability, affordability, and adoption gaps. Competitive grant awards are often favorable to pilot projects and successful pilot project extensions can attract additional grants and funding from other sources as well.		
Anticipated Benefits and Impact	• Validation of the effectiveness of targeted strategies • Better understanding of the strategies that offer the best broadband accessibility return on investment for Guilford County • Increased funding to expand on successful programs, which may lead to economies of scale		
Relative Priority	High	**General Timeline**	6 months - 1 year to obtain funding and launch first set of programs
Considerations	• Grants available for infrastructure build-out are often required to show proof of need. If need is different than FCC or other data sources used for criteria, time must be built in for additional data collection • Targeted strategies for affordability and adoption may require further need validation due to reliance on socio-economic factors to determine needs • Setting specific outcome metrics to determine whether to scale up a pilot and where adjustments to program design are needed • Pilot programs will require active involvement of partners, e.g., CBOs to help with outreach		

Case Study Example

Targeted strategies to “test” the effectiveness of programs before launching into wider implementation has proven to be an effective strategy. HUD launched the ConnectHome pilot with non-profit partners EveryoneOn and US Ignite in 2015 with 27 communities in HUD-assisted housing and one tribal nation to promote partnerships between ConnectHome communities, municipalities and NPOs and private sector and expanded to 100 cities by 2020. Initially, the pilot focused on the homework gap but has broadened its scope to digital inclusion overall.

Stakeholders	Depends on the specific pilot, but may be municipalities and local government, ISPs, CBOs and other non-profits, NCDIT, Community Anchor Institutions, Guilford County residents in areas that fall into low availability or low affordability & low adoption typologies
General Cost	Refer to the targeted strategy details for cost estimates on pg. 97-104
Potential Funding	Refer to the targeted strategy details for potential funding sources
Next Steps	• Identify which targeted strategies to pursue as pilots, location of pilots, and scope • Validate gaps and needs in pilot location area • Determine which funding sources to pursue and apply, as necessary • Once funding is secured, launch pilot

Strategy 4: Collaborate with other local governments on advocacy efforts

Collaborate with other counties and municipalities to make the **regulatory environment more friendly towards municipal broadband and allow greater flexibility for local governments** in meeting constituents' connectivity needs

Description	The current regulatory environment is not friendly towards municipal broadband. Challenges exist throughout the project life-cycle from obtaining funding to gaining access to appropriate assets to owning and operating infrastructure. Some efforts could look like the following: • Work with the NCACC and other partners to elevate broadband on the state advocacy agenda • Align with other counties and municipalities who may be interested in pursuing advocacy efforts • Collect data related to the unserved and underserved population to establish a fact base to support the need for public sector investment • Create a one-sheet or quick guide that elaborates on the need for municipal broadband and the potential net benefit to communities if law is repealed. Include list of projects that are currently inhibited by this law • Encourage constituents to write to state/federal legislative offices to advocate for municipal broadband • Support federal legislation, such as HR1904 that includes broadband as a utility for tenants of federally assisted housing that can be subsidized through federal funds. • Work with other counties and municipalities to support state legislative initiatives such as HB815 and SB 689 that seek to create fair cost allocation for pole attachments and reduce barriers to broadband expansion for ISPs. Existing federal and state pole attachment regulations have created cost barriers and time delays for ISPs seeking to deploy broadband infrastructure in rural, unserved areas. Under the current regulatory framework, Municipal and Co-op electric utilities have discretion to set rates and non-recurring upfront "make-ready" charges on ISPs.		
Justification	Regulatory conditions in North Carolina severely limit what the County and other local governments can do when it comes to broadband infrastructure build-out and expansion. Grants being offered through state-level American Rescue Plan funds are curtailed to an even narrower set of eligibility requirements compared with Federal funding guidelines due to state law and the General Assembly.		
Anticipated Benefits and Impact	• County and local government flexibility in addressing broadband unserved and underserved communities • Depending on the regulatory changes there may be opportunities for state and local governments to own and/or operate broadband infrastructure, Increased sources of funding for broadband infrastructure, and greater eligibility for competitive state-funded broadband infrastructure grants		
Relative Priority	Medium	**General Timeline**	1-3 years
Considerations	• There are multiple avenues that advocacy efforts could take, including advocating for revisions to H129, the passage of laws that expand or more clearly define what local governments are able to do when it comes to infrastructure investment, ownership, and operation, etc.		

Case Study Example

Arkansas passed Senate Bill 74 in February 2021, which effectively removed many of the barriers to establishing and maintaining municipal broadband networks in the state. There is some ambiguity to whether any barriers truly remain, and how these changes will play out legally (e.g., private ISPs could take legal action against municipal broadband efforts).

Stakeholders	Municipalities and local governments, Organizations with advocacy arms like NCACC, NCLM, ISPs, other legislative advocacy groups, residents and businesses
General Cost	Various (can be rolled into general budget allocated to NCACC or NCLM)
Potential Funding	• N/A
Next Steps	• Seek alignment amongst Commissioners that this is a priority for the County • Work with NCACC and other partners to elevate this issue on the state advocacy agenda • Evaluate benefit of working with a government relations/legislative advocacy firm to review and prioritize legislative efforts to support

Strategy 5: Explore developing public-provided, open access middle mile fiber

Explore developing public-provided, open access middle mile fiber to **increase affordable broadband access in areas with low availability** where ISP participation has fallen short [*contingent on successful advocacy*]

Description	Middle mile fiber is a critical component to last mile connections. Pending advocacy efforts and legislative changes, the County can explore the feasibility of financing and owning middle mile fiber. They can identify key anchor institutions that do not currently have middle mile fiber connections. Anchor institutions include schools, libraries, healthcare providers, community colleges, public media, public housing, and other community organizations. The County can also explore building out to other important nodes such as business parks, main streets, business districts, and agriculture/industrial. Some projects could consist of the following: • Build out middle mile fiber from existing government owned networks in Greensboro and High Point • Work with ISPs (e.g., MCNC) to identify areas they do not plan to expand fiber network in, and build out infrastructure in those areas		
Justification	Expanding middle mile fiber is a worthwhile investment for local governments because it encourages future development and expansion to last-mile providers. Publicly owned fiber can address gaps in private sector investments lowering cost of entry.		
Anticipated Benefits and Impact	Extending open access middle mile connections has been shown to: • Encourage and expedite future ISP investment near new middle mile connections • Achieve savings when multiple categories of customers an be supported, e.g., community anchor institutions and residential customers • Improve digital equity for community institutions, such as public housing, who do not have access to affordable high-speed internet • Potentially spur economic development to help connect businesses in the area		
Relative Priority	Medium	**General Timeline**	1-2 years post-regulatory changes
Considerations	• There are a variety of models the County could take to develop middle mile fiber. Depending on successful advocacy efforts, the County can consider various financing approaches (e.g., borrowing from private investors vs. using taxed dollars) and operating models (e.g., offering services directly to consumers, leasing bandwidth to ISPs who offer services to public) • Saving cost by connecting existing infrastructure using network sharing agreements • Risk mitigation, e.g., developing a comprehensive environmental plan in early project stages		

Case Study Example

Nelson County, VA built 39 miles of open access middle mile network combining broadband fiber optic and wireless services using multiple funding sources ($1.8M from the Broadband Technology Opportunities Program, local match funds (~$500K), community contributions ($690K), and $200K in CDBG funding in a two-phased rollout between 2010 to 2015. A Broadband Authority was formed to help administer the network and is now partnering with Firefly Fiber Broadband to extend last mile fiber (5 miles) to 400 homes and businesses in unserved areas.

Stakeholders	Municipalities and local governments, ISPs, residents and businesses
General Cost	Refer to targeted strategy cost estimates on pg. 97-104. Cost will depend on extent of buildout and environmental factors; Qualified engineers should evaluate feasibility and provide cost estimates
Potential Funding	• American Rescue Plan Act (Local Fiscal Recovery Funds & Capital Projects Fund Grants) • Middle Mile Infrastructure Grants
Next Steps	• Identify areas where middle mile fiber could be built out • Work with engineers, construction managers, and other partners to develop plan for buildout • Work with relevant stakeholders to socialize plan with residents and businesses

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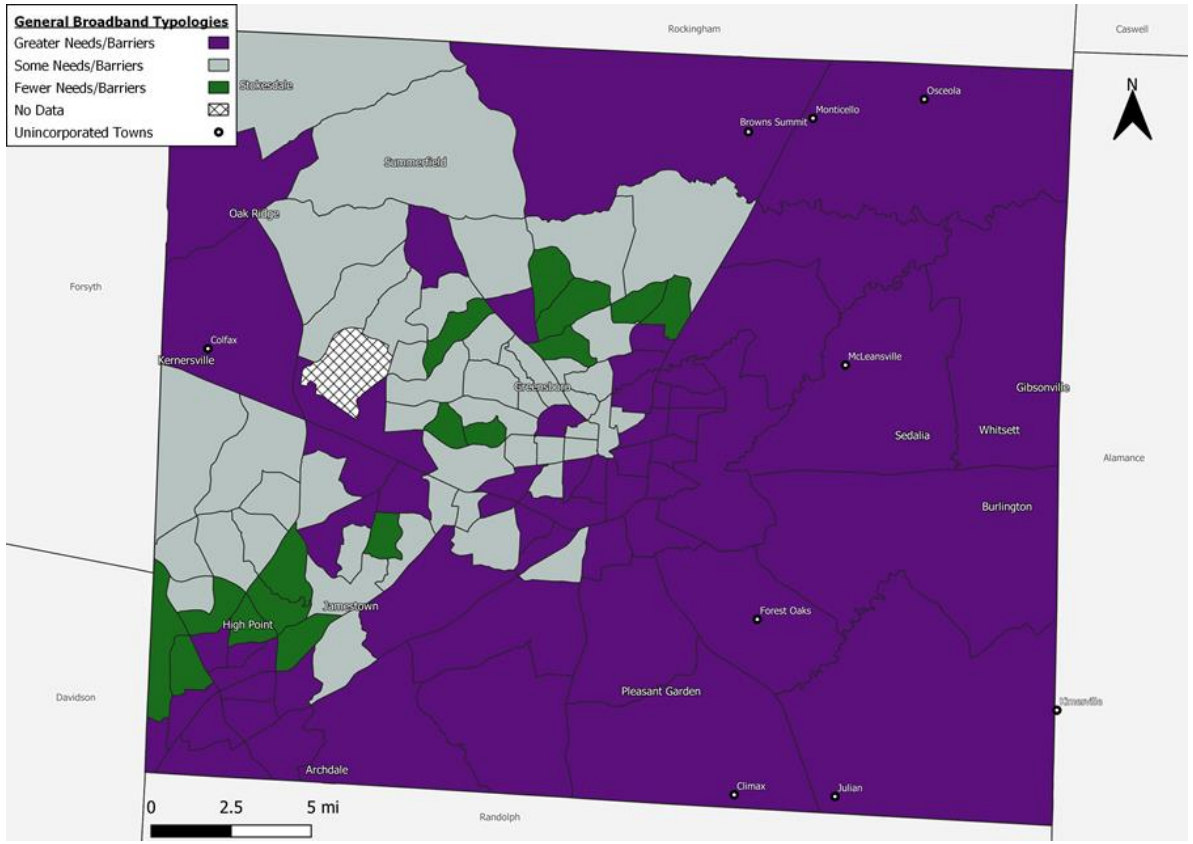
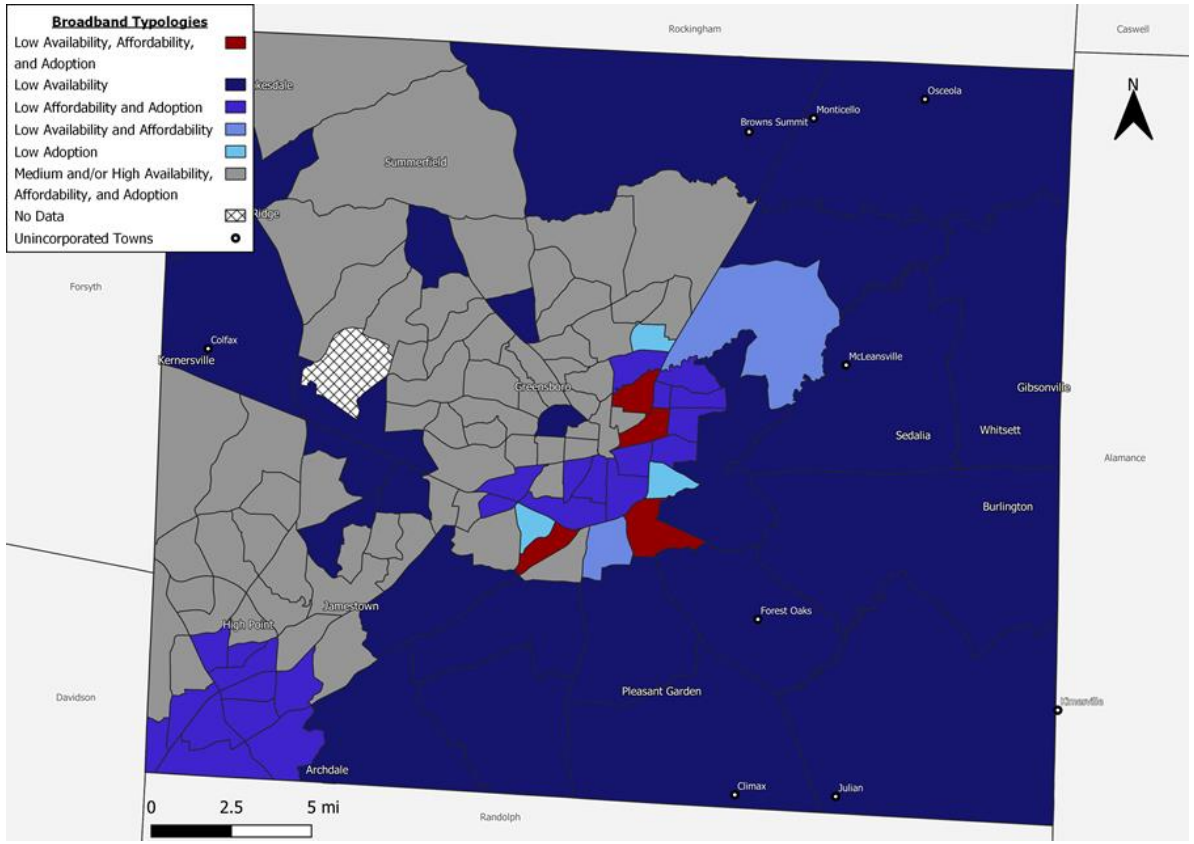
Areas with the most significant challenges as related to broadband availability, affordability, and adoption were distilled into five typologies

After analyzing the gaps and needs in Guilford census tracts, percentile scores were calculated, and census tracts were grouped into typologies.* The 5 typologies with the most significant barriers were selected for further analysis.

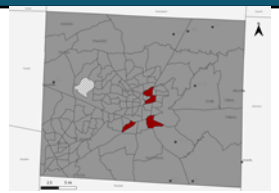
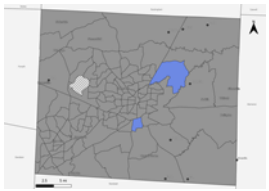
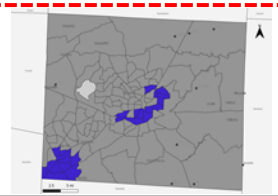
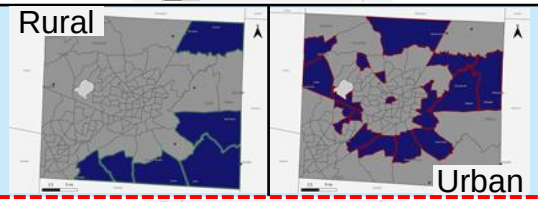
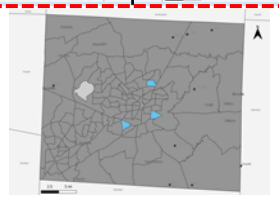




Each of the 5 typologies on the right face significant challenges related to affordability, availability, adoption, or a combination. Understanding the unique circumstances in these areas informs targeted strategies.

*See Gaps and Needs Assessment report for index methodology and details

Of the five typologies facing the most significant barriers, most census tracts fell into Low Availability or Low Affordability & Low Adoption

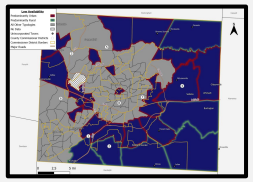
Location of census tracts within Guilford County	Typologies			Typology characteristics	Count of Census Tracts	Percent of County Population
	Low Availability	Low Affordability	Low Adoption			
	X	X	X	Urban high inequity and underserved	4	3%
	X	X		Urban fringe households with children at home	2	2%
		X *Low Affordability*	X *& Low Adoption*	Urban high inequity*	24	17%
Rural  Urban	X *Low Availability*			Low housing density • Rural: less consumer choice; higher population of elderly • Urban: limited access to fiber	24	25%
			X	Urban high inequity areas, minority households with ESL and individuals with disabilities	3	2%
				Total	**57**	**49%**

These two typologies comprise 42% of Guilford County and were the focus of targeted strategy development

*A single census tract fell into the Low Affordability only category and was grouped into the Low Affordability and Low Adoption typology due to the wide spread of adoption scores

Targeted strategies are recommended to address geographic-specific challenges related to broadband availability, affordability, and adoption

Low Availability and the Low Affordability & Low Adoption typologies comprise 42% of the County's population and the majority of areas facing digital inequity. Targeted strategies aimed at addressing needs should track to overall county goals



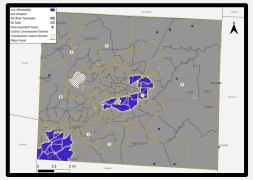
Low Availability

Greensboro's fringe, Pleasant Garden, Whitsett, Brown's Summit, Julian

Characteristics: Low housing density. Less consumer choice and a higher population of residents age 65+ in rural areas. Limited access to fiber in urban areas.

- 1.1 Last Mile: Pole Replacements
- 1.2 Middle mile: Fiber network into urban areas
- 1.3 Last mile: Fiber to the premise in unserved urban areas
- 1.4 Last mile: Urban 5G mesh network
- 1.5 Middle Mile: Fiber network into rural areas
- 1.6 Last Mile: Fiber to the premise in unserved rural areas
- 1.7 Evaluate resiliency of public safety services reliant on mobile broadband

Infrastructure-related strategies are recommendations based on the gaps assessment and will need to be validated by engineers



Low Affordability & Low Adoption

Central and south High Point and south and east Greensboro

Characteristics: Primarily in urban areas facing socio-economic barriers with special consideration for public housing authorities

- 2.1 Partner with Kramden Institute for digital device refurbishing / donations
- 2.2 "Gap" grant program and "one stop" application assistance
- 2.3 Digital Navigators
- 2.4 Digital Inclusion Nodes
- 3.1 Free / Discounted internet for public housing authorities (PHAs)
- 3.1a 5G campus network for PHAs
- 3.1b Fiber internet access for PHAs*

*3.1a and 3.1b targeted recommendations pertain to options for accomplishing recommendation 3.1

Potential KPIs

The state has set forward several goals to address the digital divide. While Guilford County already has achieved or is close to some of the state goals**, county stakeholders should consider measuring progress towards the following:

85% Raising the percentage of households with high-speed internet subscriptions from ~76%† to 85% by 2025

95% Raising the percentage of households with a connected computing device from 88%† to 95% by 2025

85% Percentage of eligible households enrolled in Affordable Connectivity Program (ACP) and successfully receiving service (currently ~31%‡) by 2025

Note: The task force can develop additional KPIs for projects as part of strategy implementation

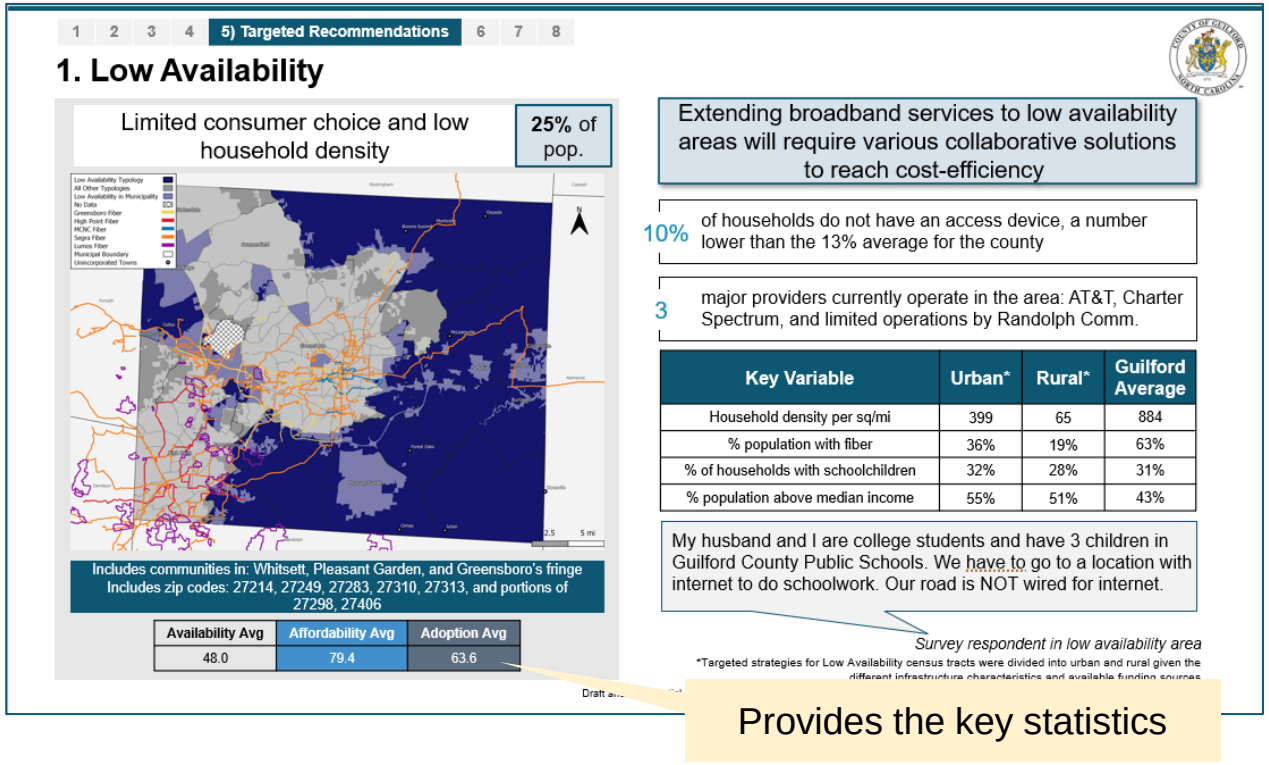
**See p.20

†Source: ACS 5-yr 2019 data

‡Estimated using Emergency Broadband Benefit enrollment data from Nov. 2021 and estimate of eligible population based on Medicaid enrollment divided by average household size

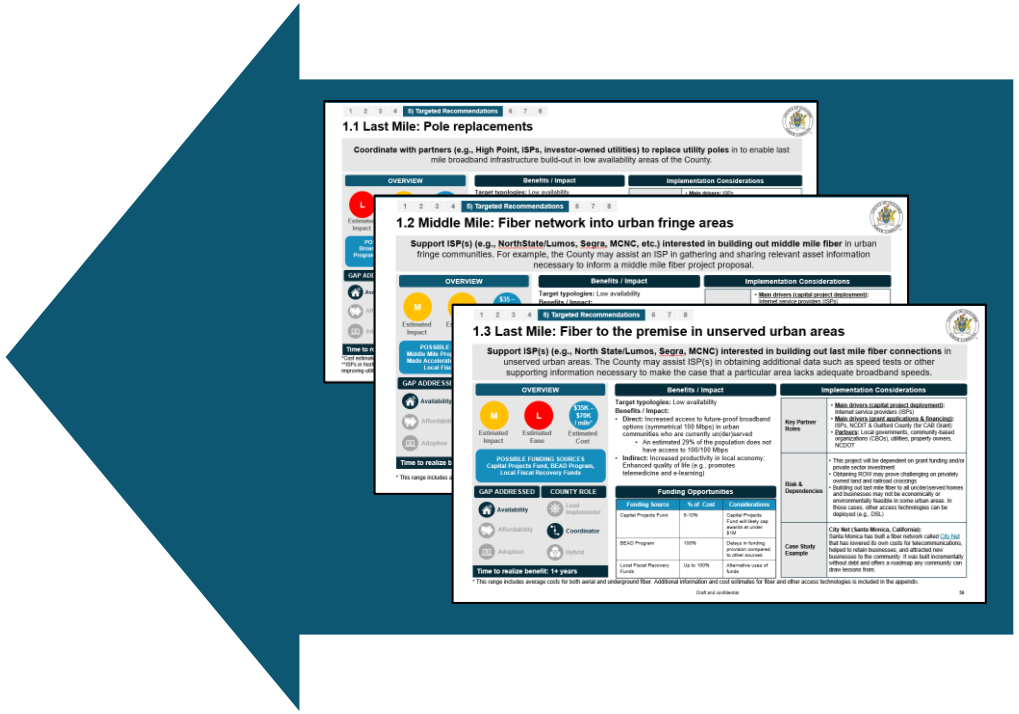
Each typology is profiled and followed by a series of targeted strategy recommendations for consideration

Typology Profile



Provides the key statistics

Targeted Strategy Baseball Cards



Profiles and targeted strategies for the Low Availability and Low Affordability & Low Adoption typologies are featured in the following pages. The profiles for the other typologies can be found in the Technical Appendix along with their mapping to the relevant targeted strategies.

