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## WHITE PAPER

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### PURPOSE

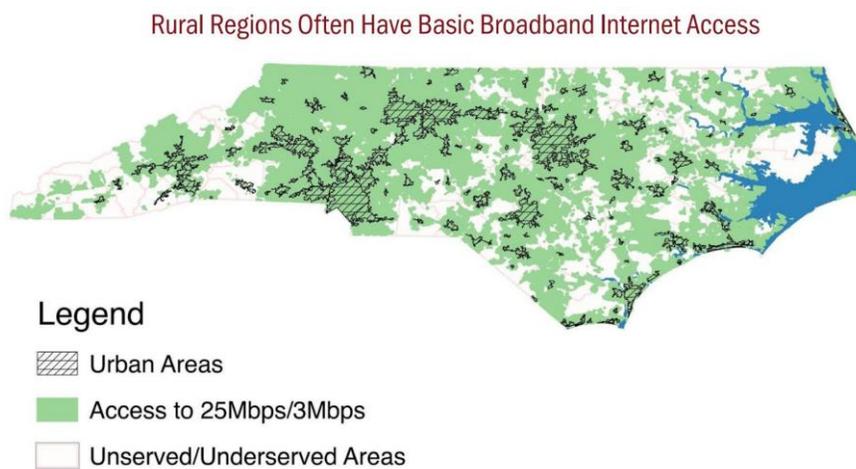
The White Paper was our final deliverable. It was created for WiderNet to distribute to legislatures and key stakeholders to provide oversight into the issues at hand as well as highlight specific issues, organizations, case studies, and possible solutions for consideration. It is an all encompassing document of the team's work for WiderNet distributive use.

Fall 2019 Capstone Project  
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## I. EXECUTIVE SUMMARY

Currently, the FCC standard for broadband access is a minimum of 25 Mbps download and 3 Mbps upload speed. Despite this, 20% of rural residents lack this basic access. While North Carolina ranks 14th in the United States for broadband connectivity, The NC Broadband Infrastructure Office stated that “within the next three to five years, many regions will not be able to support the needs of businesses and individuals” using current broadband technology (Trostle & Mitchell, 2016). This does not account for the disproportionate effect lacking broadband has in certain regions. For example, 99% of tribal lands in NC lack proper access to broadband.

While 95% of North Carolinians are reported to have access to minimally allowed broadband, it is worth noting that such data is reported by “the operators and aggregated at the census block” (BroadbandNow, 2019; Trostle & Mitchell, 2016). As seen in Figure 1, the areas underserved in North Carolina are disproportionately rural. Besides the physical and monetary barriers, there are also legal barriers as well. While 12% of rural communities only have access to one provider, there are numerous laws, such as the NCGA bill, that limit a local providers’ ability to provide adequate bandwidth on their own (Trostle & Mitchell, 2016).



(FIGURE 1)

There are numerous organizations and coalitions working to increase broadband connectivity across North Carolina. Below, we have noted several initiatives such organizations are leading to impact future legislation.

As organizations advocate in favor of increasing broadband access, the state legislature has produced several recent initiatives and House Bills in response. Of those, House Bill 387 and House Bill 431 will be voted on in the coming sessions.

## **II. INTRODUCTION**

Broadband is defined as high-speed Internet access that is always functioning and faster than traditional dial-up access (FCC, 2019). As the world further develops into a more interconnected community, broadband is crucial to individuals who wish to participate in society, or even the economy. In 2011, the United Nations classified internet access as a human right (United Nations, 2011). Even so, many nations and communities still struggle to provide broadband to citizens in rural or underserved areas. North Carolina, a state defined by its wide-ranging geographical features, is one state in the U.S. that struggles to have complete internet connectivity. This paper is an encyclopedic conglomeration of North Carolina's overall experience with broadband, including its personal history with internet connection and the people in the state working to get more people connected.