Targeted strategies were evaluated based on their impact and ease

	Criterion	Criterion Definition	Score Definition: Low	Score Definition: Moderate	Score Definition: High
Impact	**Percent of population potentially impacted**	Percent of population that could have increased broadband access as a result of the targeted strategy	0-5%	5-10%	10%+
Impact	**Types of broadband gaps addressed**	Potential to address multiple gaps through one targeted strategy	Addresses 1 type of gap: either Availability, Affordability, or Adoption	Addresses 2 out of 3 types of gaps: Availability, Affordability, and/or Adoption	Addresses all 3 types of gaps: Availability, Affordability, and Adoption
Impact	**Long-term Investment in Availability**	Long-term impact of targeted strategy in increasing availability	Supply-side infrastructure for >25/3 Mpbs but <100/20 Mbps	Supply-side infrastructure for ≥100/20 Mpbs but <100/100 Mbps	Supply-side infrastructure for 100/100 Mbps
Impact	**Long-term Investment in Affordability or Adoption**	Long-term impact of targeted strategy in increasing affordability or adoption	Only addresses 1 element of digital inclusion*	Addresses some (2 to 3) elements of digital inclusion*	Addresses nearly all (4 to 5) elements of digital inclusion*
Ease	**Cost**	Resources required to implement	Significant investment	Moderate investment - expand current resources	No additional investment
Ease	**Level of partnership required**	Number of entities external to the County needed to achieve the potential benefit	3+ external entities	1-2 external entities	No external entities
Ease	**Time**	Time needed to realize the benefit	More than 1 year	6 months - 1 year	Less than 6 months

Note: Additional details on impact and ease scores can be found in the Strategy Appendix (p.97-102)
*Digital Inclusion definition: 1) home connectivity, 2) devices, 3) digital literacy training,4) technical support, and 5) applications/content designed to enable & encourage self-sufficiency, participation and collaboration (NDIA)

Targeted strategy impact and ease comparisons

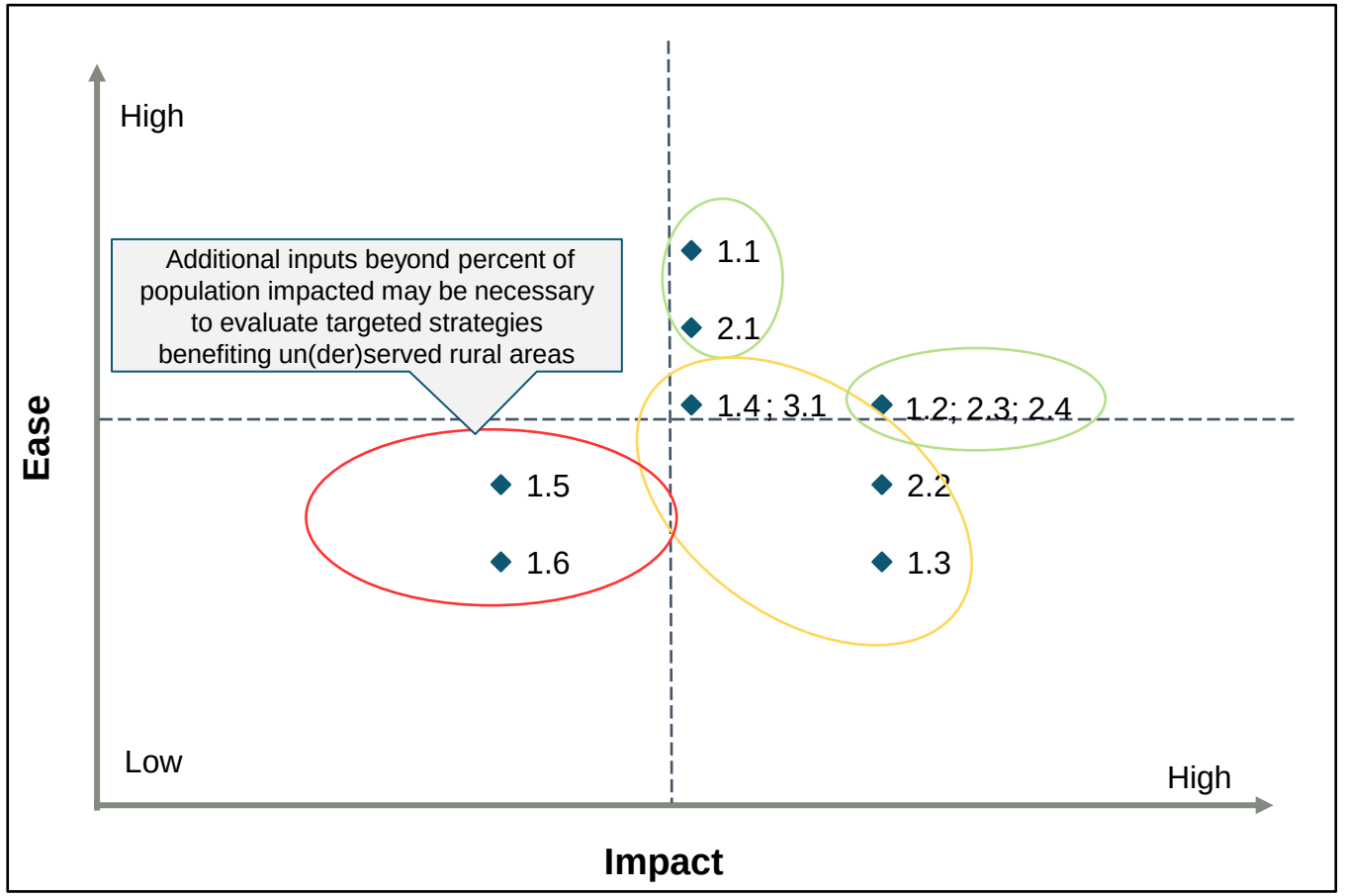
The graphic below shows the **level of impact vs. ease** for each of the targeted strategies. High impact and High ease recommendations can be pursued first subject to decisions on overall priorities

Recommendations

1.1	Last Mile: Pole Replacements
1.2	Middle Mile: Fiber network into urban areas
1.3	Last Mile: Fiber to the premise in unserved urban areas
1.4	Last Mile: Urban 5G mesh network
1.5	Last Mile: Fiber network into rural areas
1.6	Last Mile: Fiber to the premise in unserved rural areas
2.1	Partner with Kramden Institute for digital device refurbishing/donations
2.2	"Gap" grant program and "one stop" application assistance
2.3	Digital Navigators
2.4	Digital inclusion nodes
3.1	Free/Discounted internet for public housing authorities (PHAs) (includes 3.1a and 3.1b)

Results	
Bucket	Implication
◯	Strategies having relatively lower impact and/or lower ease but may be considered higher priority for funding as they address broadband availability gaps in un(der)served areas of the county
◯	Strategies having relatively moderate impacts and moderate ease
◯	Strategies having relatively higher impact and relatively moderate or higher ease that the County may consider pursuing first

Impact vs. Ease



Low Availability

> Urban Census Tracts

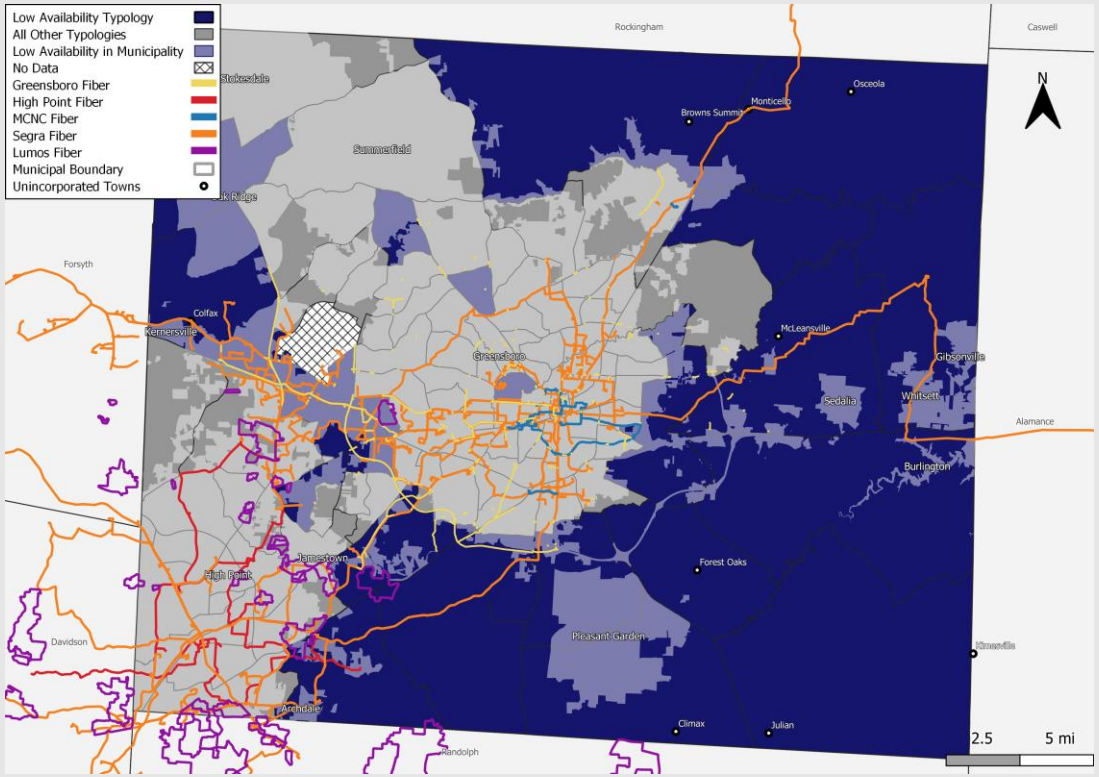
> Rural Census Tracts

> Special Considerations: Public Safety

1. Low Availability

Limited consumer choice and low household density

25% of pop.



Includes communities in: Whitsett, Pleasant Garden, and Greensboro's fringe
Includes zip codes: 27214, 27249, 27283, 27310, 27313, and portions of 27298, 27406

Availability Avg	Affordability Avg	Adoption Avg
48.0	79.4	63.6

Extending broadband services to low availability areas will require various collaborative solutions to reach cost-efficiency

10% of households do not have an access device, a number lower than the 13% average for the county

3 major providers currently operate in the area: AT&T, Charter Spectrum, and limited operations by Randolph Comm.

Key Variable	Urban*	Rural*	Guilford Average
Household density per sq/mi	399	65	884
% population with fiber	36%	19%	63%
% of households with schoolchildren	32%	28%	31%
% population above median income	55%	51%	43%

My husband and I are college students and have 3 children in Guilford County Public Schools. We have to go to a location with internet to do schoolwork. Our road is NOT wired for internet.

Survey respondent in low availability area

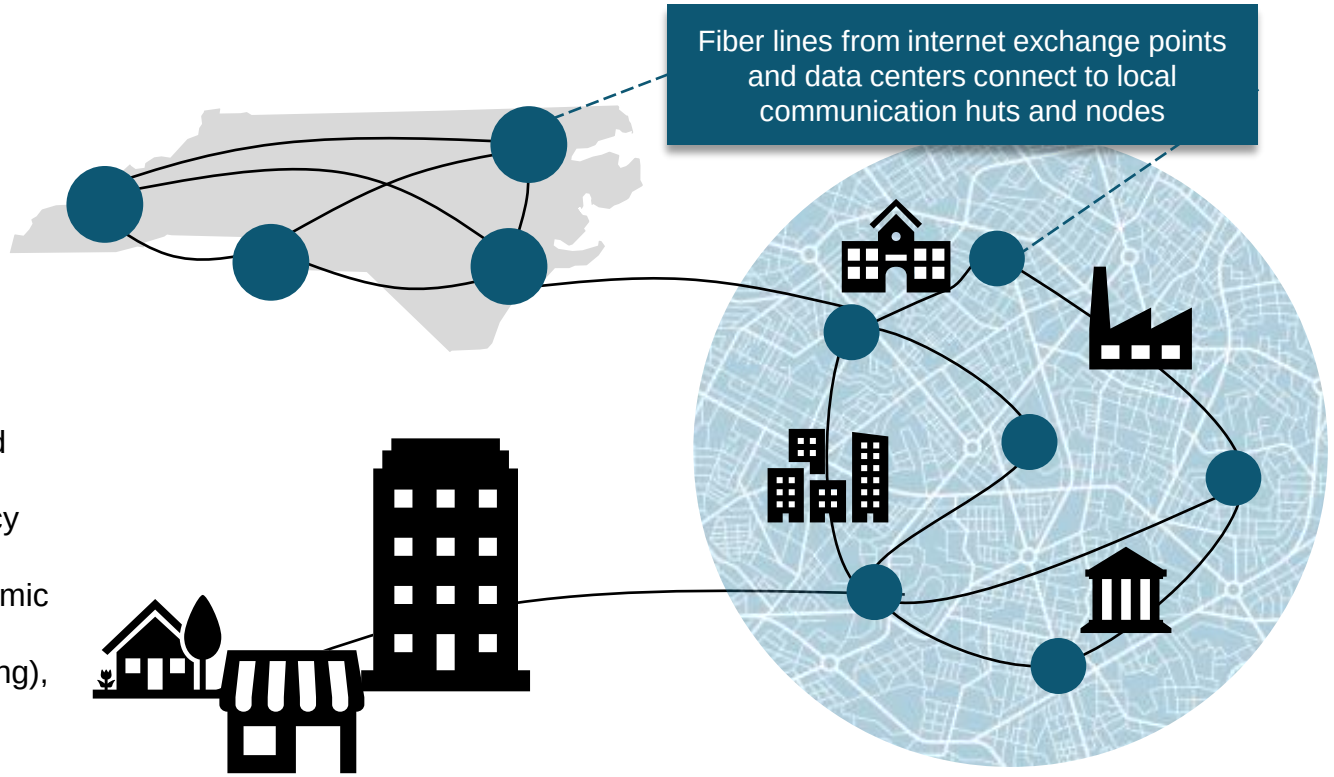
*Targeted strategies for Low Availability census tracts were divided into urban and rural given the different infrastructure characteristics and available funding sources

Multiple infrastructure components affect broadband availability

This diagram outlines the main infrastructure components of broadband. This includes the internet backbone, middle mile connections, last mile connections, and communication nodes (e.g., data centers, internet exchange points).

The internet backbone is a conglomeration of multiple, redundant networks owned and operated by numerous telecommunications entities (public and private). It is typically built with fiber optic cables (i.e., fiber).

Last mile connections provide internet to a home or business, and can be a combination of fiber, fixed wireless (e.g., 5G), and other legacy technologies such as coaxial cable and DSL. Some educational/economic activities conducted online (e.g., telehealth, e-learning, telecommuting), require higher speeds (minimum 100/100 Mbps).



Middle mile connections are typically built from fiber, and can be built off the backbone, or other middle mile lines. Middle mile will often connect anchor institutions (e.g., schools, libraries, healthcare providers, community colleges, public media, public housing) and is the intermediary between last mile connections.

Key Insight: In Guilford County, middle mile fiber is in most dense urban areas, but lacking in lower-income neighborhoods and in communities on the urban fringe.

Recommendations focus on middle and last mile connections. Depending on existing infrastructure assets, middle mile and last mile projects can either be completed together or separate**. In general, last mile projects typically require middle mile availability. Research suggests fiber is the only access technology that can reach symmetrical future-proofed speeds of 100/100 Mbps.**

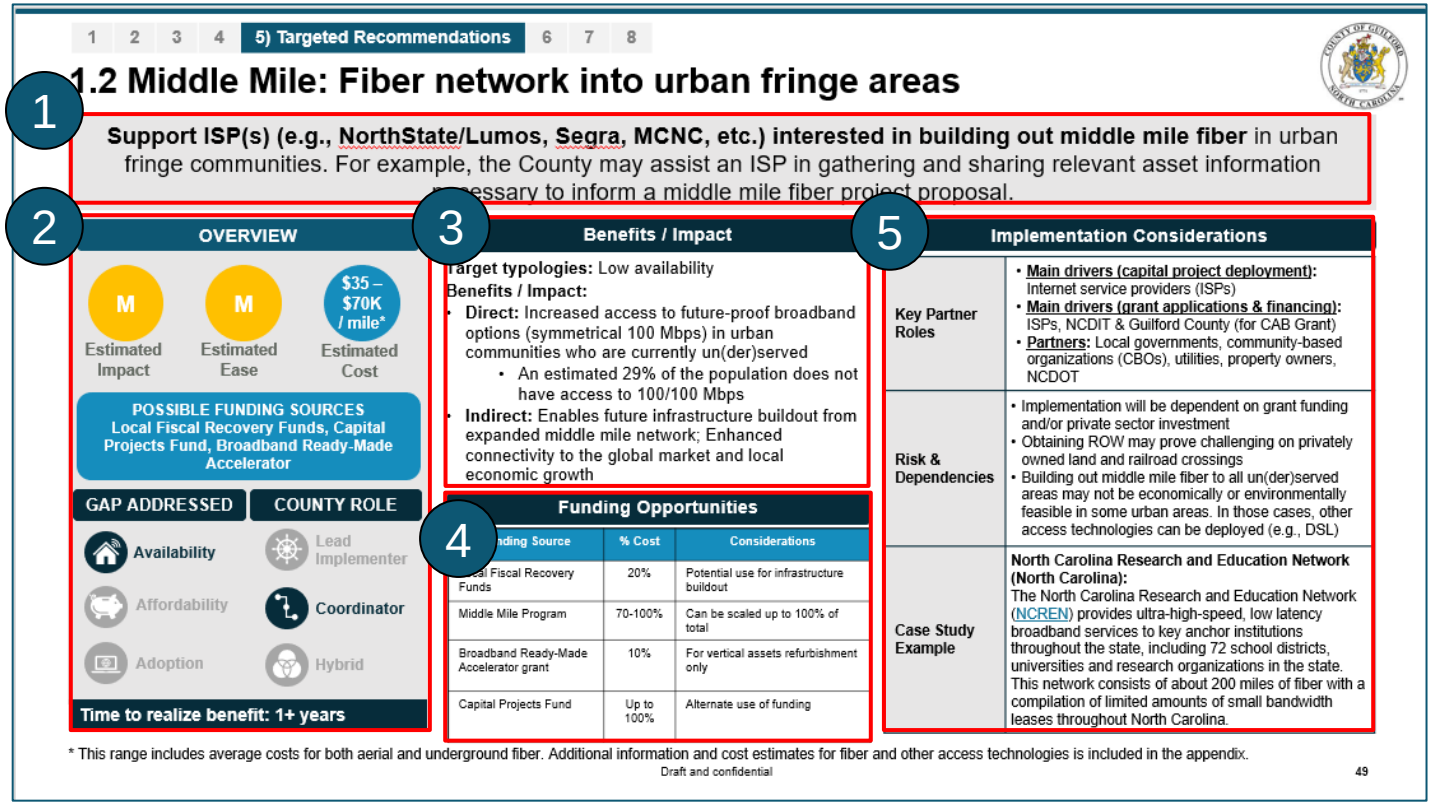
The following factors for middle and last mile connections were considered when identifying targeted strategies for areas facing low availability

			Consideration Factors						
	Targeted Strategies	**Selected for Targeted Strategy?***	**Environmental & Network Resiliency**	**Future-proofing**	**Capital Costs**	**Supply Chain & Labor**	**Infrastructure Builders & Owners**	**Public-Private Partnerships (P3s)**	**Funding & Financing**
Last Mile Connections & Maintenance	**Middle Mile Fiber**	Yes	• Underground fiber is more environmentally resilient than aerial fiber but more costly. • Underground fiber may not be feasible in some geotechnical conditions (e.g., bedrock).	• Fiber is the only technology that can reliably reach 100/100 Mbps, the speed needed for a family or business to conduct economic and educational activities online.	• Last mile fiber will be more cost prohibitive than middle mile, especially in rural areas. • Underground fiber is more costly but more environmentally resilient in the case of ice storms, etc.	• Some ISPs anticipate resource shortages (e.g., labor, materials) that may affect deployment timeline for infrastructure buildout. • Fiber optic cable has been particularly impacted by recent resource shortages, and increased demand.	• Due to regulatory restrictions, the builders and owners of broadband infrastructure for services used in residential and commercial markets will likely be ISPs and not local governmental entities.	• Local governments can enter partnerships with ISPs, especially if they are interested in a particular unserved area and pursing grant funding. • Entering partnerships can help streamline network expansion efforts (e.g., streamline granting public rights-of-way). • The County may consider partnering with neighboring local governments (e.g., counties, cities, municipalities) for projects near the County lines.	• Private ISPs may pursue funding opportunities, but it is not a primary driver for their expansion efforts. For example, for-profit ISPs have noted that many of their expansion efforts have not been driven by grant funding. • Not-for-profit ISPs (e.g., Randolph) relies more on grant funding. When approaching expansion, they try to work hand and hand with the local governments in the service area to identify gaps.
	Fiber	Yes							
	Fixed Wireless (including 5G)	Yes	• Wireless infrastructure requires lines of sight. May have connection challenges in older building stock.	• 5G Fixed Wireless is comparable to fiber for small households. • These access technologies do not reliably reach 100/100 Mbps. • Wireless connections could present security risks.	• These access technologies are typically less expensive than fiber buildout and may be deployed when fiber-to-the-premise is not economically feasible (see appendix).				
	Mobile Wireless	No							
	Coaxial Cable (i.e., cable)	No	• Cable and DSL can be aerial or underground.						
	DSL	No							
	Pole Replacements	Yes	• Replacing and/or refurbishing poles can support buildout and network resiliency of all access technologies (e.g., fiber, wireless, cable, DSL).						

*Based on feedback received from strategic focus group sessions on the need for sufficient broadband speeds to the home to do relatively higher bandwidth activities such as remote learning, work, telehealth, and EMS as well as guidelines around funding focused on 100/20 or 100/100 Mbps

45

How to Read: Targeted Strategy Baseball Card



1 Targeted Strategy Summary

The summary provides a high-level overview of what the strategy is and how it will be executed.

2 Targeted Strategy Overview

The overview section notes the strategy's level of impact and ease, and estimated cost, which are further detailed in the Appendix (pg. 91) . It describes the possible funding sources, gaps addressed, and role the County would play in implementation. The time to realize benefit is also noted.

3 Benefits and Impacts

This reviews the direct and indirect benefits and impacts for target typologies if the strategy is pursued.

4 Funding Opportunities

Funding opportunities and considerations are highlighted in this section as well as the estimated % of cost that could be covered. Information on specific funding sources is included in Appendix (pg. 114).

5 Implementation Considerations

This reviews implementation considerations such as key partner roles and responsibilities, risks and dependences, and case study examples or best practices.

1.1 Last Mile: Pole replacements

Coordinate with partners (e.g., High Point, ISPs, investor-owned utilities) to replace utility poles in to enable last mile broadband infrastructure build-out in low availability areas of the County.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost/Mile*
M	H	$27K – $32.4K*

POSSIBLE FUNDING SOURCES
Broadband Make Ready Accelerator Program, GREAT Grant, Capital Projects Fund

GAP ADDRESSED

- **Availability**
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- **Coordinator**
- Hybrid

Time to realize benefit: 6+ months

Benefits / Impact

Target typologies: Low availability

Benefits / Impact:

- **Direct:** Facilitates additional wire (e.g., fiber, cable) infrastructure attachments making it easier for ISPs to add new deployments, particularly in rural areas
  - Lowers the upfront "make-ready" costs** to ISPs seeking to deploy broadband infrastructure (Pole replacement costs can account for 1/3 of rural build-out expenses)
  - Minimizes delays in broadband deployment
- **Indirect:** Increases number of broadband service provider options thereby potentially lowering the cost of available high-speed service plans

Funding Opportunities

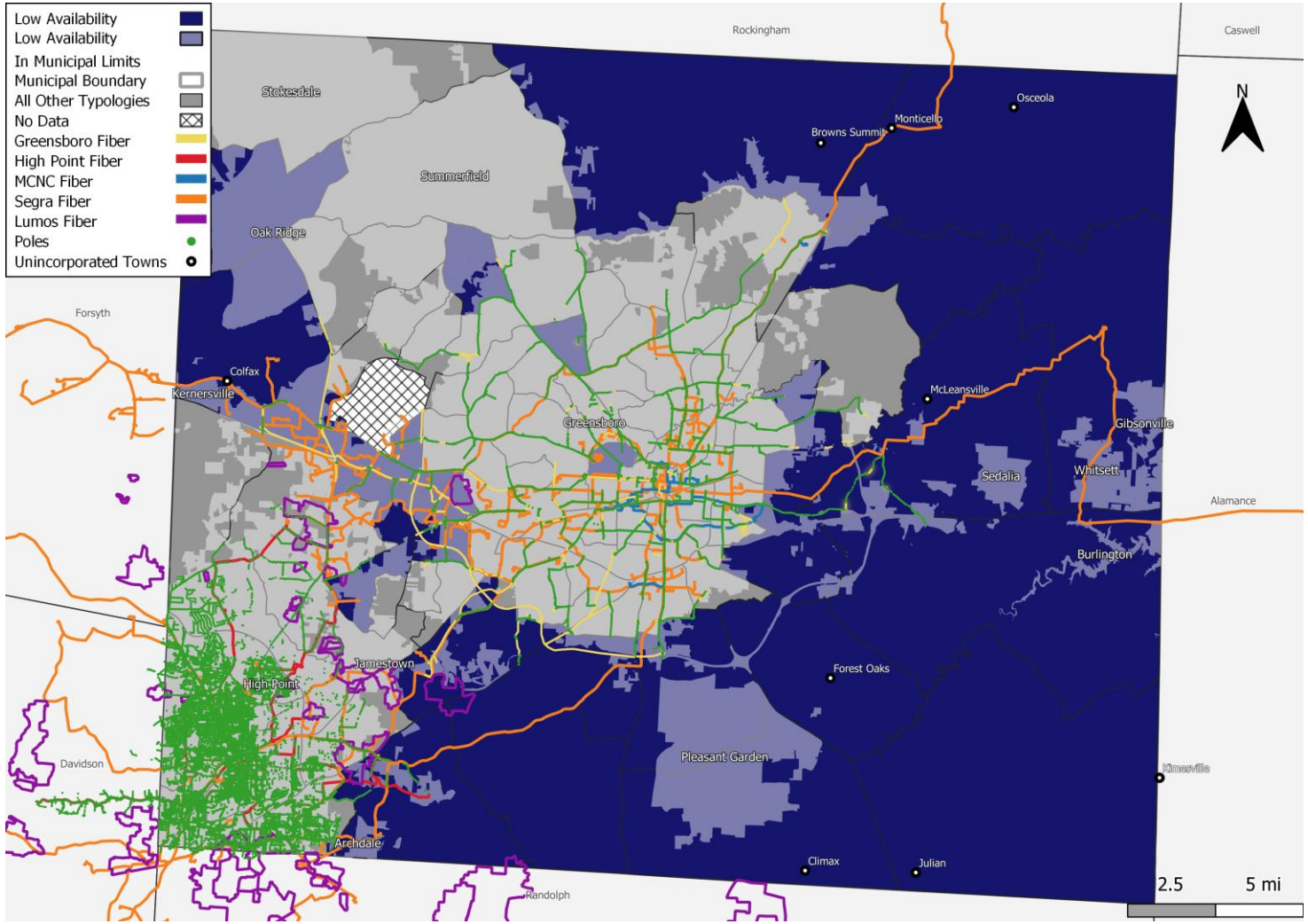
Funding Source	% of Cost	Considerations
Broadband Make Ready Accelerator Program	100%	n/a
GREAT Grant	Up to 100%	Prioritization of buildouts
Capital Projects Fund	Up to 100%	Alternate Uses

Implementation Considerations

Key Partner Roles & Responsibilities	• **Main drivers:** ISPs • **Partners:** Muni and coop electric utilities, investor-owned utilities (e.g., Duke Energy), other poles owners such as High Point, County, municipalities • **Responsibilities**: ISPs or municipalities would apply to funding to cover cost of replacing poles to accommodate additional attachments
Risk & Dependencies	• Existing state policies related to pole attachments provide muni and coop electric utilities significant market power to set pole attachment rates and terms. Depending on these conditions, it may not be profitable for ISPs to deploy infrastructure in some rural areas. HB815 and SB 689 seek to create fair cost allocation and reduce barriers to broadband expansion. • There may be environmental resilience considerations to building out aerial infrastructure versus burying fiber underground where network infrastructure may be less vulnerable to ice storms and other extreme weather.
Best Practices	The County and municipalities can advocate for regulatory reform at the state level to align pole attachment regulations with best practices related to cost-sharing, dispute resolution, and setting transparent and consistent rates for pole attachments.

*Cost estimate for this strategy is based on the pole replacement costs associated with an additional mile of aerial fiber.
**ISPs in North Carolina typically must cover upfront "make-ready" costs including the cost of replacing, repairing, and improving utility poles.

Considerations for evaluating replacing or installing new utility poles to facilitate aerial fiber expansion:



Considerations:

- Pole location data collected through the asset inventory is depicted on the map and is limited to city-owned and third-party owned utility poles in High Point and Greensboro.
- High Point is unique in that it owns most of its utility poles and would have discretion to negotiate attachment rates and other costs associated with attaching broadband infrastructure. This unique ownership structure may allow the City to take advantage of state funding for poles replacements.
- In order to assess whether a pole installation or replacement targeted strategy should be pursued, the County should first collect additional information from poles owners to determine current pole capacity and availability in rural, unserved areas.
- ISPs seeking to build out broadband may need to work with pole owners to determine cost allocation if pole replacement is necessary and apply for funding to help mitigate upfront costs.

Low Availability

> Urban Census Tracts

> Rural Census Tracts

> Special Considerations: Public Safety

1.2 Middle Mile: Fiber network into urban fringe areas

Support ISP(s) (e.g., NorthState/Lumos, Segra, MCNC, etc.) interested in building out middle mile fiber in urban fringe communities. For example, the County may assist an ISP in gathering and sharing relevant asset information necessary to inform a middle mile fiber project proposal.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
H	M	$35 – $70K / mile*

POSSIBLE FUNDING SOURCES
Middle Mile Program , Broadband Ready-Made Accelerator, Capital Projects Fund, Local Fiscal Recovery Funds

GAP ADDRESSED

- **Availability**
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- **Coordinator**
- Hybrid

Time to realize benefit: 1+ years

Benefits / Impact

Target typologies: Low availability

Benefits / Impact:

- **Direct:** Increased access to future-proof broadband options (symmetrical 100 Mbps) in urban communities who are currently un(der)served
  - An estimated 29% of the population does not have access to 100/100 Mbps
- **Indirect:** Enables future infrastructure buildout from expanded middle mile network; Enhanced connectivity to the global market, local economic growth, and for public safety services

Funding Opportunities

Funding Source	% Cost	Considerations
Middle Mile Program	70-100%	Can be scaled up to 100% of total
Broadband Ready-Made Accelerator Grant	10-30%	For vertical assets refurbishment only
Capital Projects Fund	Up to 100%	Alternate use of funding
Local Fiscal Recovery Funds	20%	Alternate uses of funding

Implementation Considerations

Key Partner Roles	• **Main drivers (capital project deployment):** Internet service providers (ISPs) • **Main drivers (grant applications & financing):** ISPs, NCDIT & Guilford County (for CAB Grant) • **Partners:** Local governments, community-based organizations (CBOs), utilities, property owners, NCDOT
Risk & Dependencies	• Implementation will be dependent on grant funding and/or private sector investment • Obtaining ROW may prove challenging on privately owned land and railroad crossings • Building out middle mile fiber to all un(der)served areas may not be economically or environmentally feasible in some urban areas. In those cases, other access technologies can be deployed (e.g., DSL)
Case Study Example	**North Carolina Research and Education Network (North Carolina):** The North Carolina Research and Education Network (NCREN) provides ultra-high-speed, low latency broadband services to key anchor institutions throughout the state, including 72 school districts, universities and research organizations in the state. This network consists of about 200 miles of fiber with a compilation of limited amounts of small bandwidth leases throughout North Carolina.

* This range includes average costs for both aerial and underground fiber. Additional information and cost estimates for fiber and other access technologies is included in the appendix.

1.3 Last Mile: Fiber to the premise in unserved urban areas

Support ISP(s) (e.g., NorthState/Lumos, Segra, MCNC) interested in building out last mile fiber connections in unserved urban areas. The County may assist ISP(s) in obtaining additional data such as speed tests or other supporting information necessary to make the case that a particular area lacks adequate broadband speeds.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
H	L	$35K – $70K / mile*

POSSIBLE FUNDING SOURCES
Capital Projects Fund, BEAD Program, Local Fiscal Recovery Funds

GAP ADDRESSED

- **Availability**
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- **Coordinator**
- Hybrid

Time to realize benefit: 1+ years

Benefits / Impact

Target typologies: Low availability

Benefits / Impact:

- **Direct:** Increased access to future-proof broadband options (symmetrical 100 Mbps) in urban communities who are currently un(der)served
  - An estimated 29% of the population does not have access to 100/100 Mbps
- **Indirect:** Increased productivity in local economy; Enhanced quality of life (e.g., promotes telemedicine and e-learning)

Funding Opportunities

Funding Source	% of Cost	Considerations
Capital Projects Fund	5-10%	Capital Projects Fund will likely cap awards at under $1M
BEAD Program	100%	Delays in funding provision compared to other sources
Local Fiscal Recovery Funds	Up to 100%	Alternative uses of funds

Implementation Considerations

Key Partner Roles	• **Main drivers (capital project deployment):** Internet service providers (ISPs) • **Main drivers (grant applications & financing):** ISPs, NCDIT & Guilford County (for CAB Grant) • **Partners:** Local governments, community-based organizations (CBOs), utilities, property owners, NCDOT
Risk & Dependencies	• This project will be dependent on grant funding and/or private sector investment • Obtaining ROW may prove challenging on privately owned land and railroad crossings • Building out last mile fiber to all un(der)served homes and businesses may not be economically or environmentally feasible in some urban areas. In those cases, other access technologies can be deployed (e.g., DSL)
Case Study Example	**City Net (Santa Monica, California):** Santa Monica has built a fiber network called City Net that has lowered its own costs for telecommunications, helped to retain businesses, and attracted new businesses to the community. It was built incrementally without debt and offers a roadmap any community can draw lessons from.

* This range includes average costs for both aerial and underground fiber. Additional information and cost estimates for fiber and other access technologies is included in the appendix.

1.4 Last Mile: Urban 5G mesh network

Partner with Verizon to expand scope of Greensboro 5G Ultra Wideband network to include High Point and urban fringe areas. Greensboro and High Point may pursue 5G as a complementary strategy to fiber to the premise in order to fill gaps in high-speed coverage in areas where fiber is not cost-effective or feasible.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
M	M	$2M – $2.4M*

POSSIBLE FUNDING SOURCES
5G Fund, Capital Projects Fund

GAP ADDRESSED

- **Availability**
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- **Coordinator**
- Hybrid

Time to realize benefit: 1+ years

Benefits / Impact

Target typologies: Low availability

Benefits/Impact

- **Direct Impact:** Increase business and residential access to high speed (mmWave 28 GHz and 39GHz) 5G wireless internet (1Gbps) in suburban areas of Greensboro and High Point
- **Indirect Impact**: Attract new economic development opportunities and enable smart city technologies (IoT) in High Point and Greensboro

Funding Opportunities

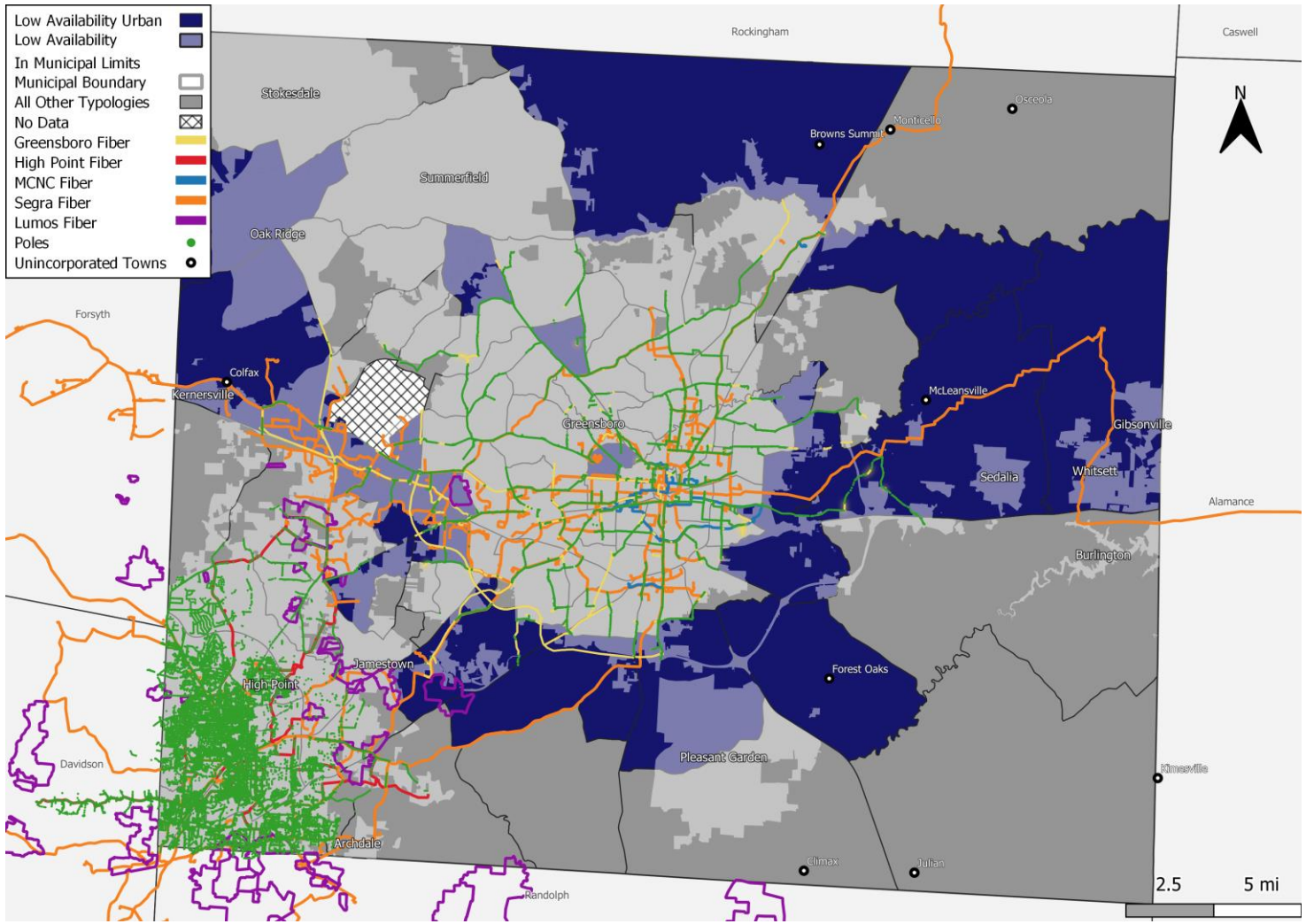
Funding Source	% of Cost	Considerations
5G Fund	100%	May require ISPs to participate in bid process
Capital Projects Fund	100%	Flexible funds which could have alternate use

Implementation Considerations

Key Partner Roles & Responsibilities	• **Main drivers:** Greensboro and High Point • **Partners:** Verizon or other wireless ISP • **Responsibilities:** High Point and/or Greensboro can build on pre-existing partnership with Verizon to build out urban 5G mesh network
Risk & Dependencies	• Existing Verizon 5G UW service is available in East Greensboro, West Greensboro, South Greensboro and near Bennett College, Warnersville Recreation Center, University Village Student Apartments and Old Peck Park – given stage of 5G roll-out it may be possible to expand scope as project is still underway • High Point's Planning & Development Department will need to negotiate with Verizon on terms of accessing city-owned utility poles and fiber assets • Further assessment of 5G demand in suburban areas outside Greensboro may be necessary to determine cost-effectiveness from ISP perspective
Case Study Example	Greensboro 5G partnership with Verizon: The city currently has 200 small cell cites and are still building.

* This range includes average costs for a project with 200 small cells. Additional information and cost estimates is included in the appendix.

Considerations for evaluating fiber and 5G infrastructure to improve broadband availability in areas on the edges of High Point and Greensboro:



Considerations:

- Mapped fiber data is not comprehensive of all available infrastructure in Guilford County, so additional fiber data will need to be collected from ISPs as necessary to analyze what existing infrastructure can be leveraged or built on to extend coverage.
- Additionally, negotiations amongst the County, cities, ISPs, and poles owners will need to be initiated to roadmap additional last mile buildouts to avoid installing redundant network infrastructure and potentially expedite permitting processes.
- Fiber and 5G can be evaluated and pursued as complementary rather than competing strategies to ensure that residents and businesses have high-speed broadband access.

*Urban or Rural status was determined by overlaying 2021 Census TIGER/Line urbanized area shapefiles and designating any tract with significant overlap as urban, and all others as rural. See Census Bureau and TIGER/Line download for sources.

Low Availability

> Urban Census Tracts

> Rural Census Tracts

> Special Considerations: Public Safety

1.5 Middle Mile: Fiber network into rural areas

Support ISP(s) (e.g., NorthState/Lumos, Segra, MCNC, etc.) interested in building out middle mile fiber to connect rural communities and enhance public safety. For example, the County may assist an ISP in gathering and sharing relevant asset information necessary to inform a middle mile fiber project proposal.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
L	L	$35 – $70K / mile*

POSSIBLE FUNDING SOURCES
GREAT/CAB Grant, ReConnect Program, Broadband Ready-Made Accelerator, Middle Mile Program

GAP ADDRESSED

- **Availability**
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- **Coordinator**
- Hybrid

Time to realize benefit: 1+ years

Benefits / Impact

Target typologies: Low availability

Benefits / Impact:

- **Direct:** Increased access to future-proof broadband options (symmetrical 100 Mbps) in rural communities who are currently un(der)served
  - An estimated 29% of the population does not have access to 100/100 Mbps
- **Indirect:** Enables future infrastructure buildout from expanded middle mile network; Enhanced connectivity to the global market, local economic growth, and for public safety services

Funding Opportunities

Funding Source	% Cost	Considerations
GREAT/CAB Grant	20-30%	Priority due to deadline
ReConnect Program	30-40%	Only for use in rural service areas
BB Ready-Made Accelerator Grant	0-30%	For vertical assets only
Middle Mile Program	Up to 100%	n/a

Implementation Considerations

Key Partner Roles	• **Main drivers (capital project deployment):** Internet service providers (ISPs) • **Main drivers (grant applications & financing):** ISPs, NCDIT & Guilford County (for CAB Grant) • **Partners:** Local governments, community-based organizations (CBOs), utilities, property owners, NCDOT
Risk & Dependencies	• Implementation will be dependent on grant funding and/or private sector investment • Obtaining ROW may prove challenging on privately owned land and railroad crossings • Building out middle mile fiber to all un(der)served areas may not be economically or environmentally feasible in some rural areas. In those cases, other technologies such as fixed wireless may be explored.
Case Study Example	**Golden LEAF Rural Broadband Initiative (North Carolina):** The Golden LEAF Rural Broadband Initiative built off the North Carolina Research and Education Network (NCREN). Completed in 2013, this project brought high-speed broadband to more than 1,500 community anchor institutions; and through private-sector service providers, potentially reached 180,000 businesses and more than 300,000 underserved families in 82 mainly rural counties in North Carolina.

* This range includes average costs for both aerial and underground fiber. Additional information and cost estimates for fiber and other access technologies is included in the appendix.

1.6 Last Mile: Fiber to the premise in unserved rural areas

Support ISP(s) (e.g., North State/Lumos, Segra, MCNC) interested in building out last mile fiber connections in unserved rural areas. The County may assist ISP(s) in obtaining any additional data such as speed tests or supporting information necessary to make the case that a particular area lacks adequate broadband speeds.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
L	L	$35 – $70K / mile*

POSSIBLE FUNDING SOURCES
GREAT/CAB Grant, ReConnect Program, Capital Projects Fund, BEAD Program

GAP ADDRESSED

- **Availability**
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- **Coordinator**
- Hybrid

Time to realize benefit: 1+ years

Benefits / Impact

Target typologies: Low availability

Benefits / Impact:

- **Direct:** Increased access to future-proof broadband options (symmetrical 100 Mbps) in rural communities who are currently un(der)served
  - An estimated 29% of the population does not have access to 100/100 Mbps
- **Indirect:** Increased productivity in local economy; Enhanced quality of life (e.g., promotes telemedicine and e-learning)

Funding Opportunities

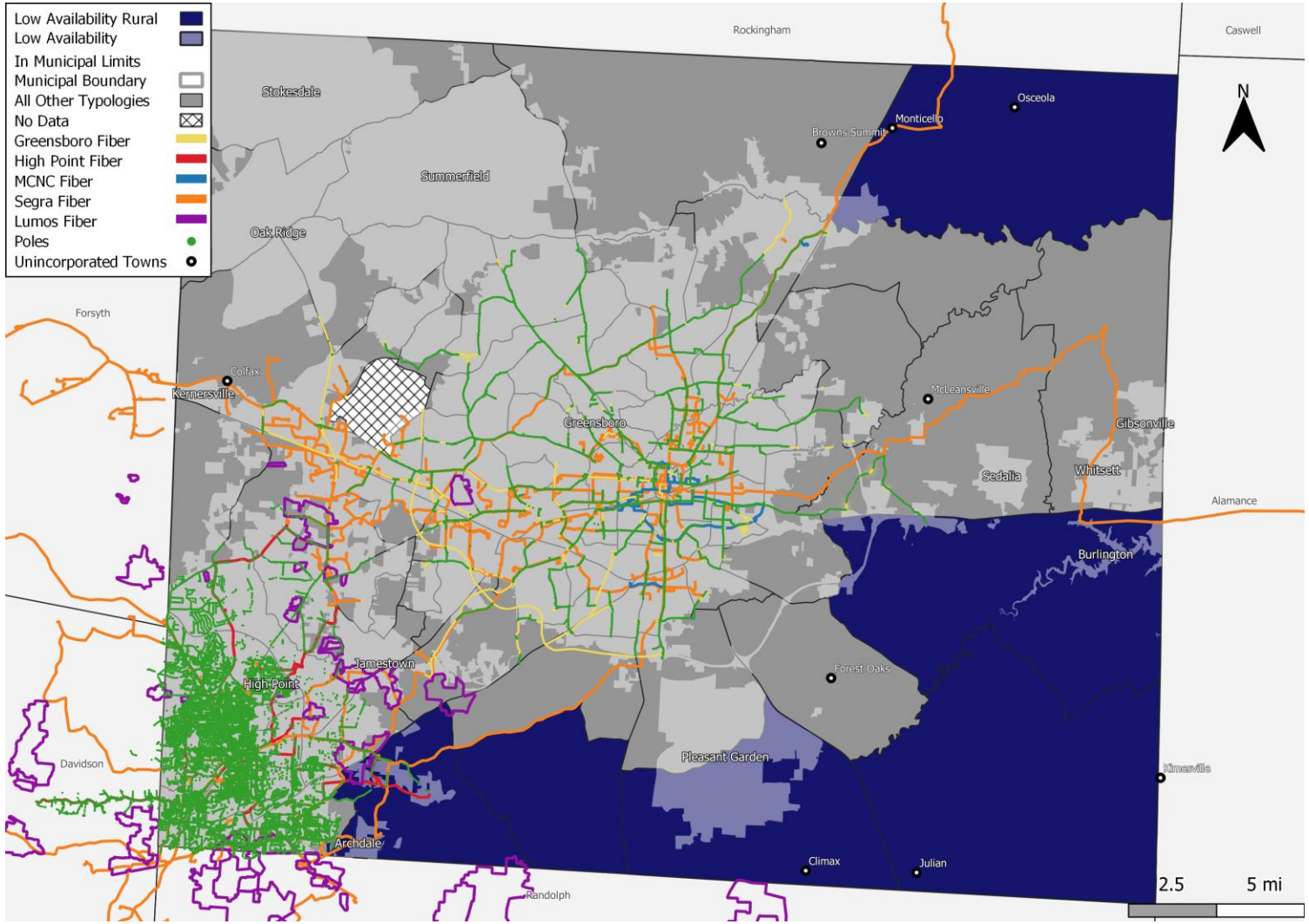
Funding Source	% Cost	Considerations
GREAT/CAB Grant	20-30%	Priority due to deadline
ReConnect Program	30-40%	Only for use in rural service areas
Capital Projects Fund	Up to 100%	Alternative uses
BEAD Program	Up to 100%	n/a

Implementation Considerations

Key Partner Roles	• **Main drivers (capital project deployment):** Internet service providers (ISPs) • **Main drivers (grant applications & financing):** ISPs, NCDIT & Guilford County (for CAB Grant) • **Partners:** Local governments, community-based organizations (CBOs), utilities, property owners, NCDOT
Risk & Dependencies	• Implementation will be dependent on grant funding and/or private sector investment • Obtaining ROW may prove challenging on privately owned land and railroad crossings • Building out last mile fiber to all un(der)served homes and businesses may not be economically or environmentally feasible in some rural areas. In those cases, other access technologies can be deployed (e.g., cable, DSL, wireless)
Case Study Example	**ReConnect Moore County, North Carolina:** Randolph Communications received a $2.3 million dollar grant from the U.S. Department of Agriculture (USDA) to help fund its 'ReConnect Moore County' project, which will deploy a fiber-to-the-home network to approximately 1,300 residential addresses in rural Moore County. This 48-mile project will serve 18 businesses, 9 educational facilities, and over 17 agricultural operations. Randolph Communications will contribute $767,000 in matching funds to bring the total project investment to over $3M.

* This range includes average costs for both aerial and underground fiber. Additional information and cost estimates for fiber and other access technologies is included in the appendix.

Considerations for evaluating middle mile and last mile fiber for rural*, unserved areas:



*Urban or Rural status was determined by overlaying 2021 Census TIGER/Line urbanized area shapefiles and designating any tract with significant overlap as urban, and all others as rural. See Census Bureau and TIGER/Line download for sources.

Considerations:

- Assessing feasibility of these strategies may require close collaboration with ISPs to assess their current plans to build out fiber in rural areas and identify projects that could be pursued with GREAT grant or other funding support
- Under current guidelines for grants administered by the North Carolina Broadband Infrastructure Office, funding is being prioritized for Tier 1 & Tier 2 counties with projects targeting areas that are unserved, meaning that they lack access toa 25/3 Mbps connection as mapped and defined by the FCC and state agencies. Currently, Guilford County is a Tier 2 county but has a small percentage of area that qualifies as unserved based on FCC data
- The case can be made for additional areas to be eligible for funding if the data can show that the lack of availability on the ground is not in alignment with the FCC and state maps. Additional groundwork may be necessary to collect speed test or survey data in rural census tracts not currently considered eligible for funding but where residents experience speeds below 25/3 Mbps.
- The 25/3 Mbps speed threshold for grants for rural areas may increase in future rounds of state funding.