## **III. PROBLEM STATEMENT**

There is a lack of broadband access to underrepresented communities in North Carolina, specifically in rural and low-income areas. Part of this stems from state policies blocking various initiatives. Rural and low-income areas are greatly disadvantaged in obtaining broadband access and the resources to utilize broadband effectively. As of 2013, only 47% of families in North Carolina with incomes \$15,000 or less reported adopting broadband (NC DIT, 2017). Additionally, in 2017, the North Carolina Department of Information Technology released a report highlighting broadband access. It indicates that 10% of North Carolinians statewide still lack broadband access. Of this 10%, only 1% of these individuals reside in urban areas. This confirms that rural areas are disproportionately affected by a lack of connectivity (NC DIT, 2017).

## **IV. BACKGROUND**

North Carolina's top internet providers are AT&T Internet, Spectrum, CenturyLink, SuddenLink, Xinfintiy, and Frontier. In total, there are 168 internet providers. The average download speed is 38.3 Mbps. Still, there are 468,000 North Carolinians who do not have access

to a wired connection capable of 25 Mbps download speeds. Even greater, there are 914,000 North Carolinians who have access to only one wired provider. Without the ability to switch, residents are left at the mercy of their sole provider. Finally, an estimated 125,000 North Carolinians lack access to *any* wired internet providers (BroadbandNow, 2019). Rural areas generally have limited competition and lower broadband speeds because of the higher industry entrance costs and lower population density. With the support of government subsidies, monopolies have formed in rural or low-income areas. In 2015, only 12% of North Carolinians in rural areas had multiple services to choose from that provided sufficient broadband at 25 Mbps. Such a setup is not wrong if providers are regulated to ensure lower costs for consumers.

In order to highlight the importance of broadband in-state development, the *North Carolina Broadband Plan* was published by the North Carolina Department of Information Technology in 2016. The report utilizes specific regional case studies to highlight the economic impact of broadband access on educational achievement and healthcare among other industries. Each case highlights key stakeholders and how different demographic groups are impacted by lacking connectivity.

For example, Montgomery County is a sparsely populated community where 74 percent of students are economically disadvantaged and 21 percent of its families live below the federal poverty line. Since internet access is a prominent barrier to academic achievement, the district attached Wi-Fi hotspots to 12 school busses. The goal was to provide internet access to students who did not have home internet access. The next step involves a strategic build-out of hot spots around the county during the evening to allow students to complete homework and increase overall student academic achievement.

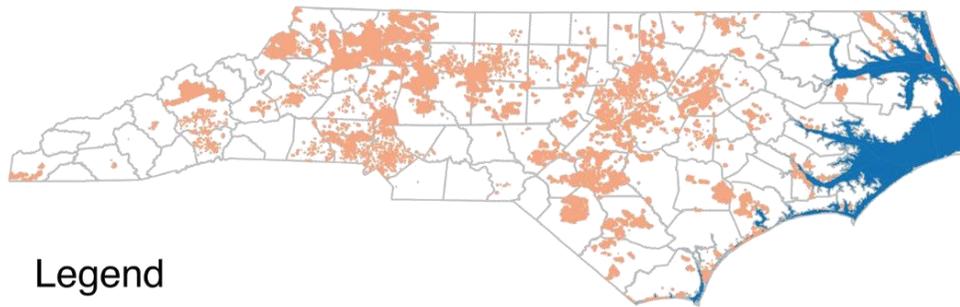
## **V. IMPEDING LAWS**

There are several laws currently in place halting broadband progress in rural areas. Nationally, the FCC relies on Internet service providers to self-report which census blocks are served by broadband. This creates an over-reporting of broadband reach. For instance, if one home in a census block is served, the entire census block is counted as served. Census blocks can comprise hundreds or thousands of people in them. They can also cover distances from a single square block in urban areas to hundreds of square miles in rural counterparts. Over-reporting

affects both federal and state programs that rely on money allocation, policies, and reporting. Misreporting impacts rural/low-income areas who are left out based on this policy loophole (Eanes, 2019).

In addition to federal policies hindering rural broadband access, there are laws in North Carolina also causing roadblocks. Across the state, townships are legally unable to provide broadband services if a private provider desires to enter the market. This leaves local governments at the mercy of private institutions and heavily impacts the quality of service in rural areas. Only 12% of NC's rural population have multiple providers to choose from concerning broadband access. The overwhelming majority are forced to remain with one option-relinquishing citizen's control over their Internet possibilities (Trostle & Mitchell, 2016).