Low Availability

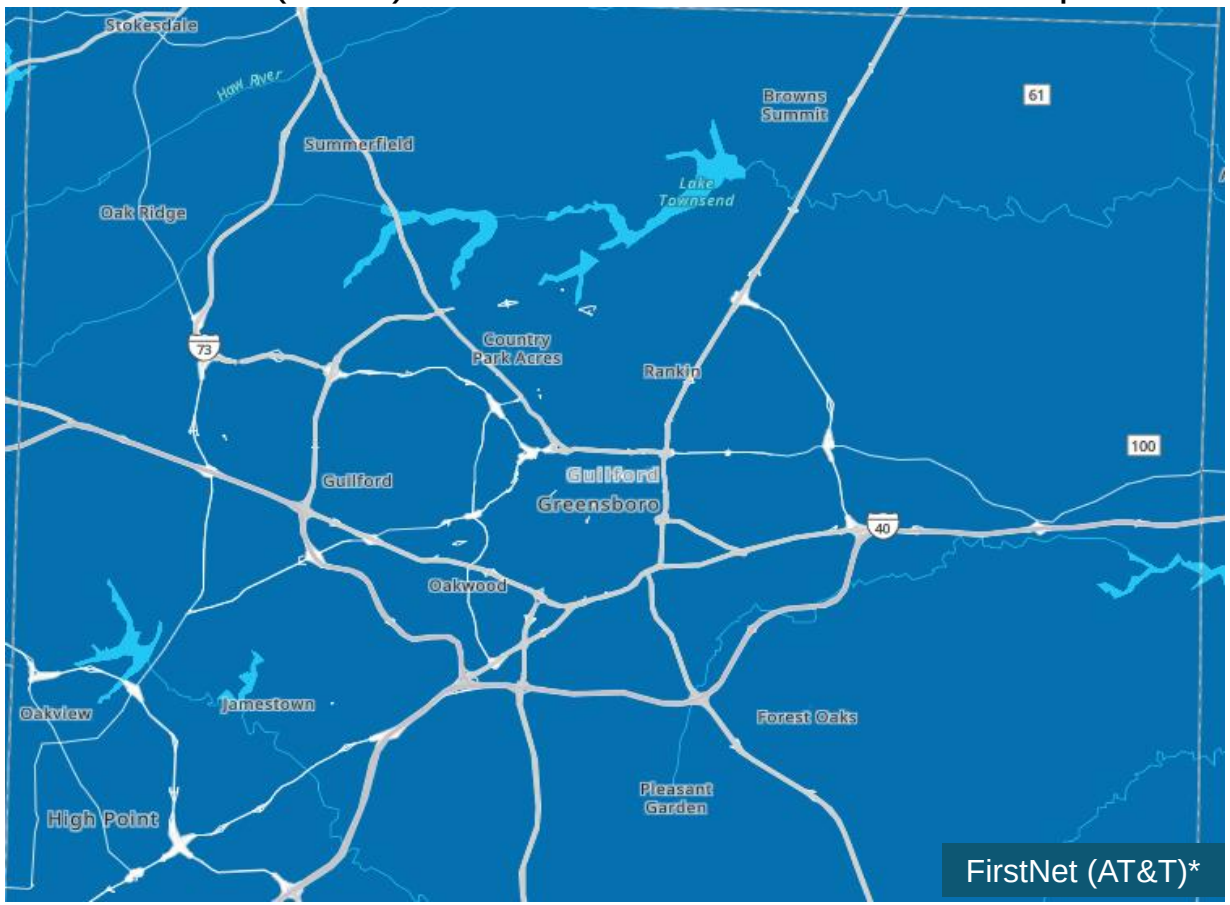
> Urban Census Tracts

> Rural Census Tracts

> Special Considerations: Public Safety

Mobile broadband coverage is important for public safety, both for those requesting assistance and first responders providing services

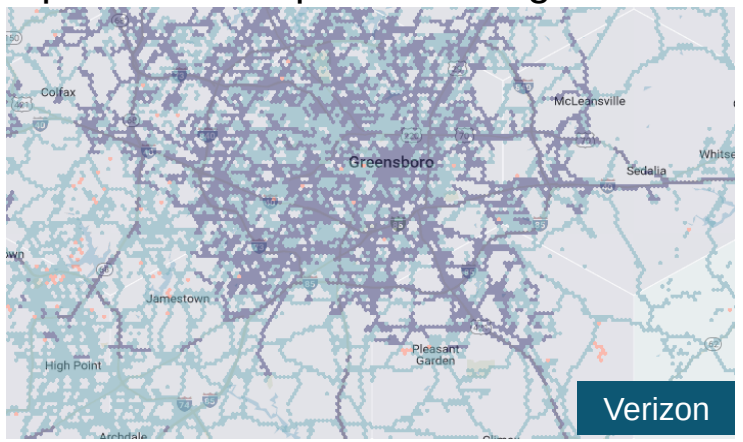
Infrastructure buildout recommended in the prior targeted strategies benefit both the general public and first responders in areas with low availability. However, there are specific solutions available to increase mobile wireless availability for first responders. FirstNet (AT&T) has dedicated network for first responders that provides complete coverage in Guilford County

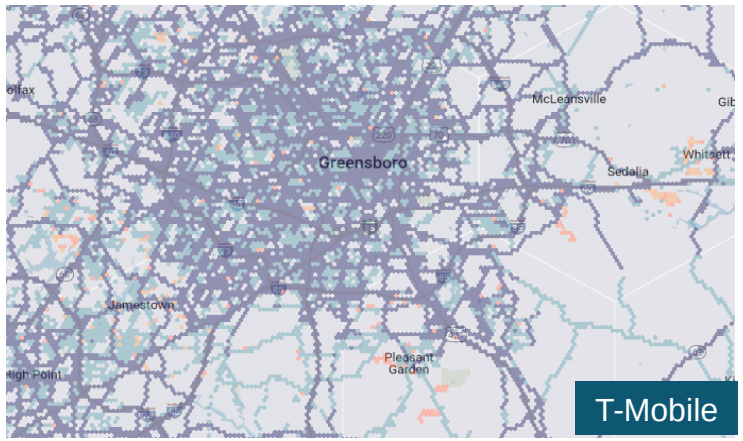


Source: FirstNet

*This map excludes AT&T's commercial LTE network

LTE w/Priority





Source: RootMetrics Broadband Coverage Map

Untested 3G+ LTE 5G

1.7 Evaluate resiliency of public safety services reliant on mobile broadband availability and possible solutions

Confirm the current gaps in mobile wireless coverage in rural, unincorporated areas that impact the availability and reliability of public safety services (e.g., Fire, Law, EMS, and Emergency Management) and evaluate solutions

OVERVIEW

The County in coordination with the County Emergency Services Department could first assess cellular reception issues in unincorporated areas to determine additional infrastructure needs and identify potential network solutions. Different providers may have better coverage in some areas than others and offer different service plans/rates.

POSSIBLE FUNDING SOURCES
State and Local Cybersecurity Grant, Emergency Services Performance Grant, Economic Adjustment Assistance Program, Capital Projects Fund, LFRF

GAP ADDRESSED	COUNTY ROLE
Availability	Lead Implementer
Affordability	Coordinator
Adoption	**Hybrid**

Challenge & Benefits

Target typologies: Low availability in rural areas

Challenge: Emergency Services first responders require a wireless connection to access vital dispatch and communications systems including incident reporting when an Emergency Operation Center is activated. Rural areas face difficulties in accessing these systems, as a stable connection is not always available.

Benefits:

- Improving resilience and reach of County public safety operations and services
- Enhancing emergency response capabilities
- Reducing dark spots for first responders in the field
- Increasing reliability of mobile-dependent technologies such as 911 and the County's Emergency Alert, Notification, and Information System (G.E.A.N.I)

Funding Opportunities

Funding Source	% Cost	Considerations
State and Local Cybersecurity Grants	Up to 30%	Funding available for outfitting public service areas with better equipment and cybersecurity measures
Economic Adjustment Assistance Program	Up to 100%	Must be used for construction costs
Emergency Services Performance Grant	Up to 100%	Cannot be used to purchase telecommunications equipment or computers
Capital Projects Fund	Up to 100%	Public service entities are eligible sub-recipients
Local Fiscal Recovery Funds	Up to 100%	Alternative uses for funding

Potential Solutions

FirstNet (AT&T): In a public-private partnership with the First Responder Network Authority, AT&T created the first nationwide high-speed wireless network for public safety applications.

Frontline (Verizon): Verizon's advanced network and technology for first responders. Types of solutions offered include response connectivity, response operations, and response devices and equipment.

Connecting Heroes (T-Mobile): 10-year commitment to public-private-partnership providing free network access, subsidized, and low-cost smartphone connectivity and technology with priority access for state and local first responders.

Case study from first responder wireless broadband service providers

FirstNet (AT&T)*

- **Wayne County, NC:** FirstNet recently built a new cell tower in the La Grange area of Wayne County to increase connectivity for first responders operating in this rural area. Wayne County also gained access to 100+ FirstNet mobile assets that can be deployed during emergencies at no additional cost. They also received new FirstNet-enabled communication devices, tools, application, and other resources.

- **Currituck County, Mitchell County, Moore County, Allegheny County, Ashe County, Cleveland County, Halifax County, Northampton County, Transylvania County, and Warren County, NC:** These counties and other jurisdictions in North Carolina have benefited from new FirstNet purpose-built cell tower deployments. All new cell tower sites have Spectrum 14 as well as AT&T commercial spectrum, improving both mobile broadband coverage and capacity for both public safety entities and residents in rural areas.

Frontline (Verizon)

- **Harris County, TX:** The Harris County Sheriff's Department partnered with Verizon to implement a digital strategy to respond in a crises involving a mental health component. Verizon equipped the Sheriff's department with connected tablets to provide a secure and reliable line of communication between law enforcement responding and licensed crisis mental health clinicians at the Harris Center for Mental Health and Intellectual and Development Disability.

- **Santa Clara Pueblo, NM:** The lands in this area provides a spiritual sanctuary for the Pueblo of Santa Clara tribe, so the tribe wanted to avoid adding permanent cellular infrastructure. The area is also challenging terrain for traditional phone and radio signals. Verizon provided a mobile connectivity trailer to first responders in the area which includes an antenna and dish to support 4G LTE cell service for voice and data communication. The trailer can be transported to any vehicle accessible location to provide 4G LTE coverage.

Connecting Heroes (T-Mobile)

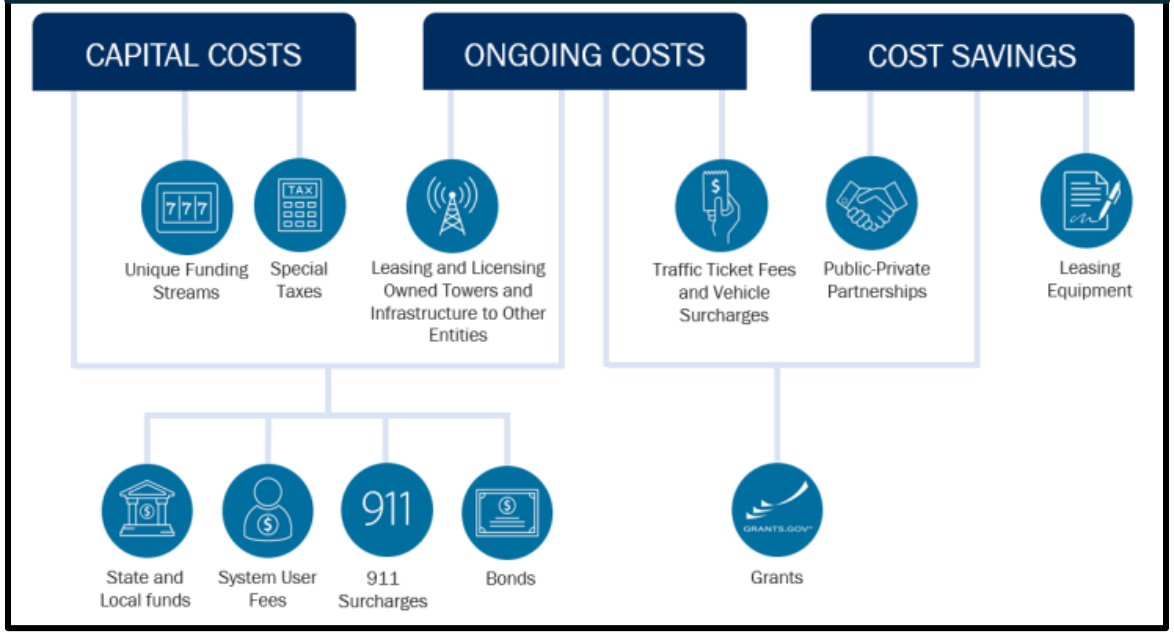
- **Hampton Valley Forge, TN:** The volunteer fire department uses free access to T-Mobile's 5G/4G LTE network to power smartphones for its Android Team Awareness Kit (ATAK) software. This provides asset visibility across the organization and allows faster communication for first responders. User data feed into elevation tools, heat maps, computed contour maps and is used as a mission planning, geospatial, tool that includes Full Motion Video helping firefights stay up-to-date with maps and routes.

- **Bay Minette, AL:** Bay Minette Police Department receives free unlimited calling, text, and data for smartphones used by police officers on agency provided devices. The agency is planning to add computer-aided dispatch (CAD) capability to each officer's smartphone and working on implementing best practices to maximize the benefits of smartphone deployment.

* Some additional counties in that use FirstNet include Whiteville, NC and Greenville, SC

Considerations for procuring, implementing, and maintaining advanced public safety communication systems and technologies

Potential revenue streams the County could leverage as part of budget planning to fund capital costs and ongoing maintenance costs



Source: Cybersecurity and Infrastructure Security Agency (CISA)

The County and municipalities could also explore joint/cooperative procurement options for contracting for wireless communications

Mid-America Regional Council (MARC): MARC and the Mid-America Council of Public Procurement in partnership with local governments established the Kansas City Regional Purchasing Cooperative (KCRPC) to help local governments increase their purchasing power and decrease administrative costs.

- As of 2003, 77 participants with $23,119,357 in contracts through KCRPC have participated with benefits including volume discount savings and new partnership opportunities with other local governments, schools, and national purchasing cooperatives.
- There are several examples of cooperative contracts posted on their searchable contract database including for wireless voice and data services, e.g., Sourcewell (government entity that provides cooperative procurement solutions for 50K+ participating agencies in the US and Canada) for FirstNet service.

Implementation Considerations

- Personnel training – as with any new system, staff will need to be trained to effectively utilize any new technologies adopted
- Ongoing operations and maintenance costs will need to be incorporated into public safety budgets
- Updating/developing cybersecurity and data management protocol

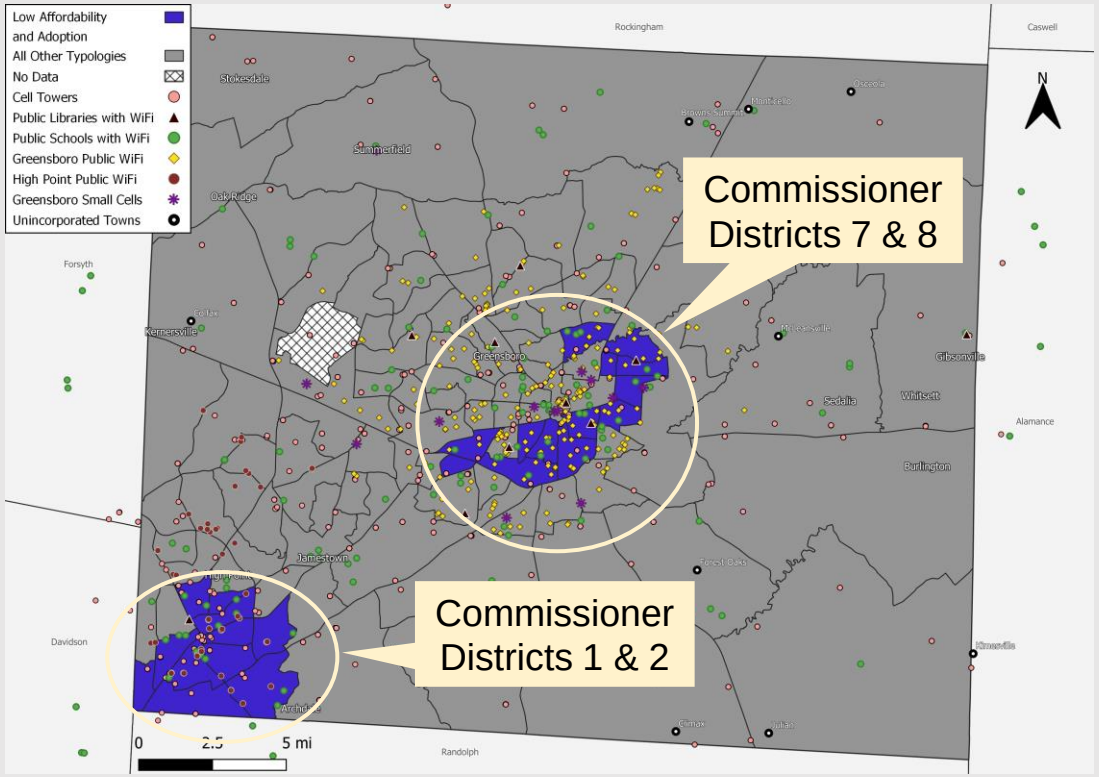
Low Affordability & Low Adoption

> Special Considerations: Public Housing

2. Low Affordability & Low Adoption*

Relatively **low rates of internet and digital device access** and **high poverty** rate

17% of pop.



Includes communities in: South High Point and South and East Greensboro
Includes zip codes: 27260, 27262, 27263, 27401-27403, and 27405-27407

Availability Avg	Affordability Avg	Adoption Avg
83.9	35.1	20.4

The cost of internet services and devices is likely prohibitive for a significant portion of the population resulting in lower adoption rates**

5% of residents in this typology area do not have access to more than one provider, suggesting broadband is available

Wi-Fi is publicly available within walking distance of residents in this typology, which may supplement access for households

Key Variable	Within Typology	Average
% of population in poverty	40%	19%
% of households with schoolchildren	36%	31%
% of households with no internet access	41%	25%
% of households with no access devices	26%	13%

Q: What is the main reason you do not currently have internet access at home?
A: Too expensive
Q: What could you do with home internet access?
A: Get my GED

Survey respondent in 27260 zip code

*A single census tract fell into the Low Affordability only category and was grouped into the Low Affordability and Low Adoption typology due to the wide spread of adoption scores

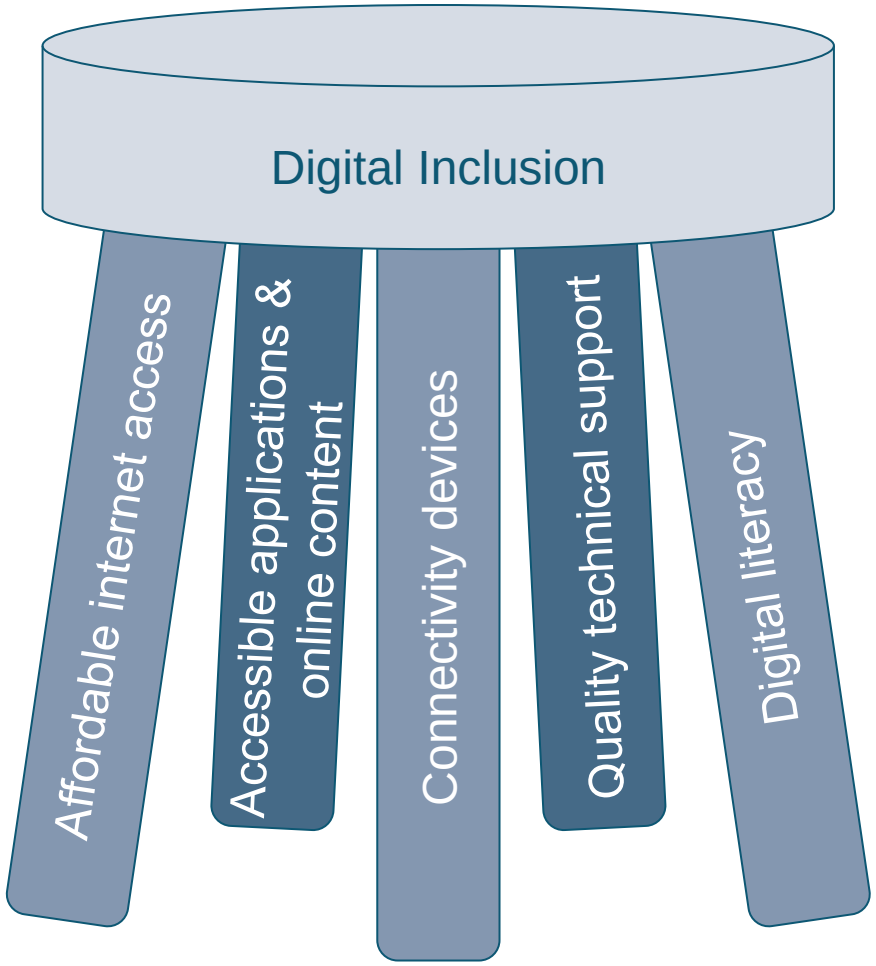
**Consumer Expenditure (CE) surveys find that low-income households pay 3% or more of their income on wireless telephone service. A recent report finds this figure to be cost burdensome on low-income households. More information is needed to adequately measure affordability thresholds for internet services and devices.

Factors impacting low adoption, low affordability, and digital inclusion

Considerations for addressing adoption and affordability needs

- **Many of the demographic characteristics that can impact affordability and adoption overlap in the same census tracts, aligning with research on socio-economic disparities** between communities (e.g., areas where poverty levels increased align with areas with lower educational attainment and higher percentages of non-white populations) and social vulnerability
- **Effective investment to increase broadband affordability and adoption will need a multipronged approach** also referred to as the digital inclusion "stool" supported by internet access, connectivity devices, and digital literacy.
  - The National Digital Inclusion Alliance extends the definition of digital inclusion further with five elements (depicted in the graphic on the right)

Targeted recommendations for low adoption and low affordability aim to address multiple legs of the digital inclusion stool in a holistic approach



2.1 Partner with Kramden Institute for refurbishing / donation of devices

Community members, companies, and organizations including government agencies donate new and used technology equipment, which is refurbished and distributed by the non-profit organization to eligible individuals and organizations and linked to digital literacy programs, e.g., afterschool STEM programs, basic computing skills

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
M	H	$50K – $60K

POSSIBLE FUNDING SOURCES
Digital Equity Competitive Grant, Philanthropic foundations

GAP ADDRESSED	COUNTY ROLE
Availability	Lead Implementer
Affordability	Coordinator
Adoption	Hybrid

Time to realize benefit: <6 months

Benefits / Impact

Target typologies: Low affordability & Low adoption; Low adoption

Benefits / Impact:

- **Direct:** Increased access to connectivity devices (~12% of the County does not have access to digital devices)
- **Indirect:** Digital literacy and other education and training opportunities
  - Increased adoption rates amongst communities with relatively lower adoption within the County
  - Can be linked with workforce development training opportunity, e.g., trainees can learn how to refurbish equipment

Funding Opportunities

Funding Source	% of Cost	Considerations
Digital Equity Competitive Grant	100%	Kramden Institute could apply directly for funding an expansion of the program
Additional philanthropic funding	Up to 100%	n/a

Implementation Considerations

Key Partner Roles & Responsibilities	• Main drivers: Guilford County & Kramden Institute • Partners: Municipal governments, universities, Chambers of Commerce, public housing authorities, CBOs, philanthropic organizations • Roles & Responsibilities: Guilford County can connect with Kramden Institute to explore opportunities to expand their service offerings in the County with support from other partners
Risk & Dependencies	• Coordination with other digital literacy programs • Cybersecurity, privacy, and safety concerns for donated items (standard guidelines and certifications exist, e.g., R2 and e-Stewards, state/County IT required security protocol. Kramden can provide certificate of destruction)
Case Study Example	Kramden Institute is a nonprofit that provides refurbished or donated computing devices to eligible K-12 students, adults, and nonprofit organizations. 43,600+ computers have been awarded since 2003 across 80 counties in North Carolina. They also provide digital literacy classes including train-the-trainer programs and incorporate an e-waste recycling program.

2.2 “Gap” grant program and “one stop” application assistance

Extend Emergency Rental and Utilities Assistance Program and transition to a multi-year program to supplement Affordable Connectivity Program and create both remote and in person “one stop” application assistance resource, e.g., when eligible applicant enrolls in SNAP offer application assistance for Affordable Connectivity Program

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
H	L	$4M – $5M

POSSIBLE FUNDING SOURCES
Digital Equity Competitive Grant, Local Fiscal Recovery Funds

GAP ADDRESSED

- Availability
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- Coordinator
- Hybrid

Time to realize benefit: <6 months

Benefits / Impact

Target typologies: Low affordability & Low adoption; Low affordability

Benefits / Impact:

- **Direct:** Direct benefit for eligible households to receive assistance paying for internet service and potentially devices
- **Indirect:** Simplifying application process for multiple benefit programs

Funding Opportunities

Funding Source	% of Cost	Considerations
Digital Equity Competitive Grant	Up to 100%	Could justify this under “adoption” clause
Local Fiscal Recovery Funds	Up to 100%	Could be used to staff a position under “revenue loss” funding

Implementation Considerations

Key Partner Roles & Responsibilities	• Main Driver: Guilford County • Partners: Municipal governments, CBOs, libraries, Guilford County Schools • Roles & Responsibilities: Guilford County & municipal governments could pool funding for the program and help provide resources for “one stop” application assistance. Partners can help with outreach
Risk & Dependencies	• Digital Navigators can help individuals with accessing application resources • Funding coordination between County and municipalities
Case Study Example	Free Broadband Service, New Hanover County: New Hanover County established a free broadband assistance program for families who have school-aged children (5-18 years old) and are part of at least one of the following programs: Supplemental Nutrition Assistance Program (SNAP), Medicaid or Work First. The program was created utilizing $5M in ARP funds and AT&T and Spectrum will provide broadband services. Service can be provided for up to two years and applicants will be re-evaluated every year to determine if they are eligible to remain in the program

2.3 Digital Navigators

Continue to build and expand "Digital Navigators" program including in person services and phone support across community anchor institutions (e.g., libraries, schools, colleges and universities, community centers, healthcare clinics, CBOs, government facilities)

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
H	M	$400K – $500K

POSSIBLE FUNDING SOURCES
Capital Projects Fund, Digital Equity Competitive Grant

GAP ADDRESSED

- Availability
- Affordability
- Adoption

COUNTY ROLE

- Lead Implementer
- Coordinator
- Hybrid

Time to realize benefit: <6 months

Benefits / Impact

Target typologies: Low affordability & Low adoption; Low adoption

Benefits / Impact:

- **Direct:** Increasing digital literacy levels
  - Improving individuals' ability access to critical virtual services, e.g., telehealth, job searching, financial assistance
- **Indirect:** Increased adoption rates amongst communities with relatively lower adoption, e.g., Greensboro and High Point libraries collectively recorded 6800+ digital assistance interactions over the past three years

Funding Opportunities

Funding Source	% of Cost	Considerations
Capital Projects Fund	100%	Project must support work, education, and health monitoring access for at least 5 years after implementation
Digital Equity Competitive Grant	Up to 100%	Program must show efforts to reach underserved populations

Implementation Considerations

Key Partner Roles & Responsibilities	• Main Driver: Public Libraries • Partners: County and municipal governments, CBOs, GuilfordWorks, Cone Health, Guilford County Schools, colleges and universities • Roles & Responsibilities: Public libraries can provide training to digital navigators, assist with program design/administration; Partners can assist with outreach, provide staff resources, host trainings, and provide referrals
Risk & Dependencies	• Need to identify targeted outreach strategies for program effectiveness • Trusted community partners and ongoing support • Coordinate digital navigator program with digital inclusion nodes
Case Study Example	Salt Lake City Public Library (SLCPL) Digital Navigators Program: The project aim was to address the need for emergency access to ICT resources as a result of COVID-19. Three high need neighborhoods were targeted. Digital navigator training was delivered by SLPCL and NDIA with a target of helping at least 450 individuals to meet personal connectivity and digital adoption goals. In total 585 individuals were reached over a 10-month program with 16.92% of respondents able to connect with Lifeline or Comcast Internet Essentials.

2.4 Digital Inclusion Nodes

Continue to leverage libraries and schools as digital inclusion nodes by outfitting libraries, schools, colleges and universities, workforce development and community centers with more and better equipment, potentially including mobile hotspots and laptops for lending, staff training, extending mobile services

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
H	M	$800K – $1M

POSSIBLE FUNDING SOURCES
Capital Projects Fund, Digital Equity Competitive Grant

GAP ADDRESSED

- Availability
- **Affordability**
- **Adoption**

COUNTY ROLE

- Lead Implementer
- Coordinator
- **Hybrid**

Time to realize benefit: 6+ months

Benefits / Impact

Target typologies: Low affordability & Low adoption; Low adoption

Benefits / Impact:

- **Direct:** Increased access to connectivity devices (~12% of the County does not have access to digital devices)
  - Improved access to critical virtual services, e.g., Telehealth, job searching, financial assistance
- **Indirect**: Increased adoption rates amongst communities with relatively lower adoption within the County (~22% of the County is resides in areas with low adoption)

Funding Opportunities

Funding Source	% of Cost	Considerations
Capital Projects Fund	85%	Computers, Mobile, and Outfitting expenses
Digital Equity Competitive Grant	15%	Outreach Staff Costs

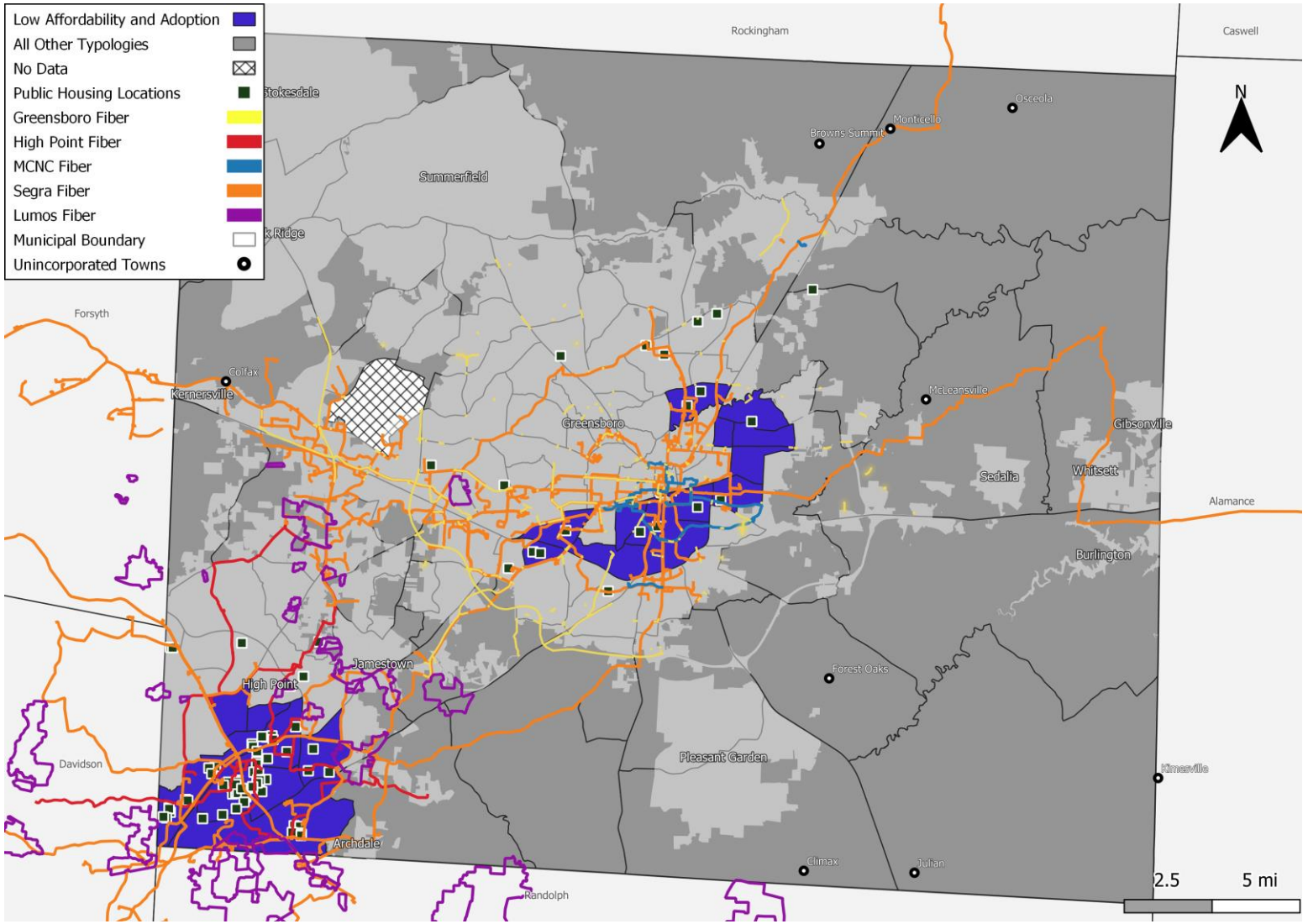
Implementation Considerations

Key Partner Roles & Responsibilities	• Main drivers: Guilford County Schools, Public libraries, Guilford Works, colleges and universities • Partners: County and municipal governments, CBOs, telecommunication companies • Roles & Responsibilities: County and municipal governments can provide funding, telecommunication companies can provide discounts/donations, CBOs can help with referrals and outreach
Risk & Dependencies	• Coordination with Digital Navigators program • Managing a laptop/hotspot lending program may be burdensome for staff • How to make the program sustainable once grant funds are exhausted (link with 2.1 Kramden Institute partnership potentially) • $2B+ School renovations may be able to cover some network upgrade costs
Case Study Example	Seattle Public Library (SPL) Hotspot Program: In partnership with Google and City Council (funders), SPL launched a hotspot lending program targeting homeless, unemployed, and low-income individuals. 675 hotspots are available for loan for free up to 21 days with an additional 325 hotspot devices reserved for “communities most in need”. SPL partnered with the Seattle Housing Authority and Goodwill Training & Job Centre (amongst others) to help reach targeted populations.

Low Affordability & Low Adoption

> Special Considerations: Public Housing

Considerations for evaluating increasing access to high-speed broadband in public housing



Considerations:

- Assess current fiber connections across public housing authorities and determine whether additional building upgrades or retrofits are necessary to facilitate in-residence fiber internet access
- Analyze locations of public housing facilities relative to urban networks such as the NC A&T/MCNC fiber ring to identify facilities to potentially prioritize for fiber projects
- As a short-term, lower cost strategy, PHAs may consider deploying 5G wireless mesh network for higher density facilities. This strategy could be initially be pursued a pilot project.
- Proximity of public housing locations to existing fiber networks such as NC A&T/MCNC fiber ring

3.1 Free/Discounted internet for public housing authorities

Find partners (e.g., ISPs, universities) to extend or future-proof internet services for low-income communities in public housing and provide free/discounted rates to both individual residential units and communal computer labs through public-private partnership

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
M	M	$2M – $3M*

POSSIBLE FUNDING SOURCES
Affordable Connectivity Program, Capital Projects Fund, Community Development Block Grant

GAP ADDRESSED

- Availability
- **Affordability**
- **Adoption**

COUNTY ROLE

- Lead Implementer
- Coordinator
- Hybrid

Time to realize benefit: 6+ months

Benefits / Impact

Target typologies: Low affordability & Low adoption; Low adoption

Benefits / Impact:

- **Direct:** Increasing affordability for low-income residents (est. over 13,000 residents)
- **Indirect:** Potential long-term benefits related to increased digital literacy and remote education and job search/training opportunities

Funding Opportunities

Funding Source	% of Cost	Considerations
Affordable Connectivity Program	100% of discounted rate	Provide outreach to constituents on eligibility
Capital Projects Fund	0-100%	Can be used to cover equipment and computer costs
CDBG Funds	10%	Can help with feasibility study/some deployment costs

Implementation Considerations

Key Partner Roles & Responsibilities	• Drivers: Greensboro & High Point Public Housing Authorities (PHAs) and municipal governments • Partners: County, ISPs, other community anchor institutions • Roles & Responsibilities: PHAs can be direct applicants for funding in partnership with municipalities; County can support coordination efforts, help find partners, and advocate†. ISPs will be implementers
Risk & Dependencies	• Operations need to be sustainable • Outreach to residents • A mixture of access technologies will likely be required depending on the location/materials in the housing facilities; each site would need a feasibility assessment (See 3.1a and 3.1b)
Case Study Example	Durham Housing Authority (DHA): The City of Durham partnered with Duke University and DHA to provide high speed wireless internet for the residents of eight Durham Housing Authority properties. The project is funded partially by money allocated by the City from funds provided through the CARES Act Federal Relief Program. The primary project objective is to provide connectivity for public school students living at the identified DHA properties to facilitate remote learning given the necessities of the Covid-19 crisis.

*Dependent on technology and infrastructure availability, e.g., mesh wireless network may be cheaper than wired, but offer slower speeds
**Estimate from Greensboro Housing Authority is 13,000+ residents.
† E.g., H.R.1904 bill in Congress to include broadband service as a utility subsidized by federally assisted housing programs through utility allowances

3.1a 5G campus network for urban public housing residents

Partnering with a wireless ISP interested in setting up a 5G campus network to provide individual Wi-Fi connections in Greensboro and High Point public and/or affordable housing.

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
L	H	$3M – $3.6M

POSSIBLE FUNDING SOURCES
5G Fund, Private Funding Sources, Capital Projects Fund, BEAD Program

GAP ADDRESSED	COUNTY ROLE
Availability	Lead Implementer
Affordability	Coordinator
Adoption	Hybrid

Time to realize benefit: 6+ months

Benefits / Impact

Target typologies: Low Availability, Low Affordability

Benefits / Impact:

- **Direct:** Provide infrastructure for low or no cost wireless broadband services with no data caps to public housing residents ($15/month per residence for 30Mbps symmetrical plan ($0 if Affordable Connectivity Program eligible).
- **Indirect:** Provides access to online education, telehealth, and job training opportunities enabled by having direct access in the home.

Funding Opportunities

Funding Source	% of Cost	Considerations
5G Fund	Up to 100%	n/a
Microsoft Airband Fund (private)	Up to 100%	May not cover 5G deployment
Capital Projects Fund	Up to 50%	Can cover equipment costs such as routers
BEAD Program	Up to 50%	Can cover equipment and deployment

Implementation Considerations

Key Partner Roles & Responsibilities	• Main drivers: Greensboro and High Point • Responsibilities: Cultivating new or pre-existing partnership with WISP partnership to build out 5G network to cover community anchor institutions • Partners: Traditional wireless ISP (e.g., Verizon, AT&T, T-Mobile) or other low-cost ISP providing 5G such as Starry that are willing to provide low-cost connection to public and affordable housing.
Risk & Dependencies	• Low cost 5G wireless models like The Starry are still relatively new so there may be connection reliability issue. This strategy could be initially pursued as a pilot project.
Case Study Example	• **Cambridge, MA:** City of Cambridge and Cambridge Housing Authorities recently partnered with Starry to provide low cost 5G to more than 2,630 affordable homes. Other PHAs in LA, Columbus, and NYC, Denver, and DC have pursued similar partnership projects with Starry. • **Durham, NC:** City of Durham built a 5G Campus Network for 8 public housing facilities utilizing $3 million in CARES Act funding.

3.1b Fiber internet access for urban public housing residents

Partnering with NC A&T and ISPs interested in building out fiber connections from existing fiber ring to serve public housing authorities

OVERVIEW

Estimated Impact	Estimated Ease	Estimated Cost
L	M	$6M – $10M

POSSIBLE FUNDING SOURCES
Middle Mile Program (As needed)
Capital Projects Fund, BEAD Program, Local Fiscal Recovery Funds

GAP ADDRESSED	COUNTY ROLE
Availability	Lead Implementer
Affordability	Coordinator
Adoption	Hybrid

Time to realize benefit: 1+ years

Benefits / Impact

Target typologies: Low availability

Benefits / Impact:

- **Direct:** Providing infrastructure for high-speed internet access public access to community anchor institution that house and provide services to populations facing high inequities
- **Indirect:** Lower cost of providing broadband services to public housing authorities. Provide reliable, high-speed in-residence internet connection to allow households to access remote learning, telework/job training opportunities, and telehealth.

Funding Opportunities

Funding Source	% of Cost	Considerations
Middle Mile Program	Up to 80%	Costs of fiber installation
Capital Projects Fund	100%	Alternative uses of funds
BEAD Program	100%	n/a
Local Fiscal Recovery Funds	Up to 100%	Alternative uses of funding

Implementation Considerations

Key Partner Roles & Responsibilities	• **Drivers**: Greensboro & High Point Public Housing Authorities (PHAs), municipal governments, North Carolina Agricultural and Technical State University (NC A&T) (or similar institutions with fiber ring) • **Partners:** County, ISPs (e.g., North State/Lumos, Segra, MCNC) other community anchor institutions • **Roles & Responsibilities:** NC A&T (or other partner)would lease its excess fiber to the municipalities for free or at a discounted rate; municipalities would fund construction costs associated with building connective fiber infrastructure; a partner ISP would own and operate the fiber infrastructure.
Risk & Dependencies	• This project is contingent on NC A&T (or other partner institution) as a public university being able to lease its dark fiber assets per restrictions under H129 • The division of costs in any agreement between the County/City and ISP would need to comply with H129 restrictions. Alternatively, fiber could be leased to an ISP who would then build out the network.
Case Study Example	• **City of Durham/Duke/Durham Housing Authority(DHA) Partnership:** Durham partnered with Duke University and DHA to provide high speed broadband service to residents at 8 DHA properties. Durham constructed fiber optic spurs and connected them to designated facilities that was funded in part by CARES Act funds. The City is responsible for lighting the fiber and providing the electronics for connecting each facility. The cost to invest in the shared fiber network was $4,266,200 (overall cost: $6,112,690).

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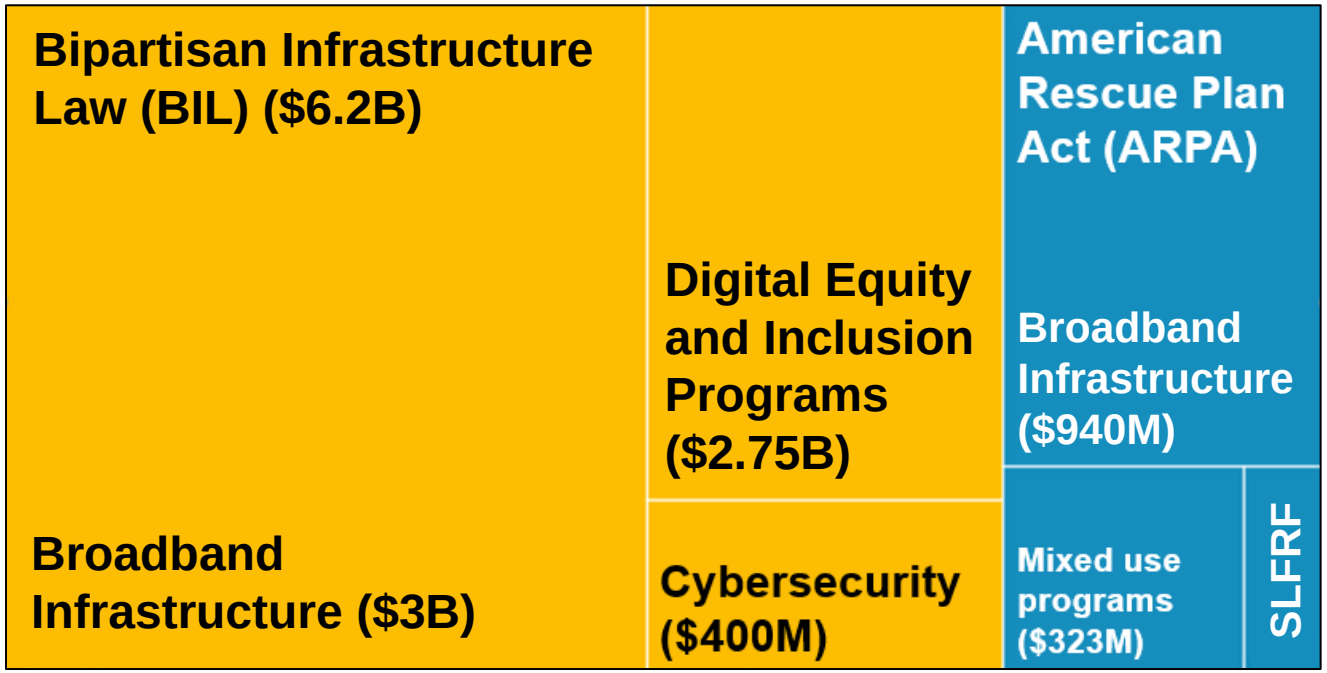
Overview of Major Funding Sources

Funding for broadband programs will primarily come from the American Rescue Plan Act and the Bipartisan Infrastructure Law allocations

American Rescue Plan Act
Provides a direct allocation and competitive grant opportunities governed by Statewide programs

Bipartisan Infrastructure Law
Provides competitive grant opportunities in a mix of state and federal programs



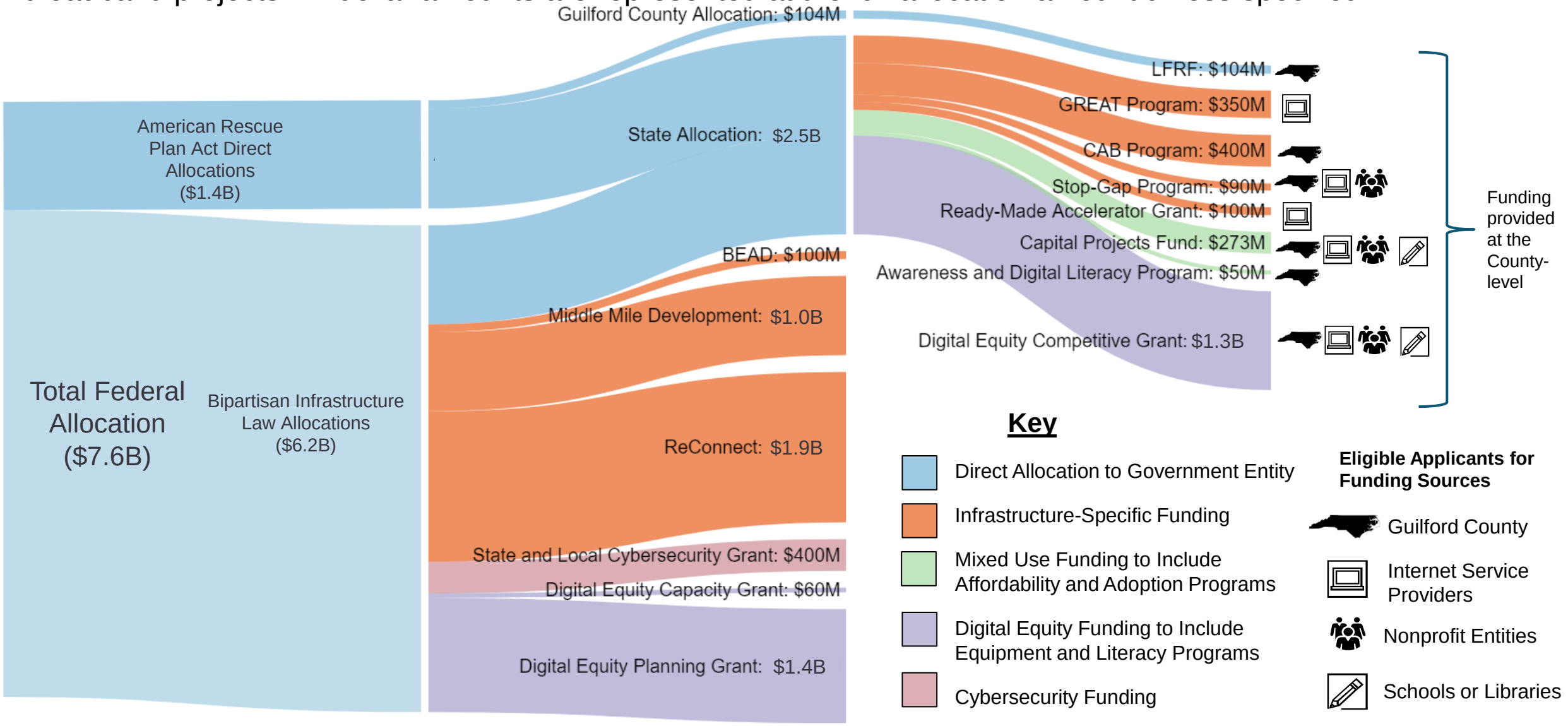
Key Takeaways from Major Funding Sources

- Municipalities must ensure there are **no Duplication of Benefits** (using two types of funding for the same activity in the same service area)
- Infrastructure projects must be capable of reaching **100Mbps symmetrical** service or 100/20Mbps when 100Mbps symmetrical is not feasible.
- Projects are asked to **prioritize fiber buildouts** and/or infrastructure that supports to-the-home connections
- Projects should prioritize unserved (lack of 25/3Mbps access) or underserved population (lack of 100/20Mbps access)*

*Underserved population definitions are subject to change based on North Carolina guidance on eligible service areas

Federal Funding Breakdown

Between state investments and direct allocations, there is roughly **$7.6B** available from ARPA and BIL for broadband projects. All dollar amounts are represented at the full allocation amount unless specified.



Key Takeaways from ARPA Funding Programs

Important Funding Deadlines	• The GREAT Grant application window will close on April 4th, 2022 • All ARPA Funds must be committed/matched to individual projects by end-of-year **2024** and expended by end of year **2026**
GREAT Grant Application Requirements	• NCBIO will score and select GREAT Grant applications based on cost, number of households served, and the partnership structure of potential projects* • GREAT Grant service area and partnership requirements may be helpful guidelines for formulating a long-term framework for project implementation
Direct Allocation Uses	• In terms of broadband, **infrastructure buildouts** are the primary eligible use of Guilford County's direct Local Fiscal Recovery Fund allocation. • However, the County can strategically allocate their "revenue loss" funds to general conduct of government services, including staffing key positions in the Broadband Task Force and County administration

*A link to the scoring criteria is available on the NCBIO website here (pg. 39)

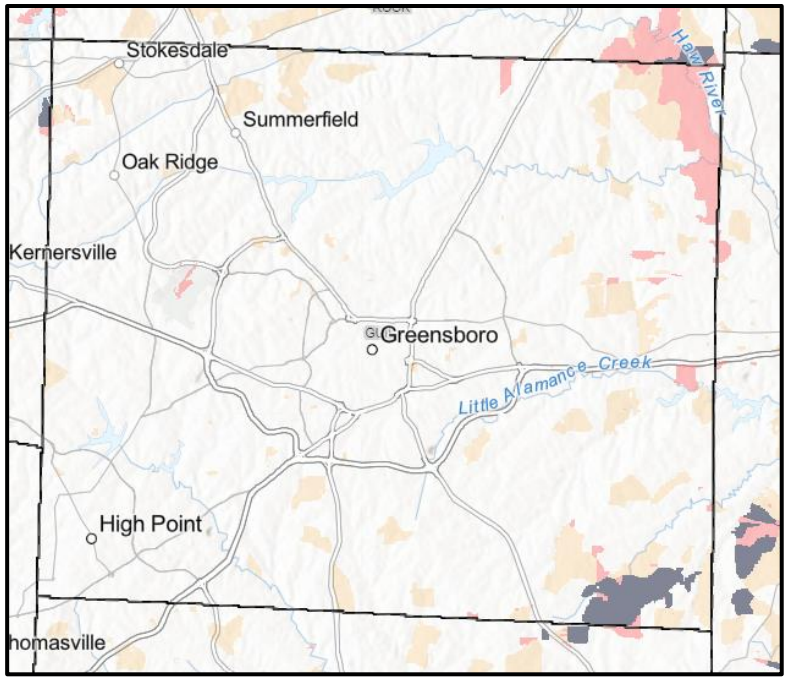
Key Takeaways from BIL Funding Programs

Funding Governance Structure	• While program governing structure is still being determined, programs will be run through a combination of State and Federal entities, the largest of which being the National Telecommunications and Information Agency (NTIA) which governs the BEAD, Middle Mile, and Digital Equity programs.
Important Funding Deadlines	• The ReConnect Grant will close it's first funding tranche on February 22nd, 2022**.** An additional tranche will be opened in Q3 2022. • NTIA will be holding bi-weekly pre-NOFO webinars on BIL Programs from **March 9th through May 11th, 2022*.**
Eligible Uses of Funding	• While ARPA funding has a broad usage mandate, BIL programs split middle and last-mile connections into separate grants, as well as call out grants for rural underserved areas specifically. • Funding sources for projects in BIL must be selected deliberately to ensure maximization of benefits (i.e., ReConnect funding in rural areas and BEAD funding in underserved urban areas).