### Little Competition in Rural North Carolina



#### Legend

More than one provider that offers 25Mbps / 3Mbps

Map 2: High-Speed Internet Access Competition  
Based on FCC Form 477 Data from June 2015, Released March 2016

For example, Chapter 160A, Article 16A of the NCGA bill states the city of Wilson is currently allowed to provide such services with two exceptions: (1) if a “retail service” becomes available in the area, Wilson must halt their services within 30 days, and (2) the city is not allowed to provide such services to individuals outside of their jurisdiction or be forced to “cease providing service to the customer” within thirty days or face legal reparations (Article 16A, 2011). Across the state, this bill blocks municipalities from providing public services if a private provider expresses interest or currently provides broadband services. This bill represents just one of the legal restrictions currently limiting the fulfillment of rural broadband access.

The NCGA bill was created in 2011 in response to Wilson creating its own network. The bill was passed at the encouragement of the NC Cable Telecommunications Association utilizing a deeply connected lobbying firm (Knopf, 2019). This Association is an example of the barriers externally influencing legal barriers in North Carolina.

One of the monetary barriers to increasing rural broadband access depends on the ability of enough customers in certain areas to pay to offset the initial installation costs. In areas where citizens are usually spread out or where low-income residents could not afford access to higher speed internet, this barrier is fully felt. In other states, the United States Department of Agriculture provides grants to local governments to build this type of infrastructure. In North Carolina, though, cities and counties are not eligible for such grant programs under current law. (Knopf, 2019).

## **VI. RELEVANT ORGANIZATIONS**

There are several organizations working for increased broadband access. Below are just a few worthy of highlighting.

### ***The North Carolina Rural Center***

The *North Carolina Rural Center* published an issue brief in 2018 boldly stating that broadband access expansion as “the rural economic development issue of our time,” (NC Rural Center, n.d.). The brief suggests five solutions to solve the rural broadband divide. These solutions include a grant program, a “dig once” policy for the North Carolina Department of Transportation, an adoption initiative, a public school program, and implementation of recommendations from a Department of Health and Human Services 2017 report (NC Rural Center, n.d.).

In 2016, the NC Rural Center developed a ten-point advocacy agenda outlining how the rural economy of North Carolina can be improved. Ranked third on the list was the expansion of accessible and affordable high-speed fiber broadband. The Rural Center is an organization prepared to advocate for rural North Carolina’s civil rights through engagement facilitation and research (NC Rural Center, 2016).

### ***North Carolina League of Municipalities***

The North Carolina League of Municipalities represents the interests of towns and cities statewide. The organization issued a white paper detailing policies and other solutions concerning the digital divide within the state. The main argument focused on the state legislature's ability to fulfill the needs and demands of its residents in terms of broadband access. To begin, legislation must make significant policy changes in regard to municipal broadband networks. Additionally, the white paper argues against private-sector providers as the sole means for meeting broadband demand. This is because such businesses cannot cover the wide reach of rural communities on their own. Instead, public-sector providers are necessary to ensure all of North Carolina has adequate internet access (Wynia, E., Hovis, J., n.d.).

### ***Connect Americans Now***

Connect Americans Now is an internet connectivity organization based in Washington, D.C. committed to eliminating the digital divide that is holding back rural America. The organization is made up of concerned citizens, local organizations, rural advocates, and leading innovators. Their goal is to bring affordable and reliable broadband to the 19.4 million rural Americans who lack connectivity by 2022, allowing them to take advantage of the same economic educational opportunities that exist in other communities. Connect America Now wants to close the rural divide by unlocking a technology model that uses TV white spaces spectrum. They plan to combine wireless technology, LTE fixed wireless, and satellite coverage in order to connect millions of Americans in a cost-effective manner. They cite healthcare, education, agriculture and small businesses as necessities for rural Americans, and that ensuring access to those without will help bridge the digital divide (Connect Americans Now, 2019).