*A link to the webinar schedule and invitation link is available here

GREAT Grant Application Framework

The Growing Rural Economies with Access to Technology (GREAT) Program funds the terrestrial deployment of broadband within unserved areas by providing grants to ISPs.



Eligible Areas for Investment*

- **Red** areas indicate FCC-defined census blocks that are unserved, which means they lack access to a 25/3Mbps connection as mapped and defined by the FCC and state agencies
- **Orange** areas indicate additional eligible NCBIO-identified areas that are unserved via the NC State Broadband Survey – to be eligible, ISPs must still justify service areas with coverage and user data.

The case can be made for additional areas to be eligible if data can show that lack of availability is not in alignment with current maps (e.g., speed tests or survey data).

Selecting Service Areas and Partners

- Allowing for greater flexibility in service area selection may provide the County and ISPs with a larger selection of eligible areas to implement projects.
- The County can reach out to ISP partners to discuss potential areas they have identified as unserved within the GREAT Grant framework.

Map source: North Carolina Broadband Infrastructure Office OneMap

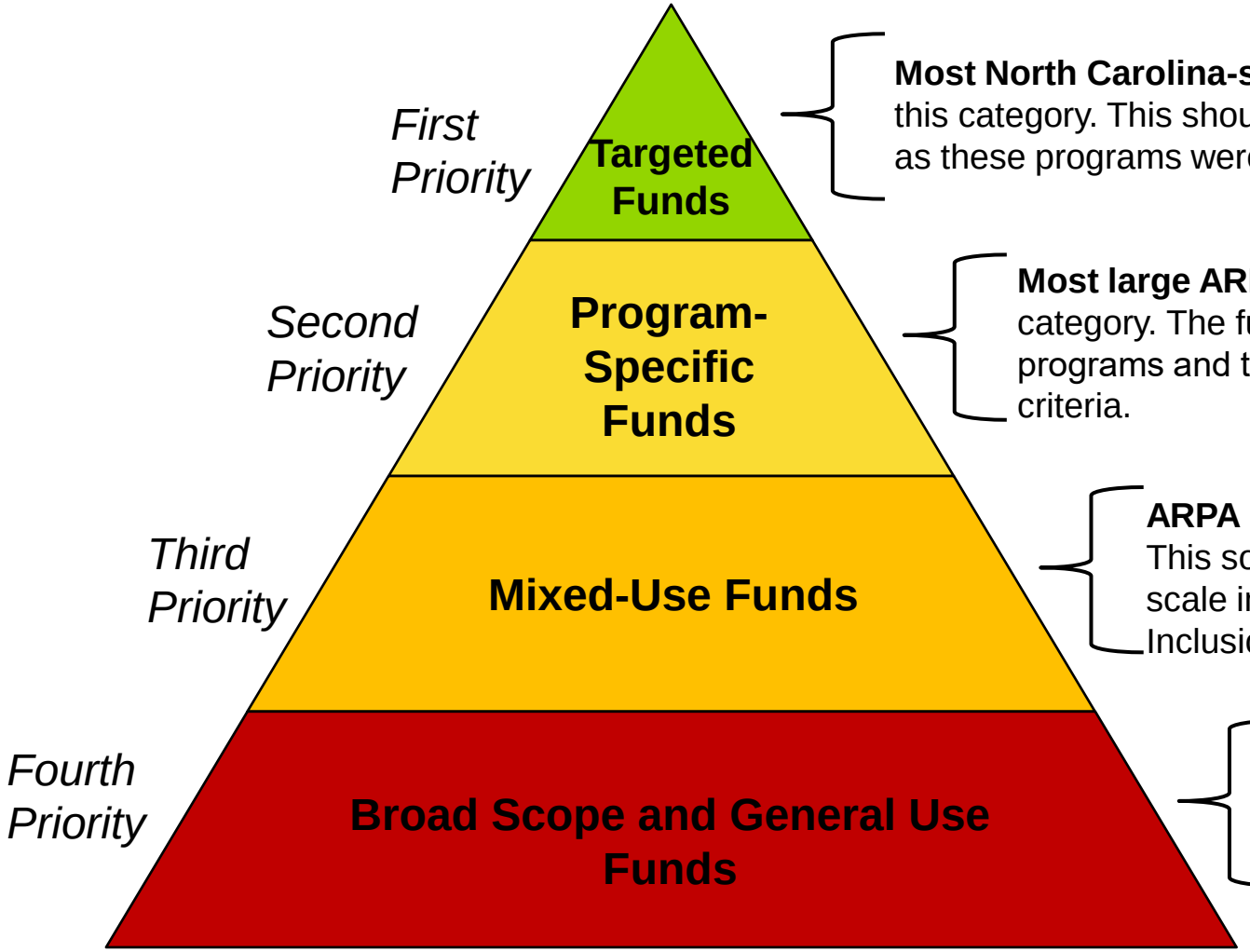
*NCBIO has mentioned that they may change the definition of “unserved” to 100/20Mbps for the GREAT Grant, in alignment with state initiatives for future tranches of funding

Using the GREAT Grant framework, the County and their selected partners can “hone-in” on the highest priority service areas that can be named in applications to other grant programs at the state and federal level. Selecting an involved ISP partner and sharing coverage data will be a useful first step in grant applications.

Next Steps: Future Funding Considerations

When considering funding sources for targeted and overall strategies, Guilford County should ensure that benefits from funding sources are being maximized where possible, exhausting funding in order of applicability

Prioritization Hierarchy by Level of Scope



Most North Carolina-specific grants, as well as public-private partnerships fall into this category. This should be the first consideration for funding matches for all projects, as these programs were designed to address specific needs.

Most large ARPA and BIL programs, as well as project loans fall into this category. The funding should be the main source of project dollars, as most pilot programs and targeted strategies can be tailored to fit each projects' eligibility criteria.

ARPA Capital Projects Funds and BEAD funding fall into this category. This source should be prioritized for large multi-use programs like large-scale infrastructure projects or outfitting community spaces as Digital Inclusion Nodes.

ARPA Local Fiscal Recovery Funds, General Funds, and tax revenue fall into this category. This funding should be used for broadband programs only if alternative funds are unable to fully fund projects.

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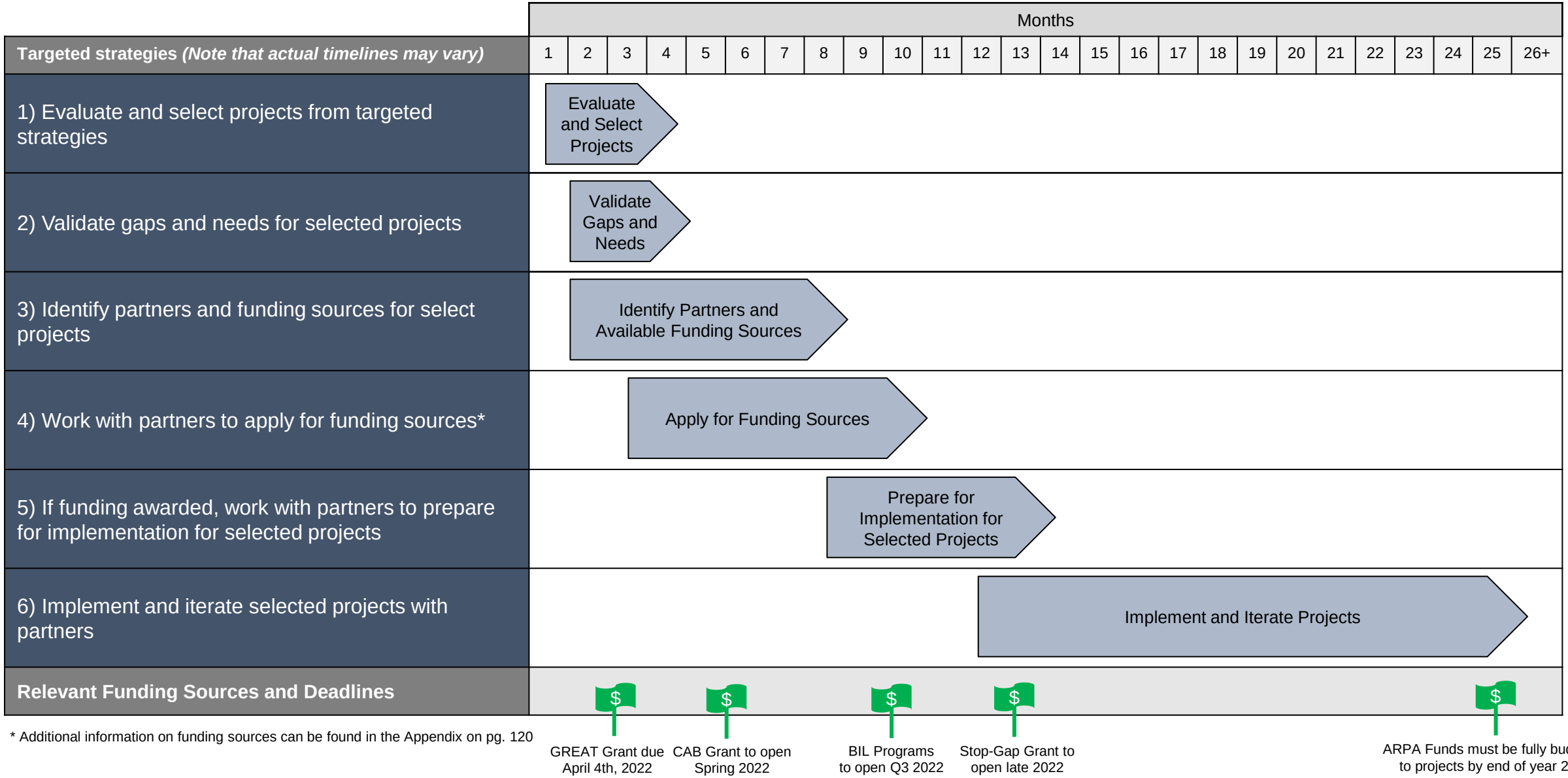
Action plan and recommended steps for overarching strategies

Overarching strategies *(Note subject to Board approval*)*	Months: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26+
1) *Dedicate a centralized broadband resource to lead efforts* 1a. Identify available resource or hire new dedicated FTE(s) 1b. Transition resource to lead Broadband Taskforce and oversee strategy implementation 1c. Resource serves as central hub for strategy implementation 1d. Evaluate additional broadband resources necessary to support implementation	1a. Hire 1b. Onboard and Transition 1c. Dedicated Staff Oversees Strategy Implementation 1d. Evaluate resource needs
2) Encourage ISP expansion to improve internet access 2a. Initiate conversations with ISPs to identify key barriers to broadband deployment and infrastructure investment 2b. Evaluate ability of stakeholders in the county to alleviate identified barriers 2c. Implement policy/process changes to help expedite projects of interest to ISPs where feasible and evaluate impact	2a. Conversations with ISPs 2b. Evaluate potential actions to reduce barriers 2c. Implement changes to expedite projects and evaluate impact
3) Launch pilot program(s) and iterate on successful program designs (timelines may vary depending on funding / projects) 3a. Identify which targeted strategies to pursue as pilot projects (location, partners, scope, KPIs) 3b. Design project(s), validate needs, determine funding** 3c. Determine which funding sources to pursue and apply 3d. Launch pilot(s) once funding is secured 3e. Evaluate pilot project(s) and validate identified needs	3a. Identify 3b. Design 3c. Submit funding* 3d. Launch Pilot Programs 3e. Evaluation/expansion of Pilot Programs
4) Collaborate with other local governments on advocacy efforts 4a. Seek alignment amongst Commissioners that this is a priority for the County 4b. Work with NCACC and other partners to elevate this issue on the State advocacy agenda 4c. Work with advocacy organizations and/or other legislative groups to review and prioritize advocacy efforts to pursue	4a. Alignment with Commissioner advocacy priorities 4b. Elevate Issue with NCACC to State level 4c. Work with advocacy organizations to review and select priorities to pursue
5) Explore developing public-provided, open access middle-mile fiber infrastructure 5a. Identify suitable areas where middle mile fiber could be built out 5b. Work with engineers, construction managers, finance teams and other partners to develop plan for buildout and conduct technical evaluation 5c. If technical evaluation is favorable, work with relevant stakeholders to socialize plan with and prepare for buildout	**Strategy dependent on advocacy success** 5a. Identify suitable areas for middle mile 5b. Technical evaluation 5c. Socialize and prepare

*Timelines may vary
**GREAT Grant closes April 4, 2022; BIL Funding Opens Fall 2022

Action Plan: Recommended steps for targeted strategies



* Additional information on funding sources can be found in the Appendix on pg. 120

Action Plan Detail: Funding Opportunities

Estimated time to implement

Short-term: 1 month - 6 months | Mid-term: 6 months – 2 years | Long-term: 2+ years

Funding opportunities	Important Deadlines
ReConnect Program	Application closes February 22nd, 2022
GREAT Grant	Application closes April 4th, 2022
CAB Grant	Opens Spring 2022

Funding opportunities	Important Deadlines
Stop Gap/Broadband Accelerator Grants	Opens later in 2022
BIL Programs	BIL Programs – to open in mid 2022 and last until expended
Capital Projects Funds	North Carolina to submit a "project plan" for funds by late Sept 2022, and funds must be expended by end of year 2026

Funding opportunities	Important Deadlines
ARPA Local Fiscal Recovery Funds	Must be obligated (budgeted or mapped to projects) by end of year 2024, and expended by end of year 2026
Capital Projects Funds	North Carolina to submit a "project plan" for funds by late Sept 2022, and funds must be expended by end of year 2026
BEAD Program	States will submit a 5-year plan to allocate funds and implement projects until 2027. Funding to last until 2027.

Regardless of funding deadline, it is important to begin to plan now, as applications and project plans may require partnerships (e.g., ISPs, municipal partners, etc.), data collection for gap validation, and coordination

Action Plan Detail: Potential ISP Partners Summary

Based on our analyses and conversation with ISPs, the below data showcases a list of potential partners that the County may choose to engage with on project implementation or applications for funding. This list is not exhaustive but showcases providers that we have identified as potentially open to working with the County.

Randolph COMMUNICATIONS

Residential & commercial
Key Insights:
- ✓ Builds and owns fiber; rural co-operative who currently serves a small portion in the southeast
- ✓ Current service area is near census blocks that fall below the 25/3 Mbps threshold
- ✓ Received a Rural Digital Opportunity Fund (RDOF) grant to expand network in the County

CONTERRA NETWORKS

Commercial & institutional
Key Insights:
- ✓ Builds and owns fiber
- ✓ Currently serves enterprise, education, and government entities
- ✓ Actively evaluating expansion opportunities into other markets

MCNC

Institutional
Key Insights:
- ✓ Builds and owns fiber
- ✓ Key player in providing fiber to anchor institutions
- ✓ Cannot provide service to residential and commercial due to tax reasons

NorthState

Residential & commercial
Key Insights:
- ✓ Builds and owns fiber; has large fiber coverage footprint (38%)*
- ✓ Has entered P3s with entities across the County (e.g., Tri-Gig Broadband Initiative)
- ✓ Is currently driving a broadband expansion plan throughout the County

SEGRA℠

Commercial & institutional
Key Insights:
- ✓ Build and owns fiber; largest independent fiber company in the Country
- ✓ Has a large fiber footprint in the County
- ✓ Has previously partnered with the City of Greensboro to advance smart cities (US Ignite)

Google Fiber

Commercial, institutional, and residential
Key Insights:
- ✓ Builds and owns fiber
- ✓ Has partnered with other local governments in North Carolina
- ✓ Google Community Fiber is currently pursuing partnership with Greensboro and High Point

*Source: FCC Form 477 Fixed Deployment data. Note: This data likely overestimates broadband coverage and speeds to residents in Guilford County. Fixed providers file lists of census blocks in which they can or do offer service to at least one location, so they may not accurately reflect what service provider and speed options are available.

Action Plan Detail: Checklist for Strategy Implementation

Guilford County can take immediate action to begin implementation of Overarching and Targeted Strategies in the following ways

Strategy Support

- ❑ Determine resource allocation and/or hire for dedicated FTE(s) to oversee strategy execution and lead Task Force
- ❑ Stand up Digital Inclusion & Broadband Task Force

Strategy Evaluation

- ❑ Begin initial introductions and conversations with ISPs and nonprofits on partnerships
- ❑ Begin conversations with municipalities and other partners on potential project service areas
- ❑ Evaluate and select preferred Targeted Strategies to implement as pilot programs

Funding

- ❑ Identify currently available funding sources that the County would like to pursue for each chosen strategy
- ❑ Begin gathering information on potential service areas using the GREAT Grant requirements as a model

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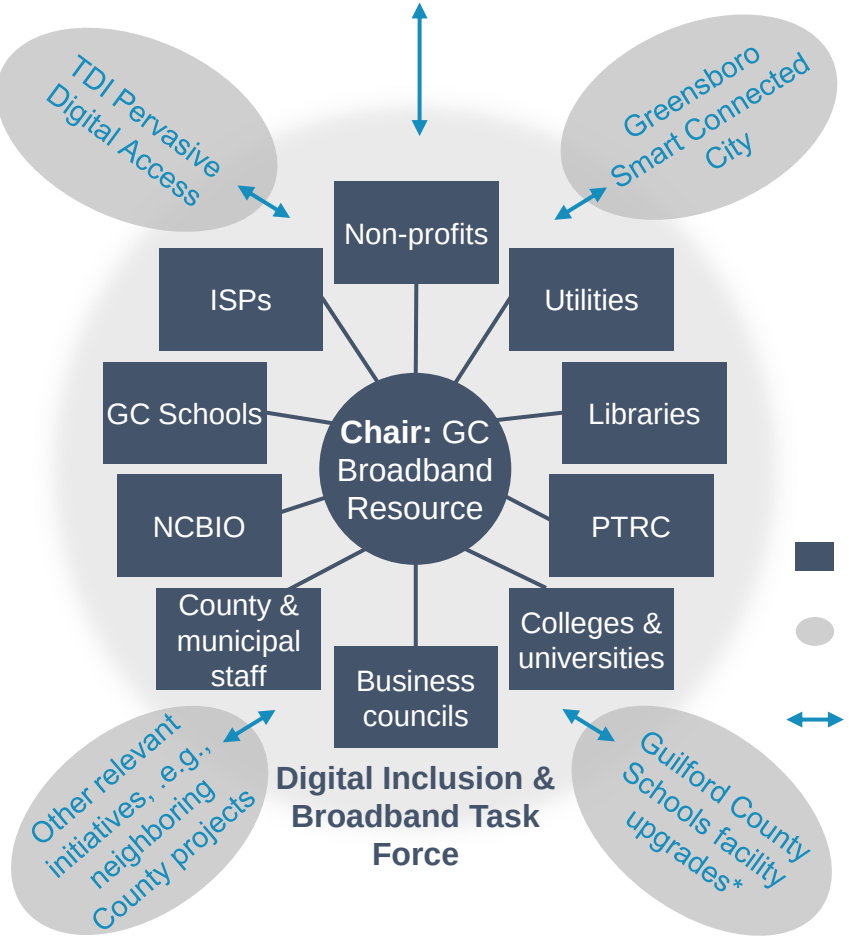
The broadband resource and task force are central in the broader ecosystem of digital equity initiatives

Decision-making authorities, e.g., City councils, Board of Commissioners, State representatives, School/college boards



Key

- Task Force members
- Non-exhaustive ecosystem of collaborative initiatives
- Information flow

Digital Inclusion & Broadband Task Force

Purpose: Advises and provides guidance to decision-makers, promotes knowledge-sharing, and coordinates efforts for implementing different elements of the Broadband Strategy and additional broadband initiatives that may be external to the strategy, i.e., the "ecosystem".

Roles: Chaired by dedicated Guilford County broadband resource who acts as the main liaison with other initiatives, administrates, and performs other coordinating requirements. Individual members may become functional leads depending on strategic objective, e.g., technical vs education or training focused-projects

Key responsibilities: Sharing priorities and perspectives from respective organizations, sharing data and knowledge exchange, championing broadband investment, gaining buy-in from key stakeholders, elevating important and time sensitive information to decision-making authorities

*Pending school bond referendum

The task force may develop tactical sub-committees, as needed

The Digital Inclusion & Broadband Task Force may initially serve primarily in an advisory role but could develop into a more tactical implementation role depending on goals. Sub-committees are suggested as an option to address more tactically focused objectives

	Digital Inclusion & Broadband Task Force	(Optional) Sub-committees
Purpose	Providing guidance, promoting knowledge-sharing, and coordinating efforts for implementing different elements of the Broadband Strategy and with additional broadband initiatives that may be external to the strategy	Implementation focused sub-committees for specific targeted strategies or functional areas
Key Responsibilities	• Share the priorities and opinions of respective organizations and the groups they represent • Champion broadband investment in Guilford County and North Carolina • Be a willing partner when it comes to implementation of the Broadband Strategy and make connections with other potential partners • Identify risks/barriers and mitigating strategies • Help gain buy-in amongst key stakeholders • Share data, knowledge and lessons learned from relevant broadband initiatives • Elevating important and time sensitive information to decision-making authorities	• Support or lead implementation for specific targeted strategies or functional areas, e.g., communications and outreach • Provide expertise • Report progress to the task force
Membership*	• County staff from Information Services, Social Services, Planning & Development, Economic Development, Health & Human Services, Emergency Services. Dedicated broadband resource can be lead • Guilford County Schools staff (Operations, Innovation, Communications) • City of Greensboro staff (Information Technology, Planning, Communication & Marketing, Libraries) • City of High Point staff (Information Technology, Planning & Development, Communication & Public Engagement, Libraries) • Universities/Colleges (See Advisory Group members – could be extended to others also) • Business councils (Action Greensboro and Business High Point) • Piedmont Triad Regional Council of Governments • North Carolina Broadband Infrastructure Office (occasional) • Duke Energy • Not-for-profit and public-private partnerships (Guilford Works, Guilford Education Alliance, Cone Health, Kramden Institute, etc.) • ISPs (MCNC is on Advisory Group, project partner ISPs could also be included after selection)	(Dependent on sub-committees) • Information Technology staff, e.g., network infrastructure deployment focused • Communications and Public Engagement Staff, e.g., outreach focus • Libraries, e.g., digital literacy focused • Guilford County Schools staff, e.g., school-related projects • ISP liaisons • Not-for-profit and public-private partnerships
Meeting frequency	Once per month w/ decreasing/increasing frequency as needed (45 minutes to 1 hour suggested)	Project dependent

*Specific composition will depend on strategic priorities and whether the task force is in a primarily advisory role or takes on any implementation responsibilities

Strategy Appendix

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Municipal and Advisory Group Partners

Working Group Committee Members

The Working Group provides day-to-day project guidance, connections with other key stakeholders, and technical expertise

Working Group Members	
Jason Jones	Assistant County Manager, Guilford County
Peter Purcell	Chief Information Officer, Guilford County
Adam Ward	Linux/VMWare Server Administrator, City of High Point
Sylvia Suriani	Network Manager, City of Greensboro
Michael Dumas	Director, IT Support Services, Guilford County Schools
Charita Sutton	Work First Employment/ Energy / Child Day Care Manager, Guilford County
Kaye Graybeal	Deputy Planning and Development Director, Guilford County
Tiffany Oliva	Fiscal Recovery Program Manager, Guilford County

Steering Committee Members

The Steering Committee provides strategic decision-making and high-level project oversight

Steering Committee Members	
Michael Halford*	County Manager, Guilford County
Jason Jones	Assistant County Manager for Quality Government, Guilford County
Erris Dunston	Assistant County Manager for Strong Community, Guilford County
Peter Purcell	Chief Information Officer, Guilford County
Jim Albright	Emergency Services Director, Guilford County
Rodney Roberts	Interim Chief Information Officer, City of Greensboro
Brigitte Blanton	City of Greensboro Libraries Director
Steve Lingerfelt	Chief Information Officer, City of High Point
Mary Sizemore	City of High Point Library Director
Eric Olmedo	Assistant City Manager, City of High Point
Jose Oliva	Deputy Chief of Staff, Guilford County Schools
Clark Poole	Director of Enterprise Operations, Guilford County Schools
Candace Salmon-Hosey**	Executive Director of Technology Services, Guilford County Schools

*Steering Committee Chair
** Stepped down in January 2022

Advisory Group Members

The Advisory Group provides guidance and a diversity of perspectives from their respective organizations to help inform the strategy and identify gaps and opportunities

Advisory Group Members	
Jason Jones	Assistant County Manager, Guilford County
Peter Purcell	CIO, Guilford County
Jon DeYoung	Assistant Director, Health Equity, Cone Health
Chris Rivera	Executive Director, Guilford Works
Cecilia Thompson	Executive Director, Action Greensboro
Brian Norris	Senior Director of Strategic Initiatives, Business High Point
Jamie Herring* Jesse Day David Putnam	Piedmont Triad Regional Council
Tom Jackson	CIO, NCAT

*Stepped down at the end of December 2021

Advisory Group Members	
Suzanne Elise Walsh Thomas Griffis Mondrail Myrick	President Executive Director of Operations Director, Management Information Systems (Bennett College)
Ron Horn	Associate Vice President, Information Technology, GTCC
Vakesia Graves	Managing Director, Connected Communities, Duke Energy
David Hatcher	Director, Grid Connectivity Strategy, Duke Energy
Glenn Knox	Technical Consultant, Central Region, NC BIO
Tommy Jacobson	COO & Vice President, MCNC
Karen Hornfeck	Vice President, Guilford Education Alliance

Impact and Ease Scores

Targeted Strategies were evaluated based on their impact and ease

	Criterion	Criterion Definition	Score Definition: Low	Score Definition: Moderate	Score Definition: High
Impact	**Percent of population potentially impacted**	Percent of population that could have increased broadband access as a result of the targeted strategy	0-5%	5-10%	10%+
Impact	**Types of broadband gaps addressed**	Potential to address multiple gaps through one targeted strategy	Addresses 1 type of gap: either Availability, Affordability, or Adoption	Addresses 2 out of 3 types of gaps: Availability, Affordability, and/or Adoption	Addresses all 3 types of gaps: Availability, Affordability, and Adoption
Impact	**Long-term Investment in Availability**	Long-term impact of targeted strategy in increasing availability	Supply-side infrastructure for >25/3 Mpbs but <100/20 Mbps	Supply-side infrastructure for ≥100/20 Mpbs but <100/100 Mbps	Supply-side infrastructure for 100/100 Mbps
Impact	**Long-term Investment in Affordability or Adoption**	Long-term impact of targeted strategy in increasing affordability or adoption	Only addresses 1 element of digital inclusion*	Addresses some (2 to 3) elements of digital inclusion*	Addresses nearly all (4 to 5) elements of digital inclusion*
Ease	**Cost**	Resources required to implement	Significant investment	Moderate investment - expand current resources	No additional investment
Ease	**Level of partnership required**	Number of entities external to the County needed to achieve the potential benefit	3+ external entities	1-2 external entities	No external entities
Ease	**Time**	Time needed to realize the benefit	More than 1 year	6 months - 1 year	Less than 6 months

*Digital Inclusion definition: 1) home connectivity, 2) devices, 3) digital literacy training,4) technical support, and 5) applications/content designed to enable & encourage self-sufficiency, participation and collaboration (NDIA)

Targeted Strategies Impact and Ease Scores

		Impact				Ease			
Targeted Strategy	Page #	% Population Potentially Impacted*	Types of Gaps Addressed	Long-term Investment	**Overall Impact Score**	Cost	Level of Partnership	Time to realize benefit	**Overall Ease Score**
1.1 Last Mile: Pole Replacements	46	0.18 (3)	1	2	2.00	3	2	2	2.33
1.2 Middle Mile: Fiber network into urban areas	49	0.13 (3)	1	3	2.33	1	2	2	1.67
1.3 Last Mile: Fiber to the premise in unserved urban areas	50	0.13 (3)	1	3	2.33	1	1	1	1.00
1.4 Last Mile: Urban 5G mesh network	51	0.13 (3)	1	2	2.00	2	2	1	1.67

* Percent of population potentially impacted was calculated by estimating the number of residents living in a low availability census tract without high-speed broadband (defined here as 100/100 Mbps) as a percent of the Guilford County population.