### ***Rural Broadband Association***

Based in Arlington, Virginia, The Rural Broadband Association is an internet connectivity group that represents over 800 independent, community-based telecommunications companies that are leading innovation in rural and small-town America. Their official mission is to work on behalf of small broadband providers who are working on behalf of rural America. Their official vision is to build a better broadband future for rural America. They focus on the

strategic areas of concern to rural broadband advocacy, education, communications and outreach (The Rural Broadband Association, 2019).

### ***National Rural Education Association***

Based in Chattanooga, Tennessee, the National Rural Education Association helps rural educators find and use the resources needed to educate today's students. The organization provides information about current legislation that affects rural communities, completes vital research, and helps tackle specific education needs one may face within his or her rural community. The association was originally founded as the Department of Rural Education in 1907. It is considered to be "the voice of rural communities and schools across the United States."

The NREA cites ten top research priorities in its Research Agenda, which spans from 2016 to 2021. These topics are meant to broaden research performed on rural education and include things such as assessing access to counseling in schools, closing achievement gaps, assessing college preparedness in schools, and several others. The NREA also cites technology integration as one of their research priorities, saying technology and access to broadband break down many barriers seen in rural schools (NREA, 2016).

## **VII. RURAL IMPACT**

Lack of proper internet access is most prevalent in rural communities in North Carolina. As previously stated, only 12 percent of North Carolina's rural population have a choice when it comes to internet providers (Kienbaum, 2019). This results in a large portion of the state having little competition from internet providers. There is also little incentive for providers to lower prices and increase access. While every provider within NC is expanding fiber to home networks in urban areas, not a single one is doing so in rural areas. Ultimately, this has led to NC's rural counties suffering the lowest rates of broadband access in a state while urban areas are fully serviced (Trostle, H. R., & Mitchell, C., 2016).

Although some rural areas do have broadband access, speeds barely meet the limited 25 Mbps threshold. Without proper connection speeds, residents in rural areas are unable to receive proper access to healthcare, increase educational opportunities, or fully participate as consumers

(Troastle, H. R., & Mitchell, C., 2016). Our economy is driven by technological advances like the internet. If rural North Carolina falls behind in connectivity, the state will hinder its economic growth potential.

Those greatest affected by the rural/urban internet divide in North Carolina are certainly the poor. While wealthier individuals in rural areas can sometimes pay for better internet access, poorer residents cannot do the same. The rural poor are left with limited market options since often only one provider is in their area with exorbitant internet costs. Thus, those most in need of access are left without any means of attaining such access (Troastle, H. R., & Mitchell, C., 2016). Companies lack the incentive to provide for such groups as it is costly to expand their network to reach people who cannot afford the full price of their service. Currently, 20 percent of rural North Carolina lacks any broadband connection at all. These areas constitute some of the poorest in the state (Kienbaum, 2019).

## **VIII. SOLUTIONS**

The lack of rural broadband access is not a new problem. Multiple municipal and state entities are already proposing legislation and positive action to close the gap. For example, in the town of Wilson, North Carolina municipal broadband has been achieved in defiance of the NCGA bill passed (Hryax Films, 2017). The North Carolina General Assembly has made similar strides through legislation with House Bill 387 and House Bill 431, both of which will foster the growth of infrastructure for broadband.

### ***Government Owned Networks - Wilson, NC***

In some municipalities, internet connectivity and broadband access are available through providers such as Time Warner or Centurylink. However, the cost of broadband is difficult to justify for the poor connection that comes with it-- less than one megabyte per second for some customers (Hyrax Films, 2017). In Wilson, North Carolina poor internet connection economically and demographically impacted the town. Employment slowed, and internet connection became a determining factor for people deciding to leave the city. In 2008, when

Centurylink and AT&T refused to upgrade their services in Wilson, the community opted to invest in their own fiber network, *Greenlight* (O' Boyle & Mitchell, 2012; Fox, 2018).

The town borrowed 28 million dollars to create the now successful network. Wilson has over a quarter of the town population subscribed to their service and reports positive annual growth since its installation. In 2013, Wilson became a “gig city,” offering their residents internet speeds up to 1giga-byte per second (Gonzalez, 2019). Since its inception, Wilson and Greenlight officials have provided support to other municipalities such as Goldsboro and Raleigh. Through the creation of Greenlight, Wilson has become its own competitor in the market. The town forced competitors to lower prices and moderately improve speeds, “contributing to the \$1 million saved by the community each year,” (O' Boyle & Mitchell, 2012).

Still, the struggle with municipal networks lies in their ability to expand beyond city limits or county lines due to legislative limitations. Another municipality within the state, Salisbury, offers citizens internet through its government owned network *Fibrant*. Fibrant offers internet at speeds up to 10 gigabytes per second to its customers. Due to legislative restrictions though, the city is unable to offer its services to people in the rural areas of the county (Finley, K. 2019; Smith, 2019).

### ***G.R.E.A.T Fiber Act***

Within the past year, states have passed legislation and created programs aiming to expand broadband into rural areas. In January 2019, Governor Phil Bryant of Mississippi signed into law the *Mississippi Broadband Enabling Act*. The law allows for broadband to be expanded into rural and underserved areas of Mississippi by supporting electric co-ops (Seid, 2019). Following suit in May 2019, Governor Kay Ivey of Alabama signed a Rural Broadband Initiative into law that will provide 30 million dollars towards grants for broadband providers (Moseley, 2019). Alabama, similar to North Carolina, faces barriers to internet connectivity. The state ranks 40<sup>th</sup> in the nation in terms of broadband connectivity, “More than 800,000 people in Alabama are without fast, wired broadband connection. More than 250,000 people in Alabama have no wired

internet connection at all,” (BROADBANDNOW, 2019; WVUA23, 2019). As these initiatives begin, governments hope to provide much-needed aid to those who need it the most.

In the 2017 Session of the *North Carolina General Assembly*, the *Current Operations Appropriations Act of 2018*, produced a program called the GREAT Grant Program. GREAT was created to “expedite the terrestrial deployment of broadband within unserved areas of Tier One counties,” (Broadband Infrastructure Office, 2019). The program bridges the gap by providing state grants to providers to encourage expansion into underserved counties.

To identify Tier One counties, four factors are calculated: average unemployment rate, median household income, percentage population growth, and adjusted property tax base per capita. Tier One counties include the forty most distressed counties in North Carolina (NC Commerce, 2019). Through the GREAT Grant Program, Tier One counties apply for grant funding concerning eligible projects.

As of the current 2019 Session of the North Carolina General Assembly, House Bill 387 has been introduced to expand the GREAT Program (Churchill, 2019). If passed, this new legislation gives support to Tier Two counties within North Carolina. Furthermore, it establishes firm standards for internet providers to ensure project completion, internet speed requirements, and quality tests are all provided. The ability for counties to support multiple projects through the Broadband Infrastructure Office will also increase. Thus, local governments are able to allocate funding to areas they know need the most support. Currently, the GREAT Grant Program has provided over 9.9 million dollars’ worth of aid, serving over 9,000 households across eighteen counties within the state (NC DIT, 2019).

Adjacent to the GREAT Grant Program, *House Bill 431: Fiber NC Act*, introduced by the 2019-2020 General Assembly, fosters the installation of broadband infrastructure to certain counties within the state (Meinig, 2019). The Fiber NC Act allows for counties and cities to maintain broadband infrastructure, impose taxes to pay for broadband infrastructure, and offer grants to private providers to expand service to unserved areas (Meinig, 2019). However, county eligibility must meet specific guidelines. For example, “more than 4.75% of the county [must be]

without a provider of broadband.” Another guideline states that any county with a major military installation is subject to eligibility. Finally, any city with 60 % of its population living in one of the designated counties are also eligible (Meinig, 2019). Broadband infrastructure can be leased by a provider for 25 years. If passed, sections of the bill will be passed as of July 2020 (North Carolina General Assembly, 2019).

## **IX. CONCLUSION**

While urban areas within North Carolina receive high-quality broadband access, it acts as a dramatic juxtaposition to rural counterparts. While numerous legal plans of action are currently being proposed, there are still numerous laws in place impeding full accessibility. To increase broadband access within rural and poor communities, we recommend that organizations currently working on this problem focus fully on rural access. Organizations must encourage stakeholders to change current impeding laws. Furthering the current G.R.E.A.T. program and allowing local governments to create their own broadband connections will ultimately increase broadband access in these underserved areas.