Targeted Strategies Impact and Ease Scores

		Impact				Ease			
Targeted Strategy	Page #	% Population Potentially Impacted*	Types of Gaps Addressed	Long-term Investment	**Overall Impact Score**	Cost	Level of Partnership	Time to realize benefit	**Overall Ease Score**
1.5 Middle Mile: Fiber network into rural areas	54	0.04 (1)	1	3	1.67	1	1	2	1.33
1.6 Last Mile: Fiber to the premise in unserved rural areas	55	0.04 (1)	1	3	1.67	1	1	1	1.00

* Percent of population potentially impacted was calculated by estimating the number of residents living in a low availability census tract without high-speed broadband (defined here as 100/100 Mbps) as a percent of the Guilford County population.

Targeted Strategies Impact and Ease Scores

		Impact				Ease			
Targeted Strategy	Page #	% Population Potentially Impacted**	Types of Gaps Addressed	Long-term Investment	**Overall Impact Score**	Cost	Level of Partnership	Time to realize benefit	**Overall Ease Score**
2.1 Partner with Kramden Institute for digital device refurbishing/donations	60	0.07 (2)	2	2	2.00	1	2	3	2.00
2.2 "Gap" grant program and "one stop" application assistance	61	0.05*** (2)	2	2	2.00	1	1	2	1.33
2.3 Digital Navigators	62	0.07 (2)	2	3	2.33	2	1	2	1.67
2.4 Digital Inclusion Nodes	63	0.07 (2)	2	3	2.33	2	1	2	1.67

**Percent of population potentially impacted was calculated by estimating the number of residents living in a low affordability + low adoption census tract without high-speed broadband (defined here as 100/100 Mbps) as a percent of the Guilford County population.

***Percent of population potentially impacted was calculated by estimating the number of residents receiving SNAP benefits (who would also qualify for Affordability Connectivity Program assistance) as a percent of the Guilford County population.

Targeted Strategies Impact and Ease Scores

		Impact				Ease			
Targeted Strategy	Page #	% Population Potentially Impacted****	Types of Gaps Addressed	Long-term Investment	**Overall Impact Score**	Cost	Level of Partnership	Time to realize benefit	**Overall Ease Score**
3.1Free/ Discounted internet for public housing authorities (PHAs)	66	0.03 (1)	3	2	2.00	1	2	2	1.67
3.1a 5G campus network for PHAs	67	0.03 (1)	1	2	1.33	2	2	2	2.00
3.1b Fiber internet access for PHAs	68	0.03 (1)	1	3	1.67	2	2	1	1.67

**** Percent of population potentially impacted was calculated by estimating the total number of public housing authority residents (Greensboro: 13,000, High Point: 5,000(estimate), Total: 18,000) as a percent of the Guilford County population.

Cost Estimates for Targeted Strategies

Cost Estimates for Targeted Strategies

Targeted Strategy	Page #	Assumptions	Calculations
1.1 Last Mile: Pole Replacements	46	Pole costs (1) Cost of pole along with associated capital costs (depreciation, taxes, cost of debt) (2) Installation costs (3) Maintenance and administrative costs Wood Poles - Sold in 5-ft increments (joint use poles are generally 35-45 feet in height): $400-600 - Pole cost will vary based on supply and demand, material, height and width - Labor and material costs will depend on pole location (rurality and topography) - Average lifespan of a pole is typically 40 + years Average annual pole attachment rates in North Carolina by pole owner type - Investor owned: $7.07 - Coop: $6.02 - Muni: $10.82	Miles of fiber: 1 Pole spacing: 100-120 feet Poles per mile of fiber: 5280/100 ~53 Total poles: 53 Cost per pole: $400-600 Total cost: 53 poles * $500/pole = $26,500

1.2 Middle Mile: Fiber Network Into Urban Areas	49	A range of **$35K – $70K** per mile was estimated for Guilford County through desktop research (see estimates above) and conversations with ISPs.**	**Use Existing Infrastructure:**
			• Overlashing: $13K – $20K per mile
			• Pulling cables through conduit: $20K - $50K per mile
			New Construction:
			Aerial: $25K - $100K per mile
			• Underground
			  • Plowing: $70K per mile
			  • Boring: $90K per mile

**Where applicable, ISPs can consider using existing infrastructure (e.g., overlashing) to reduce capital costs of infrastructure deployment.

Cost Estimates for Targeted Strategies

Targeted Strategy	Page #	Assumptions	Calculations
1.3 Last Mile: Fiber to the premise in unserved urban areas	50	A range of **$35K – $70K per mile** was estimated for Guilford County through desktop research (see estimates above) and conversations with ISPs.**	**Last Mile Connection Costs:** **Fiber:*** Drop Cables to each premise: ($500-$750) **Cable (i.e., coaxial cable):** various (may have similar pricing to fiber) **Fixed Wireless Deployment Components:** • Towers: $7.5K – $70K • Power Generator: $5K - $50K • Self Organizing Network (SON) Device: $45 – 55K • Ancillary Equipment: $4K - $26K
1.4 Last Mile: Urban 5G mesh network	51	Small cell installations: $10,000 each Greensboro's 5G City project with Verizon: 200 small cell sites	200 small cell sites $10,000 per small cell site Total cost: $2 million Total cost range (+ 20%): $2-$2.4 million

*See previous page for cost estimates
**Where applicable, ISPs can consider using existing infrastructure (e.g., overlashing) to reduce capital costs of infrastructure deployment.

Cost Estimates for Targeted Strategies

Targeted Strategy	Page #	*Assumptions*	Calculation
1.5 Middle Mile: Fiber network into rural areas	54	A range of **$35K – $70K** per mile was estimated for Guilford County through desktop research (see estimates above) and conversations with ISPs.**	**Use Existing Infrastructure:** • Overlashing: $13K – $20K per mile • Pulling cables through conduit: $20K - $50K per mile **New Construction:** Aerial: $25K - $100K per mile • Underground • Plowing: $70,000 per mile
1.6 Last Mile: Fiber to the premise in unserved rural areas	55	A range of **$35K – $70K per mile** was estimated for Guilford County through desktop research (see estimates above) and conversations with ISPs.**	**Last Mile Connection Costs:** **Fiber:*** Drop Cables to each premise: ($500-$750) **Cable (i.e., coaxial cable):** various (may have similar pricing to fiber) **Fixed Wireless Deployment Components:** • Towers: $7.5K – $70K • Power Generator: $5K - $50K • Self Organizing Network (SON) Device: $45 – 55K • Ancillary Equipment: $4K - $26K

Cost Estimates for Targeted Strategies

Targeted Strategy	Page #	*Assumptions*	Calculation
2.1 Partner with Kramden Institute for digital device refurbishing/donations	60	**Partnership implementation costs:** **Training costs:** • Internship positions: (2 interns as part of workforce development training) $15K*2 • Transportation stipend $2.5K*2 **Administrative, outreach & contingency:** • Administration, outreach, and marketing: $10K • Contingency: 15% of total	All costs were added then multiplied by the contingency to estimate the lower end of the cost range then multiplied by a factor of 1.2 for the high end of the range and rounded to the closest $10K **Cost Range: $50K – $60K**
2.2 "Gap" grant program and "one stop" application assistance	61	**Grant & application assistance implementation costs**: **Gap funding:** • Internet service gap (assumed mid-range plan to supplement ACP $30 subsidy): $75*10000 • Device gap (assumed low-range of devices to supplement ACP $100 subsidy): $50*5000 **Administrative and contingency:** • Application support: $25K • Grant administration: $80K • Contingency: 15% of total	All costs were added then multiplied by the contingency to estimate the lower end of the cost range then multiplied by a factor of 1.2 for the high end of the range and rounded to the closest $1M **Cost Range: $4M – $5M**

Cost Estimates for Targeted Strategies

Targeted Strategy	Page #	*Assumptions*	Calculation
2.3 Digital Navigators	62	**Digital Navigator implementation costs:** **Staffing costs:** • Interns: 12 (distributed between libraries and partner CBOs): $15K*12 • Program Managers (1 for Greensboro Library 1 for High Point Library): $60K*2 **Equipment for staff**: • Laptops/OS/Insurance: $550*14 • Tablets: $250*14 • Phones: $500*14 • Hotspots: $150*6 • Data plans: $50*34 **Administrative, outreach & contingency:** • Office supplies (per staff): $150*14 • Outreach & marketing: $20K • Contingency: 15% of total	All costs were added then multiplied by the contingency to estimate the lower end of the cost range then multiplied by a factor of 1.2 for the high end of the range and rounded to the closest $100K **Cost Range: $400K – $500K**
Digital Inclusion Nodes	63	**Digital Inclusion Nodes implementation costs:** **Staffing costs:** • Program managers: (2) $55K*2 **Equipment**: • Mobile resource center: $150K • Hotspots & Data Plans: $50*450 • Printers: $1000*4 • Laptops/OS/Insurance: $550*450 • Monitors: $150*24 • Desktop computers: $500*24 • iMacs: $1700*4 • Accessories (mice, headphones, etc.): $150*100 **Administrative & contingency:** • Office supplies (per staff): $150*2 • Contingency: 15% of total	All costs were added then multiplied by the contingency to estimate the lower end of the cost range then multiplied by a factor of 1.2 for the high end of the range and rounded to the closest $100K **Cost Range: $800K – $1M**

Cost Estimates for Targeted Strategies

Targeted Strategy	Page #	*Assumptions*	Calculation
Free / discounted internet for public housing residents	66-68	**Implementation costs**: (Dependent on access technology; case study data for Denver Housing Authority mesh network installation was used as an estimate) Residential units for Greensboro Housing Authority: $566.04*2500 Residential units for High Point Housing Authority: $566.04*1146 Contingency: 15% of total	All costs were added then multiplied by the contingency to estimate the lower end of the cost range then multiplied by a factor of 1.2 for the high end of the range and rounded to the closest $1M **Cost Range: $2M – $3M**

Other Typologies

Targeted Strategies are likely highly applicable to other typologies as well, but further validation is required

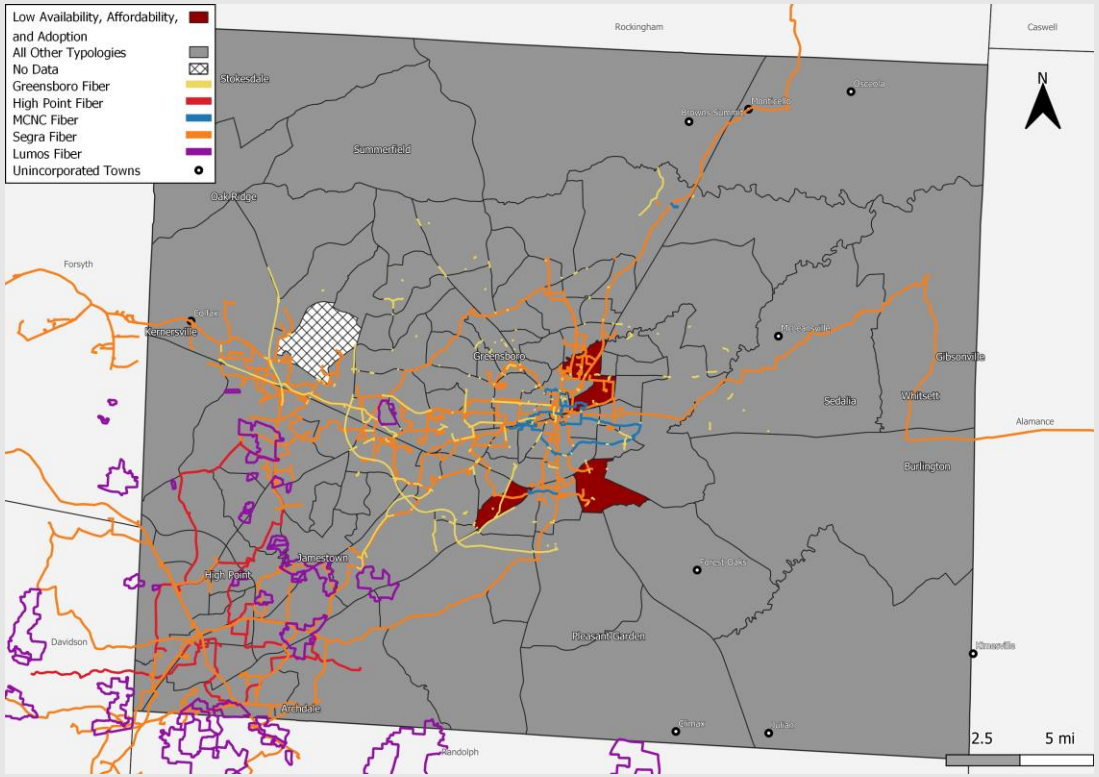
		Targeted Strategy									
		1.1	1.2 & 1.5	1.3 & 1.6	1.4	2.1	2.2	2.3	2.4	3.1	3.1a/b
	Typology (% of Guilford County)	Pole Replacements	Middle Mile Fiber	Last Mile Fiber	Last Mile 5G mesh network	Device Refurbishment / Replacement	"Gap" Grant Program and "One Stop" Applications	Digital Navigators	Digital Inclusion Nodes	Free / Discounted internet for Public Housing	5G Campus Network / Fiber for Public Housing
Areas with less digital equity	Low Availability (25%)	X	X	X	X						
	Low Affordability & Adoption (17%)					X	X	X	X	X	X
	Low Availability, Affordability & Adoption (3%)	X	X	X	X	X	X	X	X	X	X
	Low Availability & Affordability (2%)	X	X	X	X	X	X	X	X	X	X
	Low Adoption (2%)					X	X	X	X	X	X
Areas with more digital equity	Medium Availability, Affordability & Adoption (17%)	X	X	X	X	X	X	X	X	X	X
	Medium Availability (20%)	X	X	X	X						
	High Availability (14%)	*There may still be digital inequity in High Availability census tracts, but more research and analysis are needed*									

= Typologies that were the focus of Targeted Strategies in this document

3. Low Availability, Low Affordability, & Low Adoption

Lower rates of **internet and device access**, higher **poverty**, and low **consumer choice**

3% of pop.



Includes communities in: East and South Greensboro and districts 1, 7, and 8
Includes zip codes: 27401, 27405, 27406

Availability Avg	Affordability Avg	Adoption Avg
53.1	38.4	25.9

Low availability combines with challenging socio-economic conditions to create need for programs addressing affordability and adoption

21% of households have access to 0-1 provider choices, compared to a 7% county average

33% of households are in areas with access to fiber despite proximity to fiber rings, compared to a 63% county average

Key Variable	Within Typology	Average
% of population identified as non-white	81%	45%
% of population in poverty	29%	19%
% of households with no access devices	26%	13%
% of households with no internet access	41%	25%

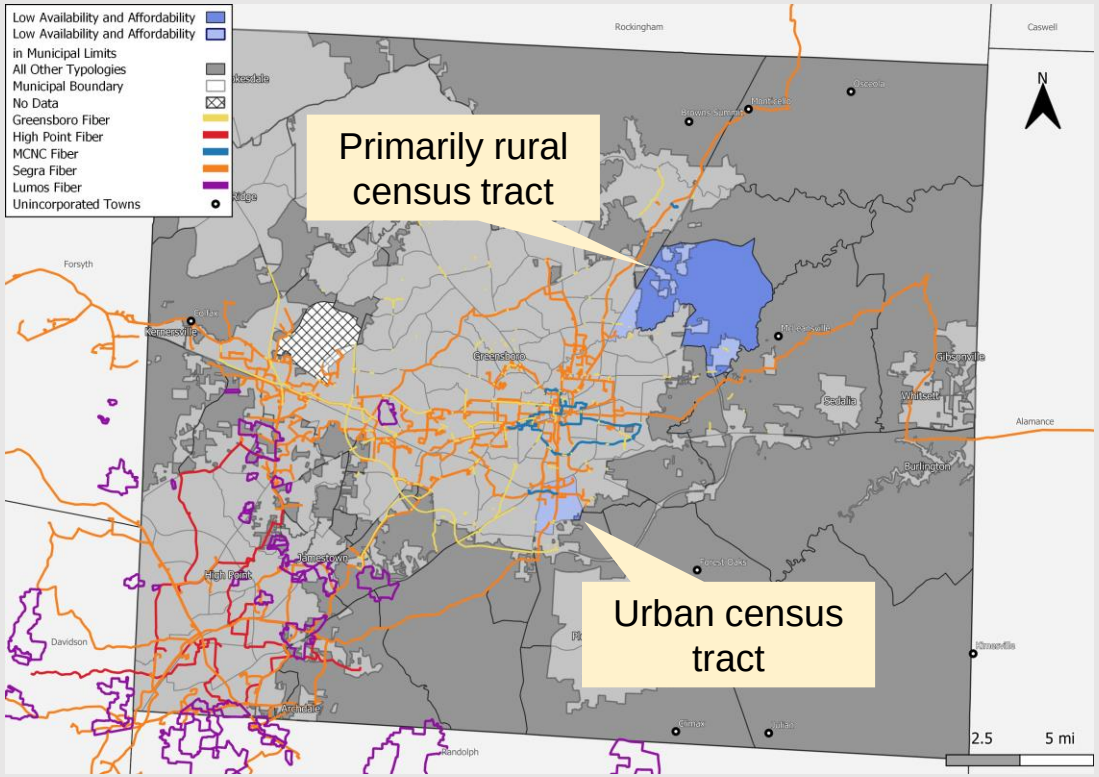
Internet is the default form of communication for our modern society. Unfortunately, in the US broadband companies make their Goal to limit the access to affordable and reliable internet. A thing that has become an essential commodity for the rest of the world.

Survey respondent in 27405 zip code with data cap

4. Low Availability & Low Affordability

Socio-economic barriers and limited **consumer choice**

2% of pop.



Includes communities in: Northeast and South Greensboro, and districts 4 and 7
Includes zip codes: 27301, 27405, 27406

Availability Avg	Affordability Avg	Adoption Avg
50.4	49.4	46.1

Location on the outskirts of urban areas may drive low investment in broadband technology for these low resource census tracts

539 households per square mile, a relatively low density, may drive low availability, especially in the northeast tract

13% have access to fiber in these two tracts on urban outskirts, compared to a 63% county average

Key Variable	Within Typology	Average
% of households have children present	40%	31%
% of population in poverty	29%	19%
% of housing-burdened* households	41%	33%
% of population identified as non-white	70%	45%

*A housing-burdened household is defined by Housing and Urban Development as any household paying more than 30% of their income in total housing costs (rent, utilities, etc.)

Q: Did you need assistance applying for the [FCC Emergency Broadband Benefit] program?

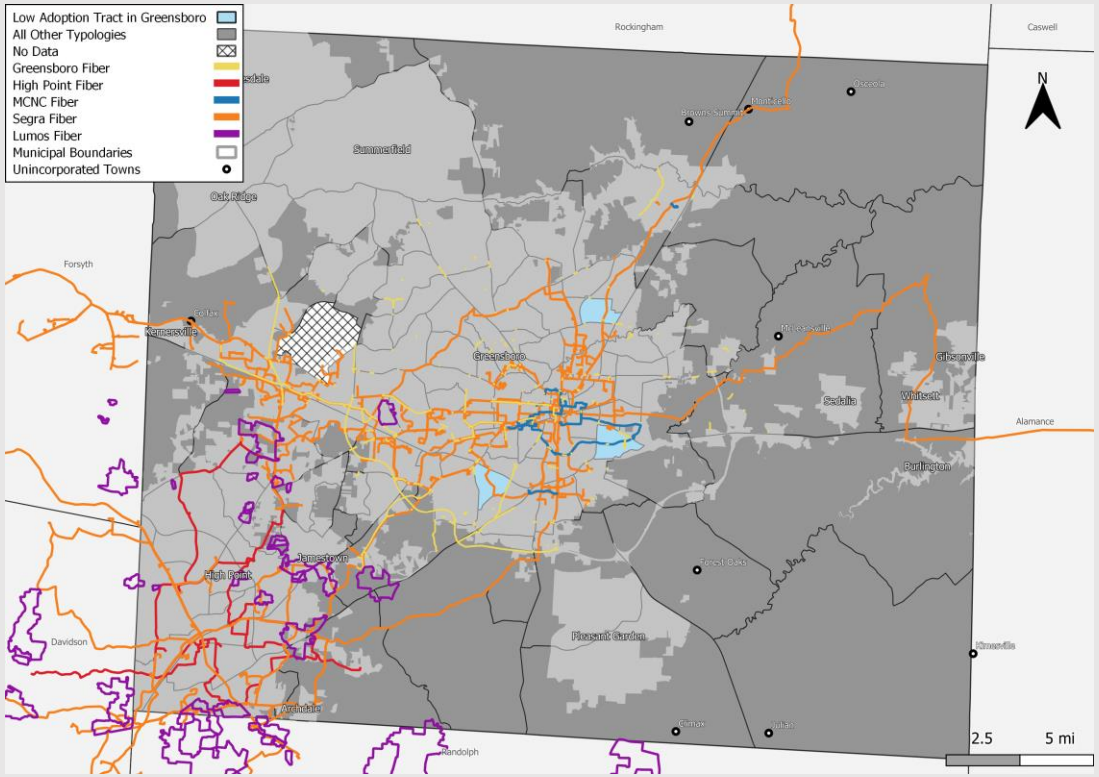
A: Yes, I needed assistance. I can barely financially afford if it wasn't for this I wouldn't be able to afford it

Survey respondent in 27301 zip code who applied for FCC Emergency Broadband Benefit

5. Low Adoption

Prevalent **limited English** skills, low **education**, and relatively high **poverty**

2% of pop.



Includes communities in: Outskirts of Greensboro and districts 7 and 8
Includes zip codes: 27401, 27405, and 27407

Availability Avg	Affordability Avg	Adoption Avg
80.9	57.4	23.6

Despite broadband services and speeds being available, residents in these census tracts may have other barriers that prevent adoption

65% of households have access to fiber, a number slightly higher than the 63% average for the county

34% of households do not have internet access, compared to a 25% county average, despite high fiber access

Key Variable	Within Typology	Average
% of households with limited English	13%	6%
% of population identified as non-white	83%	45%
% of population over age 25 with a bachelor's degree	12%	23%
% of population in poverty	27%	19%

Q: Who in your community have you seen struggle most with internet access?

A: The population [at schools] that struggled the most were the ESL (English as a Second Language) students and families. Teachers had to communicate directly with these families and set them up with the [equipment] they needed.

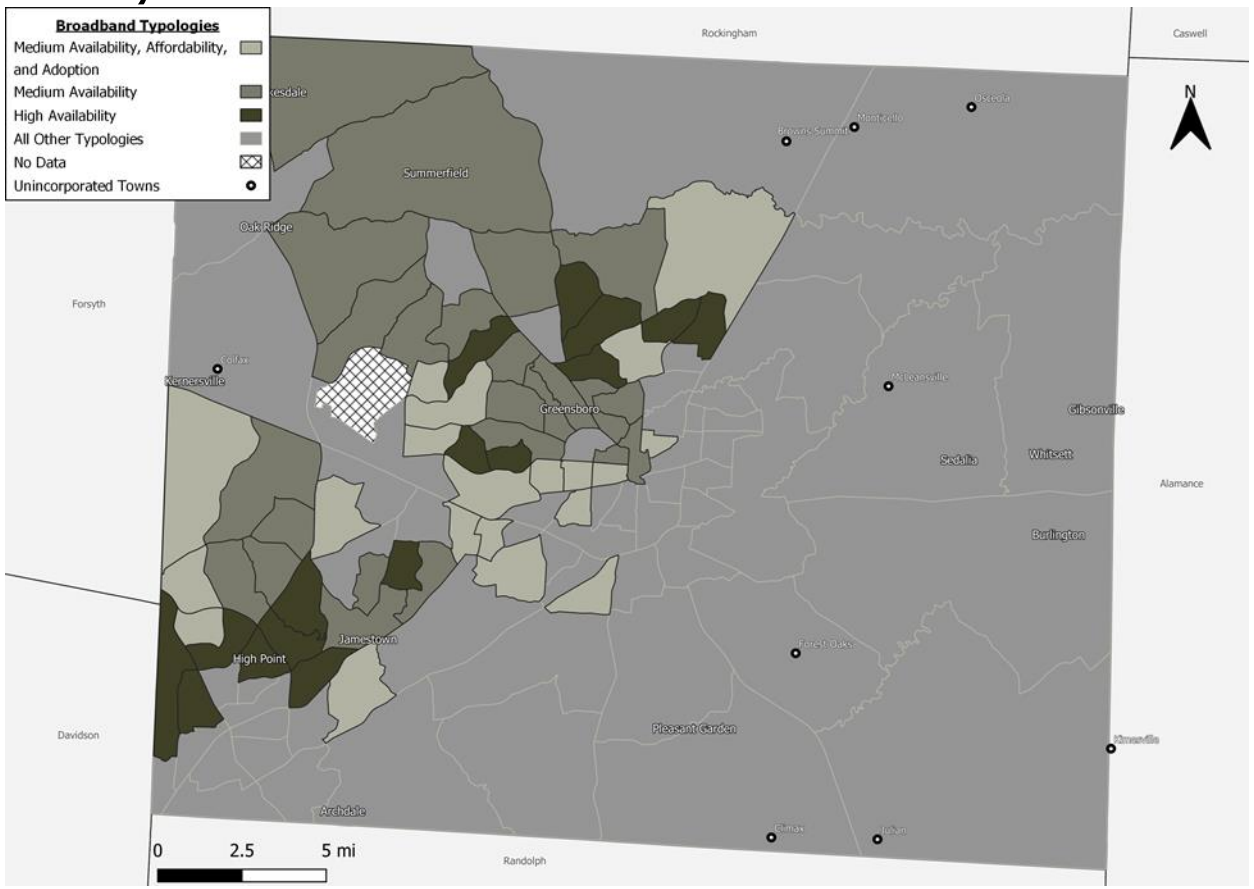
Focus Group respondent

Census tracts with medium or low barriers to broadband are located north and west of High Point and Greensboro, and the northwest corner of Guilford

Targeted strategies for census tracts with high barriers related to availability, affordability, and adoption can also be applied to areas with medium or low barriers.

Typology	Count of Census Tracts	Share of Guilford Population
All 3 Medium	20	17%
Medium Availability	25	20%
High Availability Only*	16	14%
Total	**61**	**51%**

*Some tracts in these areas may still have medium or high barriers to affordability and adoption.

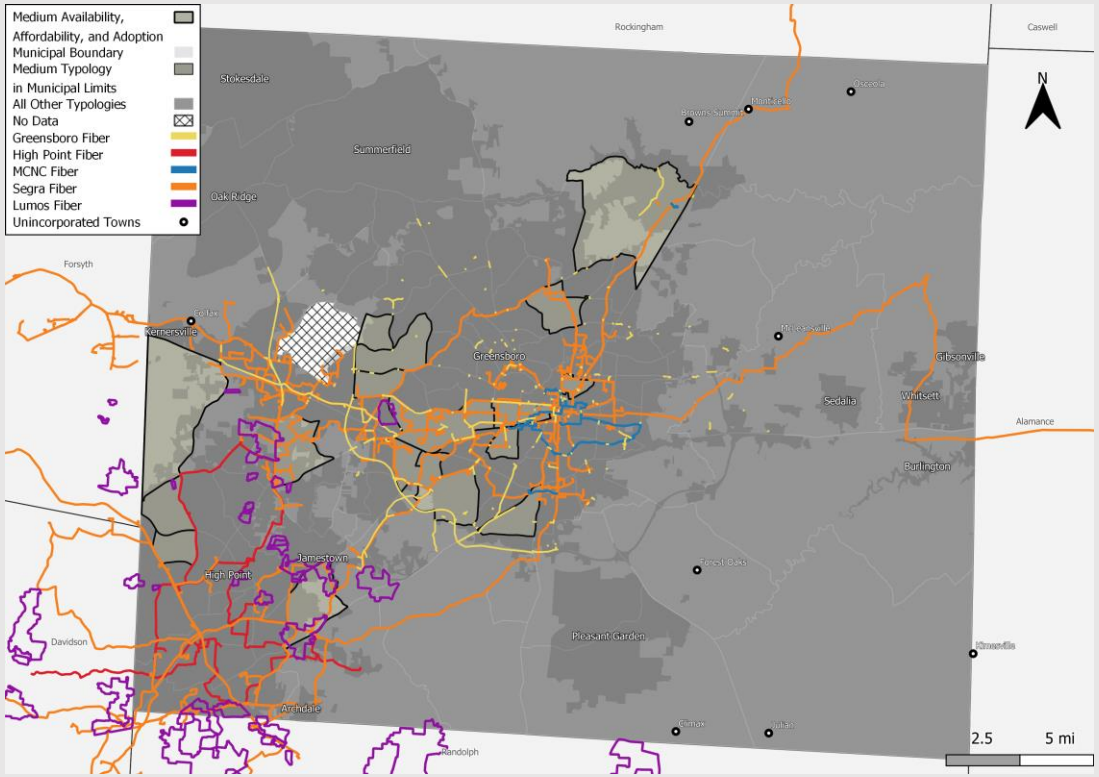


While the remaining census tracts in Guilford County also face inequities related to availability, affordability, and adoption, their barriers are not as significant as those faced by residents of other areas. Targeted strategies in high inequity areas should be pursued first.

6. Medium Availability, Medium Affordability & Medium Adoption

Less **digital device access** and **children**, higher **18-34-year-olds population**

17% of pop.



Includes communities in: High Point, Greensboro, Jamestown, districts 1 & 5-8
Includes zip codes: 27282, 27403-27410, 27265, 27284, 27235, 27214, 27260

Availability Avg	Affordability Avg	Adoption Avg
73.9	72.3	53.9

A slightly higher share of 18-to-34-year-olds are present with a lower share of children in the home, possibly due to the nearby higher education institutions.

8% of households have access to 0-1 provider choices, compared to a 7% county average

61% of households are in areas with access to fiber, compared to a 63% county average

Key Variable	Within Typology	Average
% of population ages 18-34	20%	17%
% of households have children present	26%	31%
% of households with no access devices	9%	13%
% of households with no internet access	23%	25%

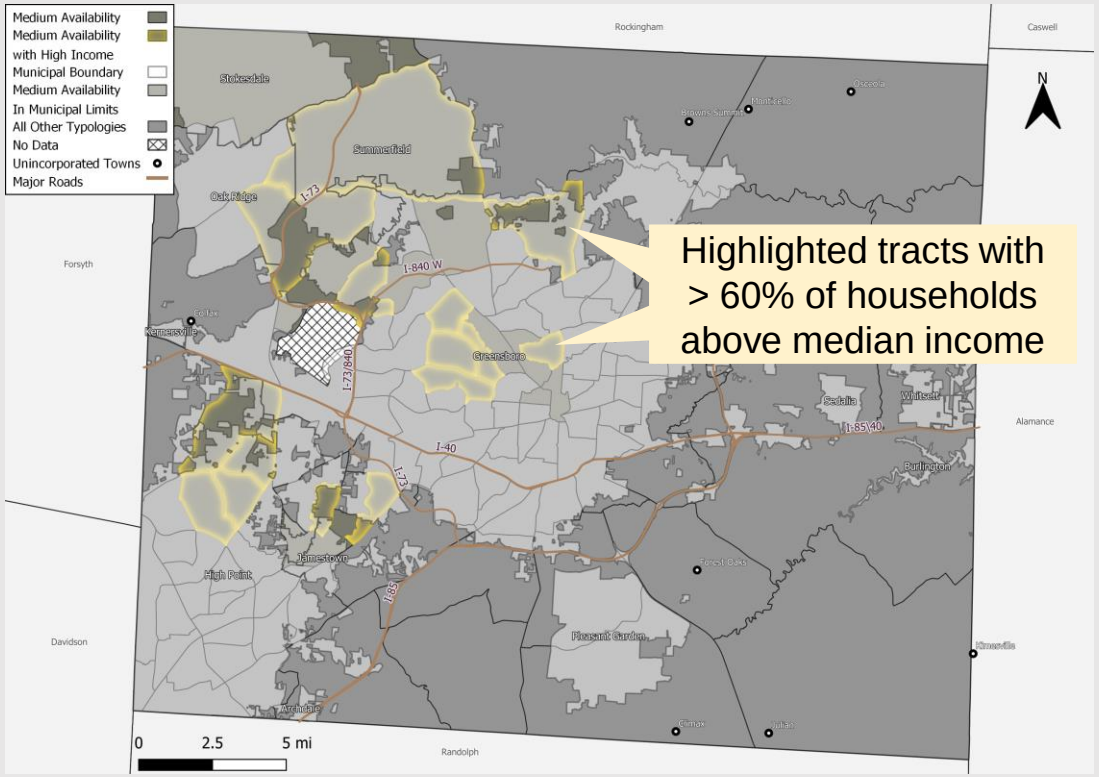
Q: How does using the internet impact your daily life?
A: It's necessary for me to work from home and also continue my studies as a part-time student.

Survey respondent in zip code 27403 pursuing higher education

7. Medium Availability

High **income** and available **broadband**, with enclaves of low access

20% of pop.



Includes communities in: Northeast and West Guilford and districts 2, 3, 5, and 6
Includes zip codes: 27265, 27284, 27357-58 27282, 27401, 27407-27410, and 27455

Availability Avg	Affordability Avg	Adoption Avg
77.0	93.8	78.5

Most residents have access to broadband and higher income. This typology requires targeted approaches to aid lower resource enclaves.

8% of residents in this area work from home, compared to 5% for the county overall

77% of households are in areas with access to fiber, compared to a 63% county average

Key Variable	Within Typology	Average
% of households above median income	65%	43%
% of population in poverty	7%	19%
% of households with no internet access	13%	25%
% of population over age 25 with a bachelor's degree	36%	23%

Q: How does using the internet impact your daily life?

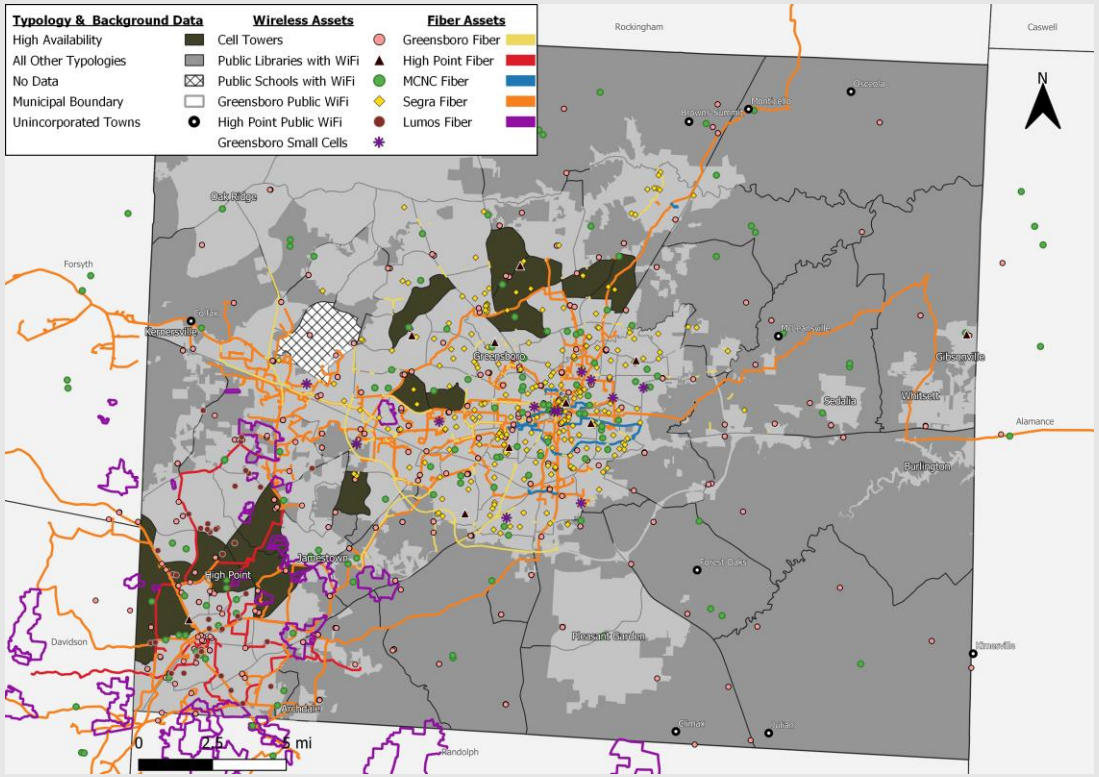
A: It allows my children to have therapy safely within our home during the current health crisis. It allows my husband to work from home safely as needed. It allows me to pursue my degree.

Survey respondent living in zip code 27401

8. High Availability

High fiber availability and relatively average **internet access** and **poverty**

14% of pop.



Includes communities in: Greensboro and High Point and districts 1-3, 5, and 6
Includes zip codes: 27260, 27262, 27265, 27405, 27408, 27410, and 27455

Availability Avg	Affordability Avg	Adoption Avg
90.1	76.7	56.0

Sharp socio-economic divisions may be driving a relatively average proportion of households with no internet access despite high availability

88% of households are in areas with access to fiber, compared to a 63% county average

1% of households have access to 0-1 internet providers offering at least 25/3 mbps, compared to 7% for the county overall

Key Variable	Within Typology	Average
% of population in poverty	15%	19%
% of housing-burdened* households	34%	33%
% of households have children present	28%	31%
% of households with no internet access	19%	25%

*A housing-burdened household is defined by Housing and Urban Development as any household paying more than 30% of their income in total housing costs (rent, utilities, etc.)

Q: How does using the internet impact your daily life?

A: If I did not have reliable internet at home, I would not have been able to work from home for the duration of the pandemic. That's been very important for me.

Survey respondent zip code 27408

Funding Opportunities

Federal Funding Opportunities

Grant Program	Agency / Authority	Type of Funding	Eligible Uses Related to Broadband	Estimated Total Funding	Eligible Recipient	Funding Deadlines
American Rescue Plan Act (ARPA) – Local Fiscal Recovery Funds	Federal Treasury allocation to municipalities	Direct Allocation	Broadband infrastructure development (i.e. laying fiber lines, vertical assets, mobile mesh networks). Provision of internet service to underserved households at speeds of at least 100 Mbps symmetrical Municipalities have broad authority to address areas of high-need in terms of equipment/infrastructure deployment	$104.3M	Guilford County, Cities of Greensboro, High Point, etc. will all receive independent allocations	Funds must be used for costs incurred on or after March 3, 2021. Further, funds must be obligated by December 31, 2024, and expended by December 31, 2026.
American Rescue Plan Act (ARPA) – Capital Projects Fund	Federal Treasury	Competitive Grant	Investment in high-quality broadband infrastructure (at a 100Mbps symmetrical minimum), as well as digital connectivity projects that require the purchase of laptops, routers, and other necessary equipment. Adoption and Affordability projects are also eligible.	$273.6M	Any county, town, or municipality within North Carolina	All funds must be expended by December 31, 2026
Accessible Connectivity Program (ACP)	Federal Communications Commission (FCC)	Direct Program to ISPs/Consumers	Any ISP that receives ARPA funding towards the completion of a broadband project must enroll in the ACP. This program provides a $30 stipend to subsidize internet costs and up to $100 for the purchase of a laptop or tablet.	$14B*	ISPs for provision to low-income households (County cannot use this funding directly)	Program has no set end date Additional funding will be announced for ACP outreach to constituents
Emergency Connectivity Fund	Federal Communications Commission (FCC)	Competitive Grant	For eligible schools and libraries, the ECF Program will cover reasonable costs of laptop and tablet computers; Wi-Fi hotspots; modems; routers; and broadband connectivity purchases for off-campus use by students, school staff, and library patrons.	$7.17B*	Public Schools and Libraries that are eligible under the existing E-Rate program	Program has no set end date

*Funding sources that do not have a designated award cap or entity allocation. The amount listed is the total overall funding available for the program.

Federal Funding Opportunities

Grant Program	Agency / Authority	Type of Funding	Eligible Uses Related to Broadband	Estimated Total Funding	Eligible Recipient	Funding Deadlines
E-Rate Program	Federal Communications Commission (FCC)	Non-Competitive Program	Eligible schools and libraries may receive discounts on telecommunications, telecommunications services, and Internet access, as well as internal connections, managed internal broadband services and basic maintenance of internal connections	$4.28B*	Public Schools and Libraries that service low-income areas	Program has no set end date
5G Fund	Federal Communications Commission (FCC)	Competitive Bid Award	Provision of funds to outfit 5G coverage/infrastructure in Counties, Towns, and Municipalities with lack of 4G LTE and 5G Broadband Service (pending final designation via FCC)	$9B*	Eligible Telecommunication Carriers	Opening/Closing dates not yet set by administering entity
Bipartisan Infrastructure Law (BIL) – ReConnect Program	US Department of Agriculture (USDA)	Competitive Grant/Loan Program	Eligible facilities include buildings, land, and fixed wireless service to construct or improve facilities required to provide broadband access to rural areas. Facilities must be capable of 100mbps symmetrical. $25M with a 25% match from the applicant	$25M per award	Rural areas (less than 20,000 inhabitants) that do not have 100/20mbps connection in 90% of the service area	Applications have a deadline of 2/22/2022 A second iteration of funding will be released in Q3 2022
Bipartisan Infrastructure Law (BIL) – Middle Mile Grants Program	National Telecommunications and Information Administration (NTIA)	Competitive Grant	Establishes and funds a $1 billion program for the construction, improvement or acquisition of middle mile infrastructure. The purpose of the grant program is to expand and extend middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the internet backbone	$1B*	Any State or Local Unit of Government, utility providers, nonprofits, and Internet Service providers	Applications will likely open during the second quarter of 2022.

*Funding sources that do not have a designated award cap or entity allocation. The amount listed is the total overall funding available for the program.

Federal Funding Opportunities

Grant Program	Agency / Authority	Type of Funding	Eligible Uses Related to Broadband	Estimated Total Funding	Eligible Recipient	Funding Deadlines
Bipartisan Infrastructure Law (BIL) – State & Local Cybersecurity Program	Department of Homeland Security (DHS)	Competitive Grant	Upgrades to computers, security systems, and cybersecurity infrastructure	$400M*	Any State, Local, or Tribal government	Applications will likely open during the third quarter of 2022 with funds appropriated until 2025
Bipartisan Infrastructure Law (BIL) – Broadband Equity, Access, and Deployment Program (BEAD)	National Telecommunications and Information Administration (NTIA)	Formula Grant Allocation to States	Planning (e.g., broadband data collection and mapping); broadband infrastructure deployment (e.g., construction), to promote broadband adoption, including through the provision of affordable internet-connected devices; to provide Wi-Fi or reduced-cost internet access to multi-family housing units. Priority is given to areas without access to a 25/3mbps connection, then areas without a 100/2mbps connection.	$100M* minimum to North Carolina	Any county or municipal government in North Carolina (After allocation to state)	States will submit a 5-year plan to allocate funds and implement projects until 2027.
Digital Equity Planning Grant Program	National Telecommunications and Information Administration (NTIA)	Formula Grant Allocation to States	Planning (e.g., feasibility) to promote adoption and use of broadband services across the targeted populations, including low-income households, aging populations, incarcerated individuals, veterans, individuals with disabilities, individuals with a language barrier, racial and ethnic minorities, and rural inhabitants.	$60M*	Any county or municipal government in North Carolina (After allocation to state)	Estimated application opening date, 2nd quarter 2022. Available until expended

*Funding sources that do not have a designated award cap or entity allocation. The amount listed is the total overall funding available for the program.

Federal Funding Opportunities

Grant Program	Agency / Authority	Type of Funding	Eligible Uses Related to Broadband	Estimated Total Funding	Eligible Recipient	Funding Deadlines
Digital Equity Capacity Grant Program	National Telecommunications and Information Administration (NTIA)	Formula Grant Allocation to States	Planning (e.g., feasibility), broadband adoption/digital literacy/tech support around broadband services to targeted populations	$1.44B*	Any county or municipal government in North Carolina (After allocation to State)	Beginning 2022 and available until expended
Digital Equity Competitive Grant Program	National Telecommunications and Information Administration (NTIA)	Competitive Grant	Broadband adoption/digital literacy/tech support, digital equity programs surrounding the same set of targeted populations as the Capacity and Planning grants.	$1.25B*	Local Education Agencies; State Governments, including municipalities and Counties, Non-Profit Organizations; Community Anchor Institutions; and Work Force Development Programs	Beginning 2022 and available until expended
Community Facilities Direct Loan and Grant Program	US Department of Agriculture (USDA)	Competitive Grant/Loan Program	Construction of community public facilities for utility services such as telemedicine or distance learning equipment. Rural areas including cities, villages, townships and towns with no more than 20,000 residents.	Up to 75% of the cost of the proposed project	Public entities, Community-based non-profits	Program has no set end date

*Funding sources that do not have a designated award cap or entity allocation. The amount listed is the total overall funding available for the program.

Note: Additional funding sources, including those targeted at schools, emergency services, and individuals, are available as a separate document in the Broadband Funding Database.

State Funding Opportunities – NCDIT Broadband Infrastructure Office

Grant Program	Agency / Authority	Type of Funding	Eligible Uses Related to Broadband	Estimated Total Funding	Eligible Recipient	Funding Deadlines
Growing Rural Economies with Access to Technology (GREAT) Grant	NCDIT Broadband Infrastructure Office	Competitive Grant	Requirement of at least 100/20 Mbps capabilities in any installed infrastructure and a 50% match to any grant award. Grants require matching investments from private broadband provider grantees, leveraging funding to deploy infrastructure to N.C. households, businesses and farms in the most rural and remote areas of the state.	$350M overall, $4M max per award	Internet Service Providers	Application Deadline is set for April 4th, 2022
CAB Grant	NCDIT Broadband Infrastructure Office	Competitive Grant	Per legislation, projects applied for and not funded under the GREAT Grant can be considered for funding under the CAB Grant program. GREAT Grant applications are due April 4.	$4M per award	Eligible County Partners	Program will launch after GREAT Grant in spring 2022.
Broadband Ready-Made Accelerator Grant	NCDIT Broadband Infrastructure Office	Competitive Grant	This program creates a special fund to reimburse broadband providers (communications service providers) for eligible pole replacement costs in connection with qualified projects.	$100M*	Internet Service Providers	The program will be launched in fall 2022.
Stop-Gap Grant	NCDIT Broadband Infrastructure Office	Competitive Grant	The Broadband Stop Gap Solutions Program provides funding for areas unserved or underserved with broadband following investment from the GREAT Grant Program and the CAB Program for broadband infrastructure installation	$90M*	Internet Service Providers, local government entities and nonprofits	The program will be launched in late 2022 following the GREAT Grant and CAB Grant programs.

*Funding sources that do not have a designated award cap or entity allocation. The amount listed is the total overall funding available for the program.

State Funding Opportunities – NC Department of Commerce

Grant Program	Agency / Authority	Type of Funding	Eligible Uses Related to Broadband	Estimated Total Funding	Eligible Recipient	Funding Deadlines
Economic Infrastructure Program	North Carolina Department of Commerce	Competitive Grant	The Economic Infrastructure Program provides grants to local governments to assist with infrastructure projects that will lead to the creation of new, full-time jobs, including the installation or extension of broadband infrastructure.	N/A	Eligible applicants are units of local government with priority given to the counties that have the 80 highest rankings	N/A
Workforce Program Enhancement Grant	North Carolina Department of Commerce	Competitive Grant	To support or sponsor innovative approaches to workforce development, including supporting workforce needs for businesses and expanding training and resource opportunities for constituents	$200K	Eligible businesses or nonprofits	N/A
Workforce Assistance – GoldenLEAF	Golden LEAF Foundation	Competitive Grant	Acquisition of workforce training equipment or construction/renovation of space needed to provide the training. Training must be available to the public and be for transferable skills – such as digital literacy	N/A	Community Colleges	N/A

*Funding sources that do not have a designated award cap or entity allocation. The amount listed is the total overall funding available for the program.

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